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# Damage-Based Theories of Aging and Future Treatment Schemes

Angus Hung

**Abstract**— Organismal senescence has been postulated to result from a myriad of biological factors, ranging from environmental facets to detrimental internal mechanisms. However, a specific cause of aging is currently unknown. Two branches of aging theories have been proposed: damage-based theories and programmed theories. Here we examine the numerous kinds of promulgated damage-based theories. The possible therapies for combating aging in humans that may be employed in the near future will also be discussed.

**Index Terms**—aging; lifespan; longevity; senescence; damage-based theories of aging

## 1 Introduction

AGING is a universal phenomenon present among all known mammalian species. As an organism is subjected to biological aging after reaching sexual maturity, it gradually loses cellular and biological function: organs become impaired, cancerous cells develop, fertility is lost, and the organism inevitably becomes more prone to age-related diseases. These degrading attributes of biological aging reach a climactic end when the organism experiences the ultimate consequence of aging: death. For humans, aging is not only fatal, but also costly. The elderly must constantly undergo treatements for the age-associated diseases which inevitably follow with the onset of aging. They pay thousands of dollars for medicines, surgeries, and healthcares simply to mitigate the effects of aging; such a disposition of finances is futile, for it merely postpones the death which will eventually be caused by aging. Ostensibly, aging is an undesirable process and must be cured.

Luckily, aging research has greatly accelerated over the years. Research organizations such as Aubrey de Grey's Strategies for Engineered Negligible Senescence Foundation have been specifically established with the single intention of curing aging. Studies of aging have strived to answer the fundamental inquiry of biogerontology: what causes aging? In the past century, theories that have been formulated to answer this question fall into two categories: damage-based theories (commonly called "wear and tear" theories) or programmed theories of aging. The general consensus for damage-based theories is that organisms accumulate detrimental toxins and damage at the molecular level throughout their lives, leading to the onset of aging. On the other hand, the general idea of programmed theories of aging is that aging is an intrinsic process programmed by an organism's own genetic code. Both classes of these aging theories are riveting and have been supported by much scientific research. However, each of these biological senescence theories has faults: damage-based theories are unable to explain how similar animals have dramatically different lifespans and programmed-based theories are unable to explicate how natural selection would promote such a detrimental process in the animal's genome. Several types of damage-based theories of aging will be explicitly examined throughout this paper.

## 2 Damage-Base Theories of Aging

### 2.1 Free Radical Theory

First proposed by Denham Harman in the 1950s, the free radical theory of aging states that organismal senescence occur as a result of accumulated free radicals over a given period of time. Free radicals are atoms or molecules with an unpaired electron in their outershell: such is the characteristic which makes numerous free radicals highly reactive. Reactive oxygen species (ROS), a type of free radicals, are characterized by their possession of oxygen and high chemical reactivity. When ROS levels are increased astronomically, cell structures degrade and and oxidative stress occurs. Essentially, a discrepancy between the production and detoxification of ROS leads to oxidative stress, and thus damage. Human age-associated diseases like atherosclerosis, Parkinson's disease, and Alzheimer's disease are all characterized by oxidative stress. Figure 1 exemplifies the correlation between ROS and age-related diseases. Due to the correspondence between aggregated ROS levels and aging-associated disorders, free radicals seem to be an extremely pertinent factor in the aging process.

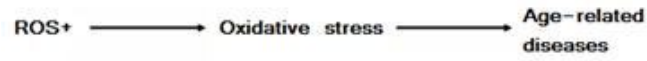


Fig. 1 – Because of the high reacvity of ROS, increasing ROS levels will lead to damage and age-related diseases.

The accumulative and pernicious free radicals and ROS can be derived from a plethora of metabolic

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processes throughout the human body, most noticeably the mitochondrion. During oxidative phosphorylation, energy is taken from those derived from the oxidation of glucose (among other foods) to create the energy molecule necessary for a cell's function: adenosine triphosphate. Throughout this process, some reactive oxygen molecules are spontaneously released from the mitochondrion. Another kind of reactive oxygen species, anion superoxides, are created through the reduction reaction of triplet-state oxygen. The reduction is catalyzed by enzymes such as NADP oxidases; they can also be mediated by nonenzymatic activity through redox reactive compounds of the mitochondria's electron transport chain. Evidently, metabolic processes, especially those occurring near the mitochondrion, signify an important role in biological senescence through their production of free radicals and reactive oxygen species.

To combat the detrimental products of cellular metabolism, particukar enzymes are employed to mitigate the havoc caused by ROS. Enzymes such as catalase and superoxide dismutase lessen the damage of ROS by simply converting them to the products of oxygen and water through an enzymatic reaction. However, the conversion of metabolic products is not perfect: some ROS molecules are often left behind, leading to a gradual accumulation of deleterious substances throughout cells. Indeed, the effects of ROS and other free radicals are felt as organisms age, leading to age-associated diseases such as Alzheimer's disease. Aggregated ROS and free radicals steadily degrade cellular macromolecules, including deoxyribonucleic acid. The implications of genetic degradation are discussed next.

### 2.2 DNA Damage Theory

The DNA damage theory of aging states that accumulated damage to deoxyribonucleic acid is the factor that leads to the onset of biological aging. The DNA damage theory applies mainly to nuclear DNA, although recent studies have shown that mutations in mitochondrial DNA also function in limiting an organism's lifespan. Damage to DNA is caused either by internal chemical reactions or external sources which interfere with the natural process of DNA replication. The two types of damage pertinent to the DNA damage theory include physical DNA damage and base-pair mutations. The physical deformities classified as damage include double or single strand breaks in the nucleic acid molecules. These abnormalities are easily recognized by enzymes which can then proceed to repair the physical damage. The repair of physical DNA damage is usually feasible as long as extra genetic information, whether from homologous chromosomes or the undamaged complementary DNA strand, is available. Antithesis to this classification of DNA damage is the creation of mutations, which are essentially modifications in the base-pair sequence of DNA. Unlike physical DNA damage, base-pair mutations are impossible to repair. A known biological mechanism employed by cells to prevent the onset of mutations is through DNA polymerase's DNA proofreading. Although strong DNA proofreading mechanisms are present in DNA replication of the nucleus, mutations still occur, with an average of one mutation per $10^8$ replicative generations. Mitochondrial mechanisms of proofreading mitochondrial DNA also have been observed, including exonuclease proofreading by mitochondrial DNA polymerase. However, higher rates of mutation have been observed in the mitochondrion than in the nucleus, suggesting the evolutionary relics of mitochondria and their primitive tactics of DNA replication. Nonetheless, mutations accumulate both in the nuclear and mitochondrial DNA. DNA mutations, in addition to the physical wreck created by internal and external sources, all hasten atrophication of deoxyribonucleic acid.

The hypothesis of a distinct relationship between genome mutations and aging is highly supported because of the age-related mutations that accumulate throughout the cell as time passes. Indeed, genome mutation occurs in all human tissues, most noticeably in the brain, kidney, liver, and muscle. These cellular mutations have been linked to a decline in gene expression. As age-associated mutations accumulate, decline in gene expression is observed, leading to the symptons related to aging.

More support for the DNA damage theory of aging lies in premature aging disorders. One rare aging disease, Hutchinson–Gilford progeria syndrome (or simply progeria), has been known to result in premature aging. Individuals suffering from progeria are characterized by age-associated symptoms at an extremely young age. Cardiovascular problems, wrinkles, and fragile bones are all symptoms of progeria. The accelerated aging disease has been linked to its defect of nuclear lamin A. Nuclear lamin A is a protein located within the interior edge of the nucleus, and functions in the organization of processes such as the synthesis of DNA and RNA. Progeria results in the unavailability of lamin A in the individual. The lack of this compulsory protein is associated with the age-related symptoms at a young, which is presumably due to damage to the nucleus and the molecules within it, including DNA.

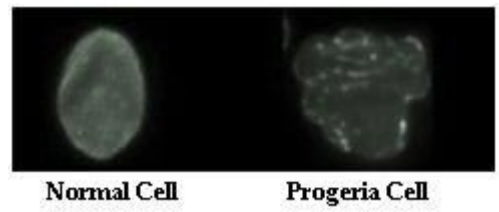


Fig. 2 – A normal cell is shown here in juxtaposition with a progeria cell. Progeria cells lack lamin A, leading to their structural deformity.

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As seen in figure 2, progeria cells accumulate damage at a faster rate than normal human cells. The reason for such a cellular deformity is presumably because of the lack of lamin A, a compulsory cellular protein. Without it, the nucleus and its components are damaged, including DNA. Thus, the inherited genetic accelerated aging disease is an existing manifestation of the implications brought about by the DNA damage theory of aging.

### 2.3 Telomere Theory

The telomere theory of aging simply states that the successive shortening of telomeres results in the onset of aging. Telomeres are the structural ends of chromosomes characterized by noncoding repetitive sequences of DNA. Presumably, telomeres protect the ends of the chromosome from DNA degradation.

During cell division, the chromosomal ends of chromosomes shorten successively. Such a curtailing in DNA is explained by the imperfection of DNA replication itself. This end replication problem in DNA replication exists in eukaryotes only, due to their linear DNA. Therefore, telomeres shield DNA from successive shortening in cell division. However, telomeres only postpone the cellular conundrum of DNA shortening. Eventually, cells reach a point where they can no longer divide, known was Hayflick's limit. The halt in cell division is an obvious sign of cellular senescence, which is presumably to result from the shortening of telomeres. Essentially, successive mitotic division results in the shortening of telomeres, resulting in cellular senescence. Cellular senescence then leads to the onset of aging (since cells are the basic units of organisms it would be logical to deduce that organisms as a whole age if cells alone do). The relationship between aging and telomeres is depicted in figure 3.

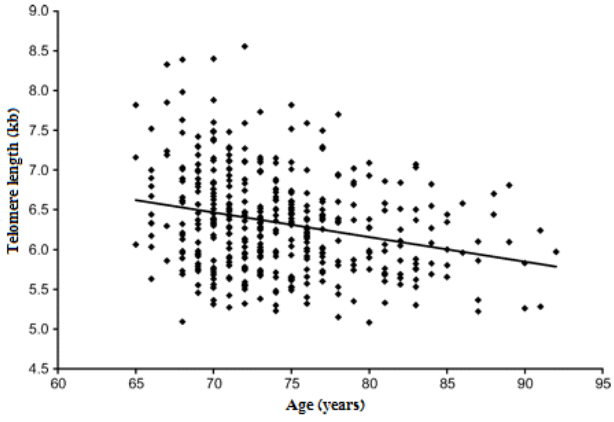


Fig. 3 The direct relationship between aging and telomere length

Since the telomere theory of aging suggests that cellular senescence results from the curtailing of telomeres, one would expect that the prevention of telomere shorting and novel mechanisms to to extend the length of telomeres would prevent or reverse the aged, or atleast prevent the upbringing of cellular senescence. Research has suggested that this theoretical prevention of cellular senescence is indeed the case. Telomerase, a recently discovered enzyme that adds DNA sequences to the ends of telomeres, initiates cell division if it is inserted into cultured cells that have reached the Hayflick limit. Although telomerase appears to reverse cellular senescence and allows unlimited cell division, the enzyme also appears in cancerous cells: the same enzyme reversing the aging of cells has also been hypothesized to bring about the deadly outcontrolled cell divison known as cancer. Nonetheless, telomerase appears to be a feasible and viable option to delay or reverse aging, as discussed next.

## 3 Prospective Aging Treatment Therapies

Insight on future therapies to combat the deleterious and unwanted aging process has been provided by numerous biogerontology groups. Telomerase, an enzyme discussed in the previous section, has been proposed as an antiaging breakthrough, reasoning that since it prevents aging in cells, it should prevent aging in humans as well. Future telomerase therapies involve the activation of telomerase promoter sites. Activating such promoter sites will increase telomerase levels within the cells, and, according to the telomere theory, delay or reverse aging. Such could possibly be perpetrated with gene therapy, although the technology is still within its infantile stage. TA-65, a telomerase promoter, seems to be a likely possible target for gene therapy. Antiaging companies such as Sierra Sciences have found dozens of other telomerase active sites which could possibly be utilized to prevent aging. However, there is still much to research to do and drugs take years to develop. Even so, prospective telomerase human therapies to combat aging have been hypothesized to emerge in approximately 20 years or less.

Anotheri antiaging treatment is caloric restriction. Currently, caloric restriction cannot be obtained through therapies, but rather through a diet restriction. The idea of caloric restriction is to basically reduce calorie intake while maintaining an organism's nutritional needs. Such has been shown to increase lifespan in nematode worms, flies, and mice. Not only do the the laboratory animals live longer under a caloric restricted diet, but they also seem to age more slowly and function as though the organism were still in its youth. From the free radical theory of aging, we were able to derive the fact that aging occurs due to the accumulation of free radicals and ROS molecules throughout cells. By restricting the number of calories consumed, there is less opportunity for such toxic molecules to accumulate. Although the mechanism by which caloric restriction acts is not yet fully understood, researchers have attributed the antiaging effects of caloric restriction from decreased rates of cell division, slower metabolism, and mitigated free radical production (due to decreased phosphorylation). A possibility to utilize the life-extending characteristics of caloric restriction is to

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identify the genes which act through the caloric restriction pathway, and then control the activity of the genes through gene therapy to promote an extended lifespan and delay the process of aging.

## 4 RESULTS

Recent research has supported the telomere and DNA damage theories of aging. A team of researchers at the Spanish National Cancer Centre, led by Maria A. Blasco, genetically engineered mice to produce 10 times the normal levels of telomerase. The result was the mice living 50% longer than normal lived controls. Even more recently, a group of scientists activated a telomerase control gene in mice, and were able to successfully reverse the detrimental effects of aging.

Research regarding the free radical theory of aging has been supported and yet remains inconclusive. As it is already known, caloric restriction yields a lifespan. Such an effect has been observed in nematode worms, flies, and mice. In the nematode worm C. elegans, lifespan has been shown to be extended by over 50% through caloric restriction. While this evidence partly supports the free radical theory of aging, other research suggests otherwise. Some common antioxidants are the vitamins A, C, and E. Contrary to the implications of the theory, increasing the doses of such antioxidants in laboratory animals does not increase lifespan. In fact, it actually reduces lifespan by a diminutive amount. However, one notable antioxidant, resveratrol, has been shown to extend lifespan in yeast, worms, and flies. Although the effects of antioxidants still remain controversial, they still seem to be promising tools in the area of life-extension.

## 5 CONCLUSION

The free radical, telomere, and DNA damage theories of aging have all been deliberately discussed throughout this review. Possible life-extension methods have also been noted. Although these damage-based aging theories still remain theories and not tangible facts, evidence has suggested that the accumulation of damage, the basis of all these theories, do infact, function aggregate as a result of aging. Biogerontology remains an active area of research today, and still, not one knows the true cause of biological senescence. Aging may result from damage-based theories or programmed-based theories, or even more likely, a combination of both. Even though numerous aging mechanisms still remain to be elucidated, it is anticipated by a number of experts that aging will be cured in the next 20 years. Indeed, with the current rate of scientific research, biological immortality will soon be achieved, and the horrendous disease known as aging will soon be regarded as facet of humanity's dismal past.

## ACKNOWLEDGMENT

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# Analysis of Routing Protocols for Highway Model without Using Roadside Unit and Cluster

B. Ramakrishnan, Dr. R. S. Rajesh, R. S. Shaji

**ABSTRACT-**VANET is an advanced version of Mobile Ad-hoc Network (MANET). Therefore, the protocols used in the MANET are applicable to the VANET also. The VANET communication has attracted the attention of the researchers who are engaged in preventing traffic accidents and traffic jams. The earlier VANET models discussed only the communication among vehicles through the RSU. Most of the researchers used standard 802.11 for VANET model considering the mobile nodes of the city environments. This paper discusses the latest VANET technology 802.11p and constructs a vehicular model in which the nodes are moving outside the city. Without using the RSUs, each vehicle in the network is treated as a router to communicate with the neighboring vehicles. With the use of the proposed Simple Highway Model and the latest VANET technology, 802.11p are used to study the performance of routing protocols. The standard VANET routing protocols are applied to the above mentioned VANET model and their characteristics are compared with the use of NS 2.34 version simulator and their results are presented.

**KEYWORDS-** MANET, VANET, SHWM, OBU , RSU, clusters, sans clusters

## 1. INTRODUCTION

The inter-vehicular communication field includes vehicle to vehicle communication and vehicle to Road Side Unit communication [1]. Each VANET node includes a Global Positioning System (GPS) device, which is used to find the position of each vehicle in the vehicular network [2]. In MANET, the mobile nodes are in a position to self-configure and communicate with each other without using any fixed infrastructural node or centralized node. In VANET, vehicles move only on a predefined road and they do not have the problem of resource, data storage and power. GPS Positioning is not a problem to VANET [3]. The Primary Architecture Components are On Board Unit [OBU] [4]. This information of the GPS is used by the VANET communication to identify the position of other vehicles and exchange information which decreases the road accidents in the highways. But the VANET communication suffers from high topology changes which require smaller latency and higher reliability [5]. These vehicles that move along the same road are able to communicate either directly to the destination or by using the intermediate node, such as router [6]. This Vehicular Ad-hoc Network Communication requires a new type of routing protocols for efficient data transmission. This paper compares the main routing protocols and analyzes how these protocols behave in the given highway scenario with varying traffic density and speed of the vehicles.

## 2. BACKGROUND RESEARCH WORK IN HIGHWAY MODEL

Much research has already been done on MANET. However, these cannot be directly applicable to VANET as there is a fundamental difference between the architecture of VANET and MANET [7]. Hence VANET requires a new model for studying the communication between vehicle and vehicle. Most of the existing models developed by the researchers deal the vehicular motion within a city area [8]. The real issue is to find a model for highway mobility outside the city [9]. For this purpose a simple highway mobility model has been developed. In the existing model, the communication at any point is done only through a Road Side Unit [10]. So when a vehicle moves in a high speed on the highways outside the city, it will not able to receive any communication from the road side unit.

Therefore, each vehicle is equipped with a Global Positioning System (GPS) device to identify the correct location of the destination node. Moreover, it is assumed that each vehicle has an on-board navigation system and the preloaded digital maps through which it can determine the position of its neighboring junction. It is also assumed that each vehicle has the knowledge about its velocity and direction of movement of the vehicle. The reliability of the routing protocols is analyzed only on the basis of the above mentioned assumptions. It is observed that in the existing research work, the IEEE standard used for data communication is 802.11. But due to the high speed vehicle movements, the standard 802.11p is included in this model [11].

## 3. SYSTEM MODEL

The range of 802.11 standards is nearly hundred meters, and the vehicles within this range behave as a router to propagate the information in a multi-hop communication [12]. To transfer the message from one vehicle to another vehicle, the network needs an efficient protocol. The main function of the routing protocol is to identify the position of each vehicle in a VANET [13]. The routing protocol can be classified according to the range of communication. By the use of routing algorithm, a route is established to link source and destination vehicles. For reliable vehicular communication, the performance of the routing protocol used to communicate the message is important. Different routing protocols are suited for different VANET characteristics and scenarios, but the main issue is how to select an efficient routing protocol from them [14]. For this purpose reactive and proactive protocols are taken into consideration and these protocols are applied to the proposed sans cluster based highway model scenario mentioned in this paper. The characteristics of these protocols are studied by the use of NS 2.34 version network simulator [15]. This paper also evaluates the performance analysis of the data communication between vehicle and vehicle without using

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the cluster concepts and compare this value with the cluster based vehicular model discussed by the author in another paper [16].

## 4. Proposed Simple Highway Model Without Cluster Concepts

A vehicle within a radio coverage range can communicate by using multi-hop communication without the support of the Fixed Road Side unit. Most of the previous works on routing protocols have been established for Mobile Ad-hoc Networks. Only a limited work has been done on vehicle to vehicle communication inside the city. But no major attempt has been so far made on vehicular communication outside the city area.

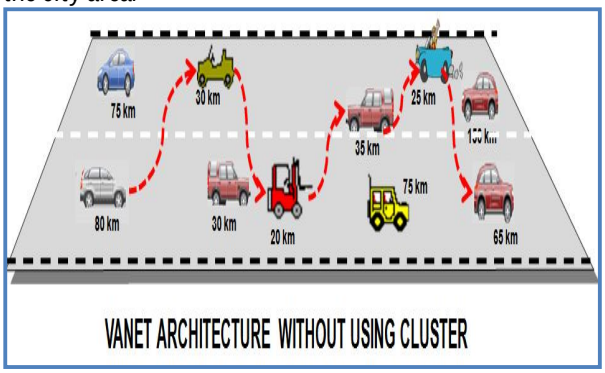


Figure 1: VANET architecture – Without Cluster concept

In addition to that, the IEEE 802.11 technology is used for data communication among the vehicles. For reliable high speed vehicle communication, a vehicular-based standard IEEE 802.11p technology is used in this paper [17]. The packets can be delivered from source vehicle to destination vehicle without using RSUs and each vehicle can act as a router. The performance parameters of routing protocols are analyzed for various nodes with different speeds of the nodes. This part of the research work can be analyzed by using IEEE standard 802.11 and 802.11p. The VANET architecture without using cluster concepts in highways is shown in Figure 1.

## 5. Simple Highway Model With Cluster Concepts

The clustering concept in simple highway network is briefly discussed in this paper because it is elaborately presented by the author in paper [18]. The proposed clustering algorithm splits the VANET area into a number of clusters. Each cluster has a cluster head. The cluster head may be any one of the vehicles in a cluster with good database storage and access capabilities. Each vehicle is equipped with an OBU. Each cluster head has all the service descriptions, which are regularly updated, if a new service enters into the network. All the Cluster heads are periodically synchronized to ensure that the cluster heads have latest service description. Nodes of the clusters are managed by service requests and service updates. In the cluster based VANET, the cluster area remains the same and predefined. But in MANET, clusters are created dynamically. The Service discovery architecture for cluster-based simple highway model is shown in Figure 2.

## 6. Data Communication In Cluster Based Vanet

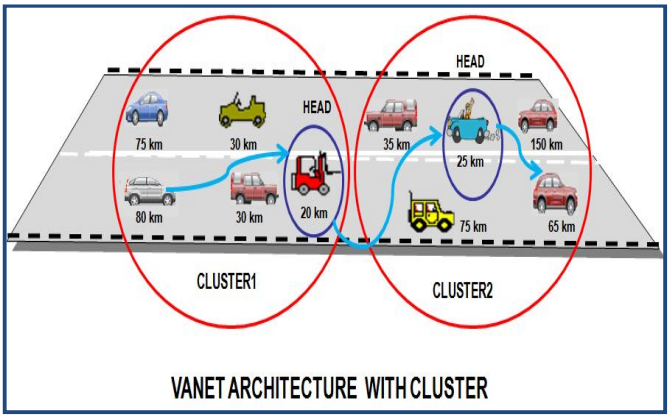


Figure 2: Service Discovery Architecture

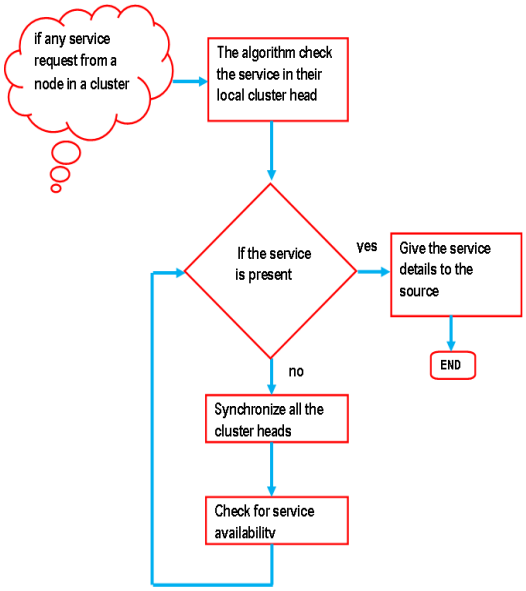


Table Service Discovery Procedure

If a vehicle wants to search a service, then it initially contacts its local cluster head. The local cluster head searches the local database for the specified service. If the specified service is present, then it will give the necessary details of the service provider and the data communication can be processed. If the service is not present, then the algorithm synchronizes all cluster heads in this model immediately. After synchronizing the procedure, it searches the cluster head again for the availability of the required service. This paper focuses the performance analysis of various protocols in sans cluster-based highway model and these results are compared with

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the results obtained from the cluster based highway model, which is discussed by the author in paper [16].

## 7. Routing Procedures In Sans Cluster - Based Highway Model

Instead of the random movement of nodes in MANETs, the nodes in VANET move in predefined road. The radio range of VANET is in between 250 and 350 meters. Within this range the vehicles can easily communicate with each other. The mobility of the vehicular node is dependent on parameters like speed, direction of the vehicles and the layout of roads. It is a fact that the speed of the moving vehicle on a highway is higher i.e. nearly 150 km/hr. Therefore, the topology in VANET changes more frequently. For this reason the IEEE standard 802.11 is not well suited for vehicular environment. So the amendment made on 802.11 establishes a new standard for VANET model. It is known as the wireless access in vehicular environment (WAVE). Another version of 802.11 is known as 802.11p [17]. The VANET model using cluster concept NS2 simulation screen scenario is shown in Figure 4. With the use of the above mentioned network parameter, an efficient routing protocol for sans cluster VANET model is studied in this paper.

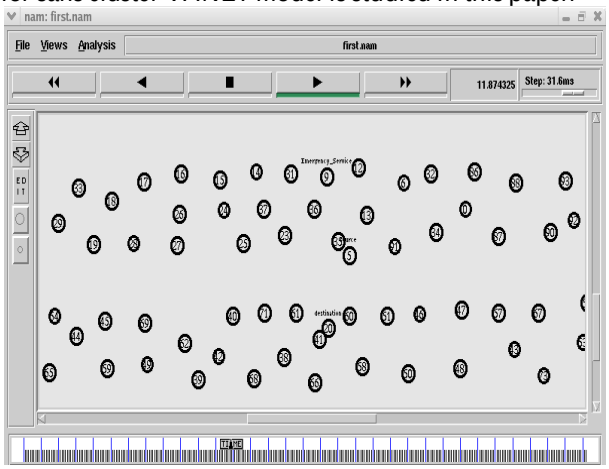


Figure 4 : SHWM without cluster -NS2.34 NAM file output

This paper discusses the routing protocols for VANET implemented in NS2.34 version. A comparison of the three protocols namely DSDV, AODV and DSR is made in this paper. Here the Destination Sequence Distance Vector (DSDV) protocol is a table driven protocol, while the other two, namely Dynamic Source Routing (DSR) and Ad-hoc On-demand Distance Vector (AODV) routings are on demand protocols. The VANET is a main component of MANET, so the operations of these two Ad-hoc networks are the same. Therefore, most of the MANET routing protocols are applicable to vehicular networks. DSDV is a modification of the Bellman-ford algorithm, which can solve routing problem in VANET environment. Each node maintains a routing table, which contains the shortest path information to other node in the vehicular network. The DSDV is well suitable for small scale ad-hoc network. The DSR and AODV are on-demand Reactive routing, in which network routes are only updated when a source vehicle wants to send a message to the destination vehicle. The DSDV is a proactive routing protocol while the other two are reactive routing protocols.

### 8. Simulation Environment

The simulation model is based on NS 2 simulation version 2.34. The simulation scenario is designed according to the normal state of car running on a road shown in Figure 3and 4. The position and the movement of the nodes are given in the screen scenario generator file shown in Table 4. This simulation results are displayed in the NAM file and the routing parameters obtained from the trace file. To evaluate the performance of the routing protocols, some parameters have been used in the TCL file for measuring the efficiency of vehicle-to-vehicle communication. The study of these parameters is analyzed by the NS 2 Trace file. Therefore the Agent Trace ON and Route Trace ON in the TCL file are activated. The speed of the vehicles is assumed to be constant between 5m/sec and 25 m/sec. An IEEE working group has invented a new PHY/MAC layer amendment of the 802.11 standard, which is designed for car- to-car and car-to-infrastructural communication only.

```
$node_(95) set Z_ 0.0000000
$node_(95) set Y_ 361.54
$node_(95) set X_ 1186.8
$node_(96) set Z_ 0.0000000
$node_(96) set Y_ 401.67
$node_(96) set X_ 1222.8

$ns_ at 2.5 "$node_(95) setdest 1250 179 10
$ns_ at 2.5 "$node_(96) setdest 1250 235.3 10
```

Table 4: Screen scenario generator

| | |
|---|---|
| Network Area | 1500 x 1500 m |
| Radio Range | 200 m |
| Traffic Type | CBR |
| Visualization Tools | NAM, Tracing |
| Duration | 200 Seconds |
| MAC Layer | IEEE 802.11p, 802.11 |
| Protocol | DSDV,AODV,DSR |
| Mobility | Our proposed without using Cluster concepts in Simple High Way Mobility Model (SHWM) |
| No. of Nodes | 25,50,75,100,125 &150 |
| Speed | 5m/s,10m/s,15m/s and 25 m/s |

The critical parameter used in the NS2.34 version simulation is given in Table 5.

This paper uses the above mentioned parameter and estimates the performance of the Routing protocols DSDV, AODV and DSR for sans cluster based vehicular communication.

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```
set opt(chan)  Channel/WirelessChannel   ;
set opt(prop)  Propagation/TwoRayGround;
set opt(netif)  Phy/WirelessPhy  ;
set opt(mac)   Mac/802_11          ;
set opt(ifq)  Queue/DropTail/PriQueue;
set opt(ll)       LL                    ;
set opt(ant)    Antenna/OmniAntenna      ;
set opt(ifqlen) 50      ;
set opt(nn)     100           ;
set opt(adhocRouting) DSDV  ;
set opt(sc)  "cbr1" ;
set opt(x)  1500            ;
set opt(y)  1500            ;
set opt(seed)  0.0          ;
set opt(stop)  250          ;
```

Table 6: IEEE 802.11 Parameters in TCL file

It also compares Packet receiving time, Packet delay time, Average delay time and Throughput with standard 802.11 and 802.11p for sans cluster VANET model. These values are compared with the values obtained from the simple highway model using Cluster concept. For reliability, fifty samples are used to find the values and the average is given. The critical parameters used in TCL file are shown in Table 6 and Table 7. The performance of 802.11 and 802.11p standard was studied in our previous work.

```
set opt(chan)  Channel/WirelessChannel  ;
set opt(prop)  Propagation/TwoRayGround  ;
set opt(netif)  Phy/WirelessPhyExt;
set opt(mac)  Mac/802_11Ext;
set opt(ifq) Queue/DropTail/PriQueue;
set opt(ll)     LL   ;
set opt(ant)   Antenna/OmniAntenna
set opt(ifqlen) 50 ;
set opt(nn)     100  ;
set opt(adhocRouting)  DSDV ,AODV,DSR
set opt(sc)    "cbr1"   ;
set opt(x)     1500 ;
set opt(y)     1500 ;
set opt(seed)  0.0  ;
set opt(stop)  250  ;
```

Table 7: IEEE 802.11p Parameters in TCL file

## 9. EXPERIMENTAL ANALYSIS

The following analysis discusses the performance of various parameters without using cluster concepts in highway model.

### 9.1: Throughput for AODV, DSR and DSDV routing protocols without cluster concepts

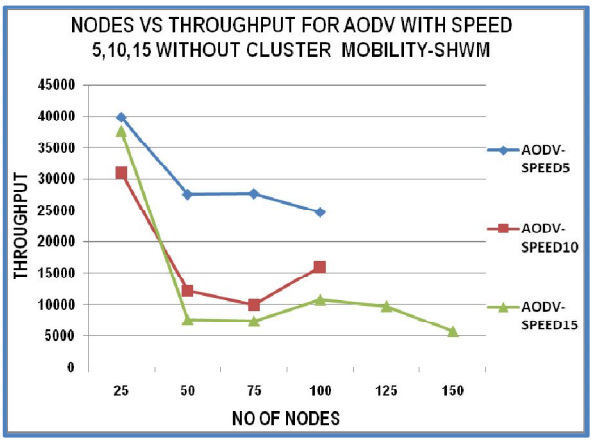


Figure 1: Throughput for AODV

The performance of various routing protocols without using the cluster concept but with varying vehicle speeds in SHWM model in terms of Throughput is shown in Figure 1, 2 and 3.

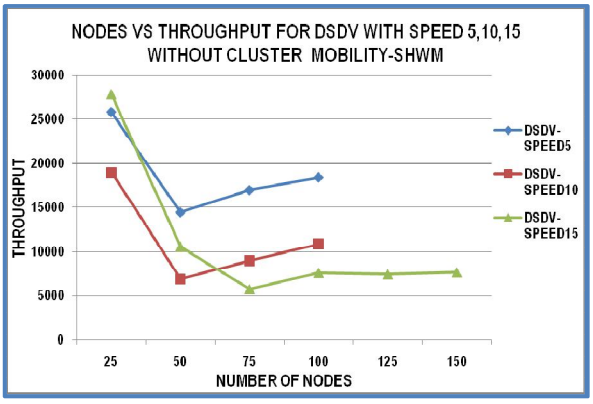


Figure 2: Throughput for DSDV

A new standard 802.11p technology which is well-suited for VANET communication is used in the scenario discussed. From the simulation result it is noticed that when the number of nodes increases, the throughput decreases in DSDV, AODV and DSR protocols. For 25 nodes, the throughput is higher than other sets of nodes. From this graph it is observed that DSDV, AODV and DSR with speed 5 yields higher value than the speed 10 and above.

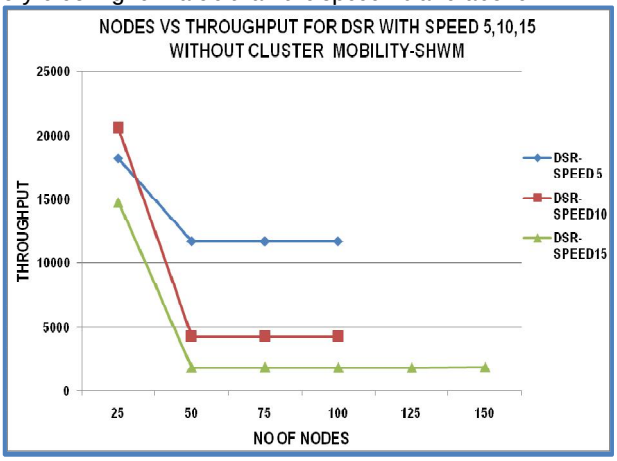


Figure 3: Throughput for DSR

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In Figure 4 and 5, it is observed that for speed 10 and 15 the routing protocol AODV gives better performance than the other two protocols with the same speed.

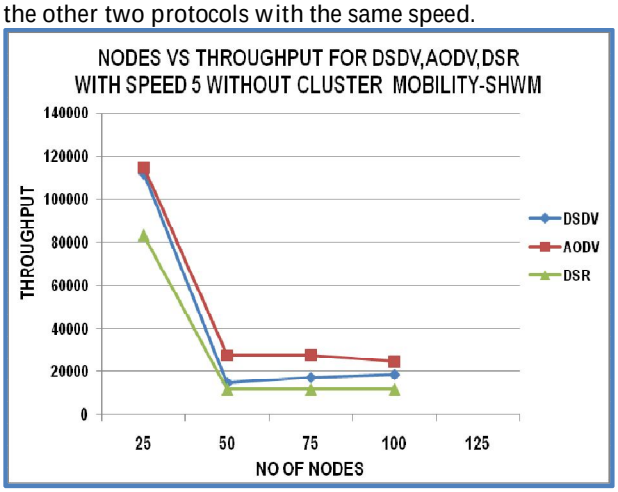


Figure 4:Throughput for DSDV,AODV & DSR –speed5

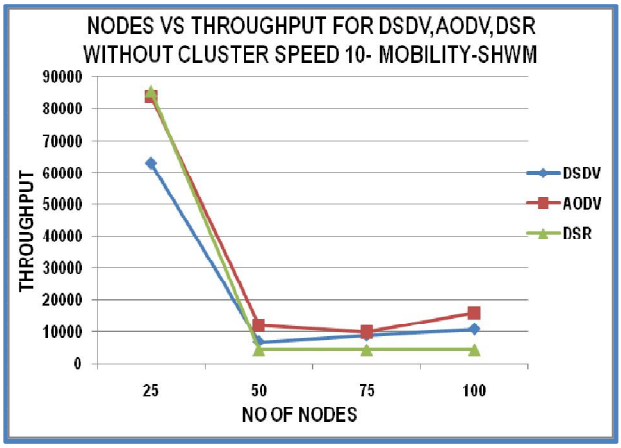


Figure 5:Throughput for DSDV,AODV & DSR –speed10

## 9.2: Packet forward ratio for AODV, DSR & DSDV

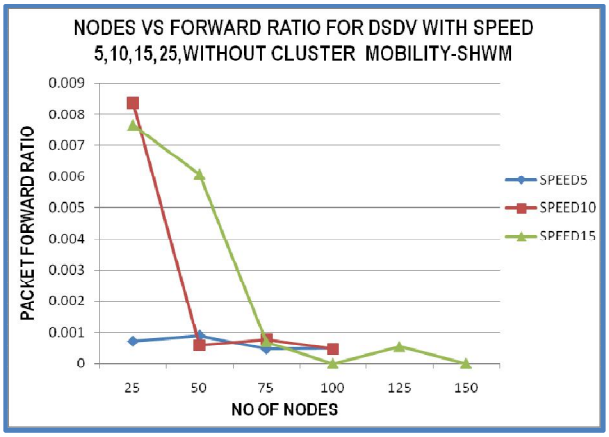


Figure 6:Packet Forward ratio for DSDV

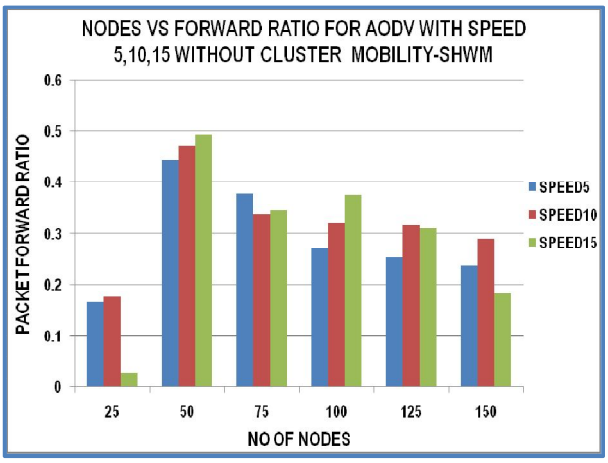


Figure 7:Packet Forward ratio for AODV

The packet forward ratio for DSDV and AODV with various speeds is given in the Figure 6 and 7. From this graph it is clear that high packet forwarded ratio results when the vehicle moves with a speed of 15 m/sec. The comparison of various protocols in a given scenario shows that AODV is better than DSDV protocol and very low value is recorded in DSR protocol, which is shown in Figure 8.

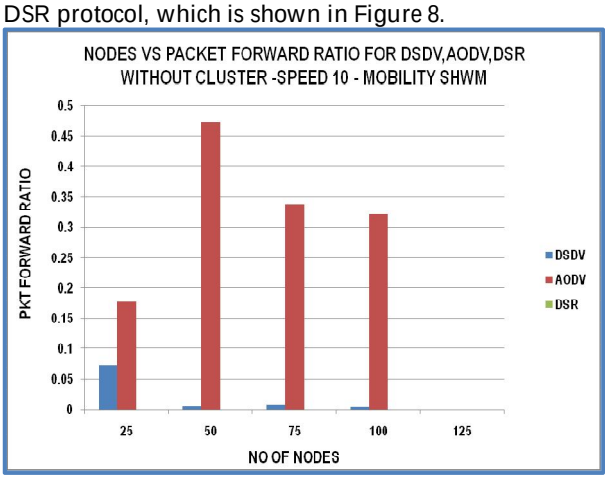


Figure 8:Packet Forward ratio for AODV,DSDV&DSR

## 9.3. Packet delivery ratio for DSDV & AODV

Figure 9, reveals when the speed of the vehicle is 15, the protocol that yields an optimal packet delivery ratio is AODV. Almost a constant value is obtained for 25 nodes and no major changes are found when the speed of the vehicle varies. From Figure 10 it is observed that for speed 5, the DSDV protocol gives maximum packet delivery ratio.

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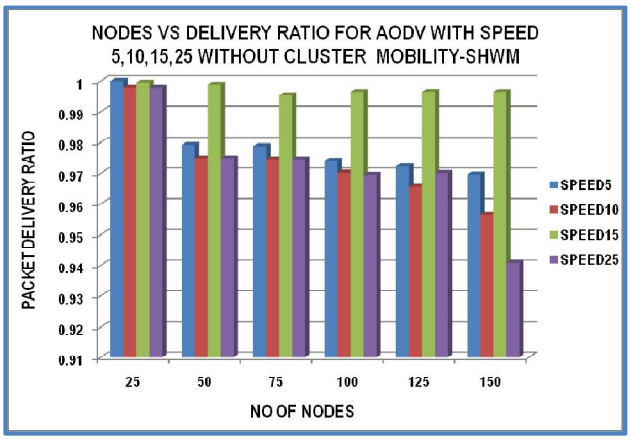


Figure 9:Packet Delivery ratio for AODV

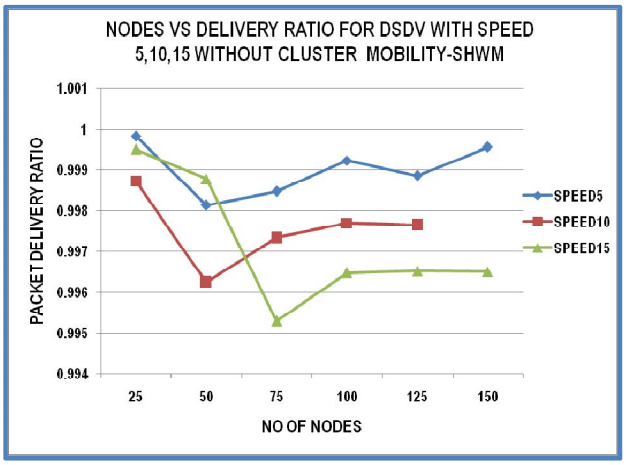


Figure 10:Packet Delivery ratio for DSDV

## 9.4. packet delivery ratio for DSDV, AODV & DSR

Figure 11 shows the analysis of packet delivery ratio for DSR, AODV and DSDV protocols. Here it is noticed that the responsibility of DSR protocol is better among three protocols. When the number of nodes increases, the DSDV and DSR yield almost constant value but in the case of AODV protocol, the delivery ratio is high for 25 nodes and this value decreases when the number of nodes increases.

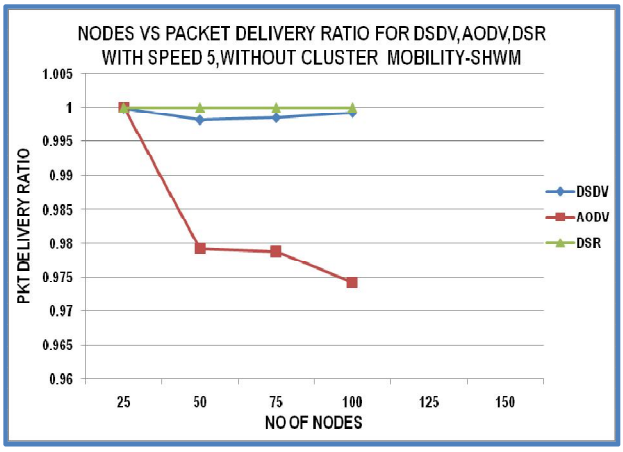


**Figure 11:Packet Delivery ratio for AODV, DSDV & DSR**

## 9.5. Packet receiving time for DSDV,AODV&DSR

Figure 12 shows how the packet receiving time for DSDV protocol decreases when the speed of the vehicle increases and the packet receiving time reaches very high value when the number of nodes is above 25.

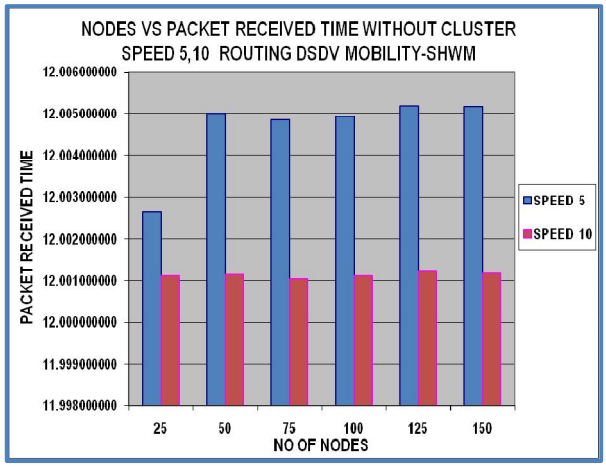


Figure12: Packet receiving time for DSDV

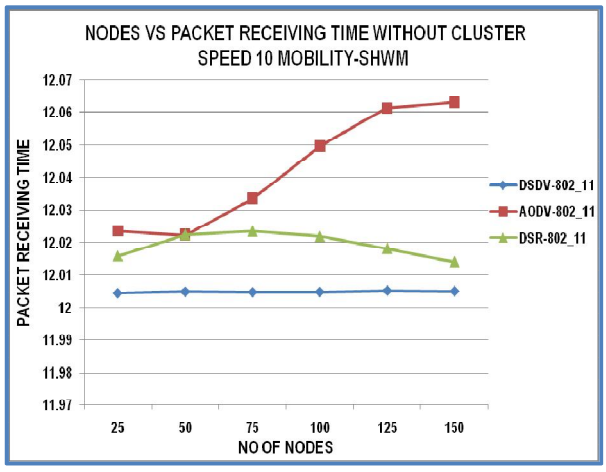


Figure13: Pkt receiving time for DSDV,AODV&DSR-802.11

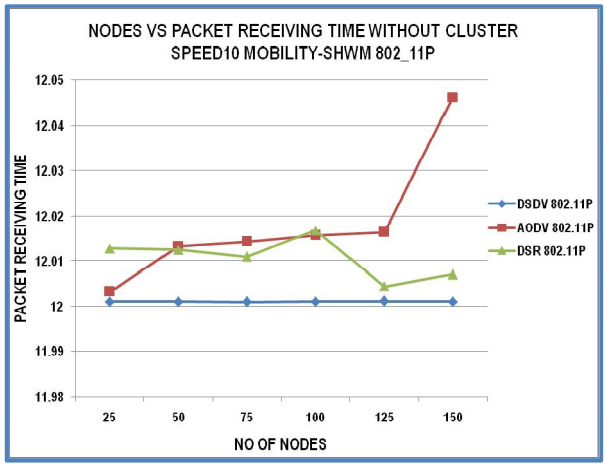


Figure14: Pkt receiving time for DSDV,AODV&DSR-802.11p

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The performance of packet receiving time for various routing protocols without using cluster concepts and with speed 10 and standard 802.11 and 802.11p is shown in the Figure 13 and 14. For both standards, the AODV protocol yields better packet receiving time than DSDV and DSR. When the number of nodes increases the performance of AODV protocol also increases in 802.11 and 802.11p.

### 9.6. Packet receiving time for DSDV,AODV &DSR with 802.11 & 802.11p

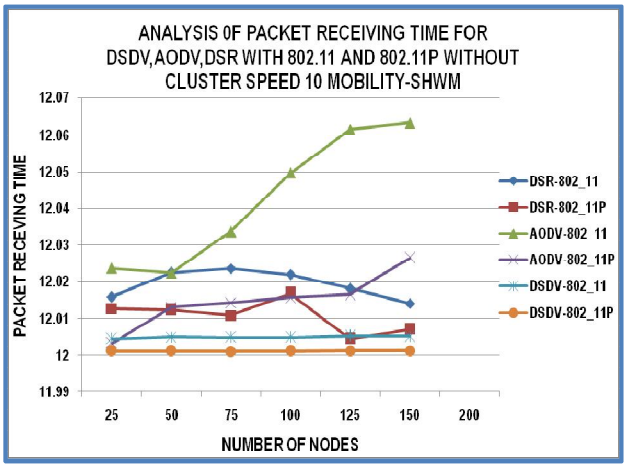


Figure15: Packet receiving time for DSDV,AODV&DSR
With 802.11p & 802.11 – sans cluster network

Figure 15 shows the overall performance of packet receiving time for various routing protocols in sans cluster network with 802.11 and 802.11p technology. From this graph it is noted that very low packet receiving time is observed when DSDV protocol with 802.11p is used in the given scenario. All the routing protocols with 802.11 standards give less performance than the routing protocols which use 802.11p.

### 9.7. Average packet delay time

The Average packet delay time for AODV protocol with various speeds is given in Figure16. It is noticed that average packet delay time for AODV is less for node with speed 5. It is also observed that the average packet delay is low for node 25 and it increases initially when the number of node increases and then decreases.

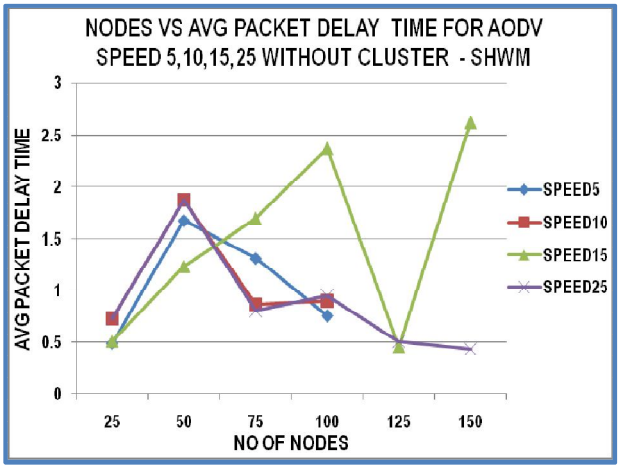


Figure 16:Average Pkt time for AODV-speed 5,10,15&20

### 9.8. Packet receiving time for DSDV, AODV & DSR with cluster and sans cluster

Packet receiving time for various protocols without using cluster concepts is compared with the protocol which uses the cluster concepts. This is shown in Figure 17. The packet receiving time for DSDV with cluster 8 yields lesser value than other protocols. The performance of routing protocols with cluster-based SHWM model gives better response than sans cluster model.

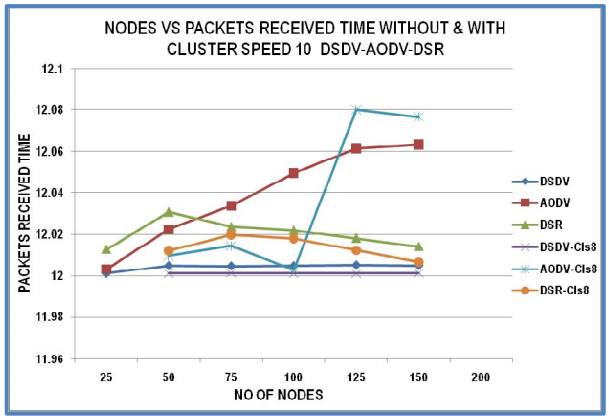


Figure17: Packet receiving time for DSDV,AODV&DSR
With 802.11p – cluster & sans cluster SHWM

### 9.9. Packet delay time for cluster and sans cluster with 802.11 & 802.11p

The packet delay time for DSDV,AODV and DSR with sans cluster model is shown in Figure 18 and Figure 19. Here it is observed that AODV with 802.11p yields better performance than the other protocols using 802.11 and 802.11p. The packet delay time for various protocols with cluster and without cluster concepts and standard 802.11 and 802.11p are shown in Figure 20. From this graph it is noted that the packet delay time is low for routing protocols which use cluster concepts and 802.11p technology.

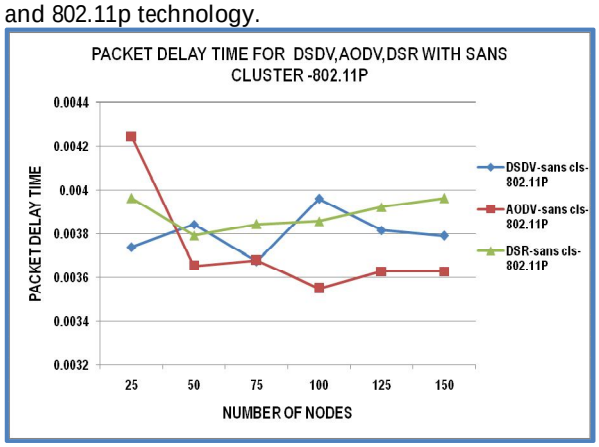


Figure 18:Packet delay time for DSDV,AODV&DSR
With sans cluster – 802.11p

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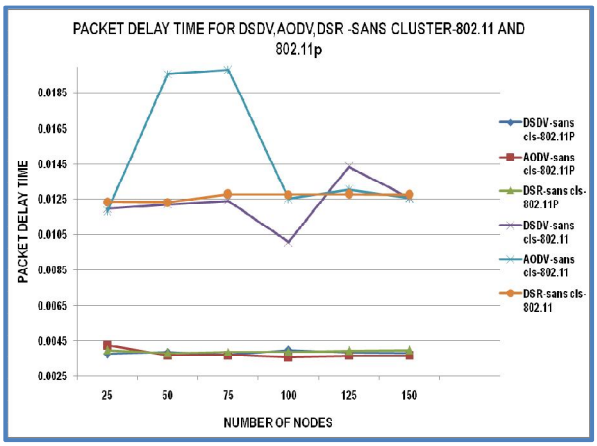


Figure 19:Packet delay time for DSDV,AODV&DSR

With sans cluster – 802.11p & 802.11

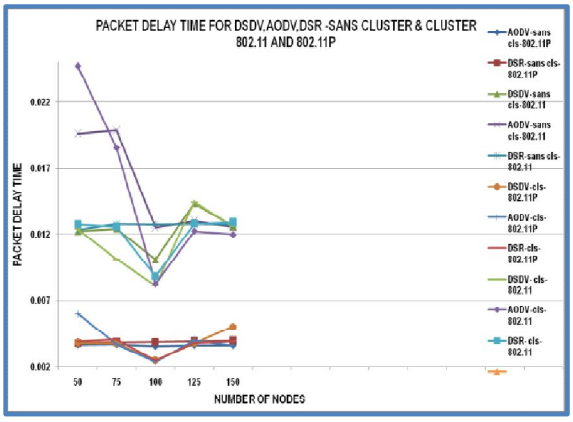


Figure 20:Packet delay time for DSDV,AODV&DSR

With cluster & sans cluster – 802.11p & 802.11

## 10. Performance Of Routing Protocols

The various network parameters considered for analyzing the routing protocols performances in this papers are packet delivery ratio, packet receiving time, packet throughput, average packet delay time and packet delay time of two consecutive packets. From this simulation result, it is noticed that the proactive routing protocol DSDV has a better packet receiving time among the three in a given simple highway scenario. But AODV offers better performance in terms of packet throughput, packet forwarded ratio and packet delay time. The link failure requires new route discoveries in AODV since it has almost one route per destination vehicle in its routing table. The delay in AODV is less than DSR because AODV creates routes only when it is needed.

## 11. Conclusion

This paper presents the study of an efficient routing protocol for vehicular communication in highway environment. The earlier VANET models discussed only the communication between vehicles through the RSU. Most of the researchers used standard 802.11 for VANET model with the movements of mobile nodes within the city area. The proposed new SHWM model without using cluster concept and the standard 82.11p outperforms the existing models that use roadside units. For efficient data communication the protocol used in the given model is important. Thus the familiar routing protocols are compared with each other and it is concluded that the routing protocols with 802.11p yields better performance than 802.11. The new cluster concept introduced by the author [ ] is used to compare the performance of routing protocol, which gives better efficiency than the routing protocol without using cluster concepts.

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# A Comparative study on Breast Cancer Prediction Using RBF and MLP

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**Abstract-** In this article an attempt is made to study the applicability of a general purpose, supervised feed forward neural network with one hidden layer, namely. Radial Basis Function (RBF) neural network. It uses relatively smaller number of locally tuned units and is adaptive in nature. RBFs are suitable for pattern recognition and classification. Performance of the RBF neural network was also compared with the most commonly used Multilayer Perceptron network model and the classical logistic regression. Wisconsin breast cancer data is used for the study.

Keywords - Artificial neural network, logistic regression, multilayer perceptron, radial basis function, supervised learning.

## 1.0 INTRODUCTION

MULTILAYER Perceptron (MLP) network models are the popular network architectures used in most of the research applications in medicine, engineering, mathematical modeling, etc.1. In MLP, the weighted sum of the inputs and bias term are passed to activation level through a transfer function to produce the output, and the units are arranged in a layered feed-forward topology called Feed Forward Neural Network (FFNN). The schematic representation of FFNN with '*n*' inputs, '*m*' hidden units and one output unit along with the bias term of the input unit and hidden unitis given in Figure 1.

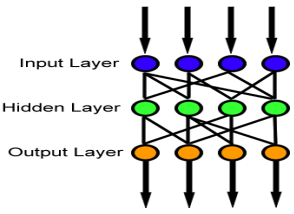


**Figure 1.** Feed forward neural network.

An artificial neural network (ANN) has three layers: input layer, hidden layer and output layer. The hidden layer vastly increases the learning power of the MLP. The transfer or activation function of the network modifies the input to give a desired output. The transfer function is chosen such that the algorithm requires a response function with a continuous, single-valued with first derivative existence. Choice of the number of the hidden layers, hidden nodes and type of activation function plays an important role in model constructions[2-4]

Radial basis function (RBF) neural network is based on supervised learning. RBF networks were independently proposed by many researchers[5],[6],[7],[8],[9] and are a popular alternative to the MLP. RBF networks are also good at modeling nonlinear data and can be trained in one stage rather than using an iterative process as in MLP and also learn the given application quickly. They are useful in solving problems where the input data are corrupted with additive noise. The transformation functions used are based on a Gaussian distribution. If the error of the network is minimized appropriately, it will produce outputs that sum to unity, which will represent a probability for the outputs. The objective of this article is to study the applicability of RBF to diabetes data and compare the results with MLP and logistic regression.

## 2.0 RBF NETWORK MODEL

The RBF network has a feed forward structure consisting of a single hidden layer of $J$ locally tuned units, which are fully interconnected to an output layer of $L$ linear units. All hidden units simultaneously receive the $n$-dimensional real valued input vector $X$ (Figure 2).

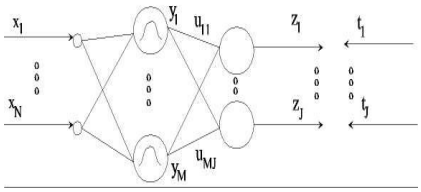


**Figure 2.** Radial basis function neural network.

The main difference from that of MLP is the absence of hidden-layer weights. The hidden-unit outputs are not calculated using the weighted-sum mechanism/sigmoid activation; rather each

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hidden-unit output *Zj* is obtained by closeness of the input *X* to an *n*-dimensional parameter vector $\mu_j$ associated with the *j*th hidden unit[10,11]. The response characteristics of the *j*th hidden unit ( *j* = 1, 2, ⊙, *J*) is assumed as,

$Zj = K[\|X - \mu j\|/\sigma j^2]$ eqn(1).

where *K* is a strictly positive radially symmetric function (kernel) with a unique maximum at its 'centre' *mj* and which drops off rapidly to zero away from the centre. The parameter $\sigma j$ is the width of the receptive field in the input space from unit *j*. This implies that *Zj* has an appreciable value only when the distance $\|X - \mu j\|$ is smaller than the width $\sigma j$. Given an input vector *X*, the output of the RBF network is the *L*-dimensional activity vector *Y*, whose *l*th component (*l* = 1, 2 ⊙⊙*L*) is given by, $Yj(X) = \sum_{j=1}^{J} Wij Zj(X)$ eqn(2).

For *l* = 1, mapping of eqn. (1) is similar to a polynomial threshold gate. However, in the RBF network, a choice is made to use radially symmetric kernels as 'hidden units'. RBF networks are best suited for approximating continuous or piecewise continuous real-valued mapping $f : R^n \rightarrow R^L$, where *n* is sufficiently small. These approximation problems include classification problems as a special case. From eqns (1) and (2), the RBF network can be viewed as approximating a desired function *f* (*X*) by superposition of non-orthogonal, bell-shaped basis functions. The degree of accuracy of these RBF networks can be controlled by three parameters: the number of basis functions used, their location and their width[10–13]. In the present work we have assumed a Gaussian basis function for the hidden units given as *Zj* for *j* = 1, 2, ⊙⊙*J*, where $Zj = exp\left(\frac{\|x-\mu j\|^2}{2\sigma j^2}\right)$ eqn(3). and *mj* and *sj* are mean and the standard deviation respectively, of the $j^{th}$ unit receptive field and the norm is the Euclidean.

2.1 TRAINING OF RBF NEURAL NETWORKS

A training set is an *m* labelled pair {*Xi*, *di*} that represents associations of a given mapping or samples of a continuous multivariate function. The sum of squared error criterion function can be considered as an error function *E* to be minimized over the given training set. That is, to develop a training method that minimizes *E* by adaptively updating the free parameters of the RBF network. These parameters are the receptive field centres *mj* of the hidden layer Gaussian units, the receptive field widths $\sigma j$, and the output layer weights (*wij*). Because of the differentiable nature of the RBF network transfer characteristics, one of the training methods considered here was a fully supervised gradient-descent method over *E*[7,9]. In particular, $\mu j$,$\sigma j$ and *wij* are updated as follows:

$\Delta\mu_j = -\rho_\mu \nabla_{\mu_j} E$ eqn(4).

$\Delta\sigma_j = -\rho_\sigma \frac{\partial E}{\partial \sigma_j}$ eqn(5).

$\Delta W_{ij} = -\rho_W \frac{\partial E}{\partial W_{ij}}$ eqn(6)

where $\rho_\mu, \rho_\sigma, and\ \rho_W$ are small positive constants. This method is capable of matching or exceeding the performance of neural networks with back-propagation algorithm, but gives training comparable with those of sigmoidal type of FFNN. The training of the RBF network is radically different from the classical training of standard FFNNs. In this

case, there is no changing of weights with the use of the gradient method aimed at function minimization. In RBF networks with the chosen type of radial basis function, training resolves itself into selecting the centres and dimensions of the functions and calculating the weights of the output neuron. The centre, distance scale and precise shape of the radial function are parameters of the model, all fixed if it is linear. Selection of the centres can be understood as defining the optimal number of basis functions and choosing the elements of the training set used in the solution. It was done according to the method of forward selection[15]. Heuristic operation on a given defined training set starts from an empty subset of the basis functions. Then the empty subset is filled with succeeding basis functions with their centres marked by the location of elements of the training set; which generally decreases the sum-squared error or the cost function. In this way, a model of the network constructed each time is being completed by the best element. Construction of the network is continued till the criterion demonstrating the quality of the model is fulfilled. The most commonly used method for estimating generalization error is the cross-validation

error.

2.2 FORMULATION OF NETWORK MODELS FOR WISCONSIN BREAST CANCER **DATA**

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The RBF neural network architecture considered for this application was a single hidden layer with Gaussian RBF. The basis function *f* is a real function of the distance (radius) *r* from the origin, and the centre is *c*. The most common choice of *f* includes thin-plate spline, Gaussian and multiquadric. Gaussian-type RBF was chosen here due to its similarity with the Euclidean distance and also since it gives better smoothing and interpolation properties[17].

The choice of nonlinear function is not usually a major factor in network performance, unless there is an inherent special symmetry in the problem. Training of the RBF neural network involved two critical processes. First, the centres of each of the *J* Gaussian basis functions were fixed to represent the density function of the input space using a dynamic '*k* means clustering algorithm'. This was accomplished by first initializing the set of Gaussian centres $\mu_j$ to random values. Then, for any arbitrary input vector $X(t)$ in the training set, the closest Gaussian centre, $\mu_j$, is modified as:

$$\mu_j^{new} = \mu_j^{old} + \alpha(X(t) - \mu_j^{old}) \quad \text{eqn(7).}$$

where $\alpha$ is a learning rate that decreases over time. This phase of RBF network training places the weights of the radial basis function units in only those regions of the input space where significant data are present. The parameter $\sigma_j$ is set for each Gaussian unit to equal the average distance to the two closest neighboring Gaussian basis units. If $\mu_1$ and $\mu_2$ represent the two closest weight centres to Gaussian unit *j*, the intention was to size this parameter so that there were no gaps between basis functions and only minimal overlap between adjacent basis functions were allowed. After the Gaussian basis centres were fixed, the second step of the RBF network training process was to determine the weight vector *W* which would best approximate the limited sample data *X*, thus leading to a linear optimization problem that could be solved by ordinary least squares method. This avoids the problem of gradient descent methods and local minima characteristic of back propagation algorithm[18].

For MLP network architecture, a single hidden layer with sigmoid activation function, which is optimal for the dichotomous outcome, is chosen. A back propagation algorithm based on conjugate gradient optimization technique was used to model MLP for the above data. A logistic regression model[22] was fitted using the same input vectors as in the neural networks and cancer status as the binary dependent variable. The efficiency of the constructed models was evaluated by comparing the sensitivity, specificity and overall correct predictions for both
datasets. Logistic regression was performed using logistic regression in SPSS package [22] and MLP and RBF were constructed using MATLAB.

## 3.0 RESULTS

Wisconsin data set with 580 records were used for the research. The MLP architecture had five input variables, one hidden layer with four hidden nodes and one output node. Total number of weights present in the model was 29. The best MLP was obtained at lowest root mean square of 0.2126. Sensitivity of the MLP model was 92.1%, specificity was 91.1% and percentage correct prediction was 91.3%. RBF neural networks performed best at ten centres and maximum number of centres tried was 18. Root mean square error using the best centres was 0.3213. Sensitivity of the RBF neural network model was 97.3%, specificity was 96.8% and the percentage correct prediction was 97%. Execution time of RBF network is lesser than MLP and when compared.

**Table 1.** Comparative predictions of three models

| Database Model | Sensitivity (%) | Specificity (%) | Correct prediction (%) |
|---|---|---|---|
| LOGISTIC REGRESSION | 75.5 | 72.6 | 73.7 |
| MLP | 92.1 | 91.1 | 91.3 |
| RBFNN | 97.3 | 96.8 | 97.0 |

With logistic regression, neural networks take slightly higher time. Logistic regression performed on the external data gave sensitivity of 75.5%, specificity of 72.6% and the overall correct prediction of 73.7%. MLP model was 94.5%, specificity was 94.0% and percentage correct prediction was 94.3%. The RBF neural network performed best at eight centres and maximum number of centres tried was 13. Root mean square The comparative results of all the models are

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presented in Table 1. The results indicate that the RBF network has a better performance than other models.

## 4.0 CONCLUSION

The sensitivity and specificity of both neural network models had a better predictive power compared to logistic regression. Even when compared on an external dataset, the neural network models performed better than the logistic regression. When comparing, RBF and MLP network models, we find that the former output forms the latter model both in test set and an external set. This study indicates the good predictive capabilities of RBF neural network. Also the time taken by RBF is less than that of MLP in our application. The limitation of the RBF neural network is that it is more sensitive to dimensionality and has greater difficulties if the number of units is large.

Here an independent evaluation is done using external validation data and both the neural network models performed well, with the RBF model having better prediction. The predicting capabilities of RBF neural network had showed good results and more applications would bring out the efficiency of this model over other models. ANN may be particularly useful when the primary goal is classification and is important when interactions or complex nonlinearities exist in the dataset [23]. Logistic regression remains the clear choice when the primary goal of model development is to look for possible causal relationships between independent and dependent variables, and one wishes to easily understand the effect of predictor variables on the outcome.

There have been ingenious modifications and restrictions to the neural network model to broaden its range of applications. The bottleneck networks for nonlinear principle components and networks with duplicated weights to mimic autoregressive models are recent examples. When classification is the goal, the neural network model will often deliver close to the best fit. The case of missing data is to be continued.

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# Three Layered Hierarchical Fault Tolerance Protocol for Mobile Agent System

Heman Pathak, Kumkum Garg, Nipur

**Abstract**— A Mobile Agent (MA) is autonomous and identifiable software process that travel through a network of heterogeneous machine and act autonomously on behalf of user. Improving the survivability of MA in presence of various faults is the major issue concerns with implementation of MA. During its life cycle, a MA can fail due to some uncaught exception, or due to the failure of the MAS, or its components or the host machine. The MA may also be lost on its way or blocked due to link failure. Since failure occurs at different places due to different reasons, specialized approaches should be used to tolerate different kinds of faults. This paper presents a brief introduction of Hierarchical Fault Tolerance Protocol (HFTP) for Mobile Agents. The proposed protocol is hierarchical in nature, which works at three levels. Based on the experience gained from prior work, our approach is to use the concept of fault masking without replication at one level. This ensures that failure is not visible to the MA through grouping of hosts within a network. At another level rear guard based fault detection and recovery based approach has been used. A thread based approach has been used to detect faults at the lowest level. In this way, the protocol tolerates various kinds of faults and takes the advantage of both centralized and distributed approaches. HFTP can tolerate host failure, system failure as well as link failure by grouping the hosts within a network and rear guard based migration of MA in the global network. A well known modeling tool Color Petri Net (CPN) has been used for architectural model of HFTP. Simulation results have been used to check the performance of HFTP in presence of various faults.

**Index Terms**—Mobile Agents, Fault Tolerance, Colored PetriNets, Mobile Agent Systems

## 1 Introduction

MOBILE Agent (MA) [1], [16] is an emerging technology that is becoming increasingly popular. Although potential usefulness of the MA computing paradigm has been widely accepted, MA technology has not yet found its way into today's more prominent applications. Before MA applications begin to appear on a large scale, Mobile Agent System (MAS) needs to provide infrastructure services to facilitate MA development. Among these are security, management of MA, fault tolerance, and transaction support. In this paper we are introducing the Hierarchical Fault Tolerance Protocol (HFTP) for MAs and its Colored Petri Net Model. CPN model has been used to analyze and check the performance of HFTP in presence of various faults.

## 2 Hierarchical Fault Tolerance Protocol

During the life cycle of MA, it can fail due to some uncaught exception or due to the failure of MAS or its components or host machine. MA may also be lost on its way or blocked due to link failure. Since failure occurs at different places due to different reasons, specialized fault tolerance approaches should be used to tolerate different kinds of faults. Suggested protocol is a hierarchical protocol, which works at three levels. Based on the experienced gained from prior work, this approach has been designed to use fault masking by grouping hosts within a network at one level while fault detection and recovery by using rear guards at another. For fault masking replication is the most common technique but it requires to use multiple host to implement one logical host and also enforcing exactly once execution of mobile agent is critical in replication based approaches [10], [16], [17]. Proposed protocol achieves fault masking through grouping of hosts [6], [9] within the network. Since it is not using the replication so there is no need to enforce exactly one. There is always one active copy of the MA in network.

### 2.1 Assumptions and Requirements

Some of the assumptions / requirements for HFTP are –

- All networks are connected via Routers.
- Routers are fault free i.e. MA can not be lost there, but may be blocked due to link failure.
- There is a fault free storage space in each network shared by all the hosts within the same network as well as router.
- Every network has its own fault tolerance mechanism to detect and recover the faulty hosts as well as implement network services efficiently in presence of host or link failure within the network.
- MAS has been installed on each host of the network where Mobile Agents may be executed.
- MAS has also been installed at the routers but router is responsible just to receive and send the MA, not to execute them.

### 2.2 Grouping of Hosts

Our protocol is based on grouping of hosts within the same network based on kind of services offered by them. Hosts are grouped logically and one of the group member works as In-charge. One host is part of one group only.

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One group appears as a single host to other hosts of distributed system.

To keep records of each group and all MAs running on each group of network, a group table and an agent table are maintained in shared storage. *GroupTable* contains the information about which host is part of which group and which is the in-charge host of the group, while agent table stores the information about which mobile agent is running on each group as well as on which host. A FailedHostTable for each group is also maintained to keep the record of failed or inaccessible host. Hosts within each group communicate with each other through Group Communication Services designed to operate in a Local Area Network [6], [9].

### 2.3 Layered Architecture

HFTP consists of three layers. Different kinds of faults are detected and recovered at different layers. These three layers have been implemented as proxy servers. Server at lowest layer is *Personal Daemon Server (PDS)* monitors the MA and MAS, server at middle layer is *Local Daemon Server (LDS),* monitors the hosts and server at highest layer is *Global Daemon Server (GDS)*, responsible for fault free migration of MAs in global network. LDS and PDS have been installed on each host of the network. GDS is installed on routers.We briefly describe the functionality of each server (see Figure-1).

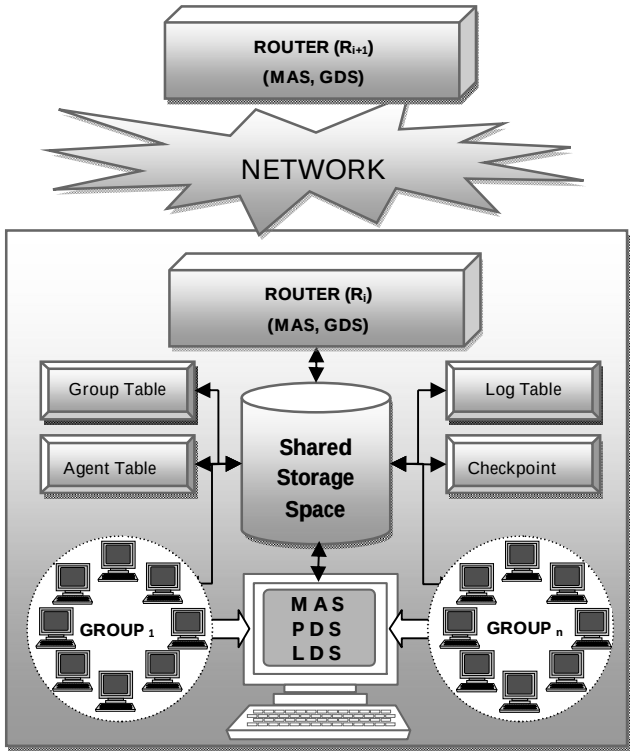


Fig. 1. Architecture of Hierarchical Fault Tolerance Protocol

**Personal Daemon Server (PDS):**

It monitors the MAS as well as all the MAs running on the host by maintaining a thread fro each. In case MAS crashes due to any reason, it is responsible to inform other group members about this fault as well as responsible to initiate recovery of MAS.

**Local Daemon Server (LDS):**

It is responsible for detecting the host failure as well as executing all group communication services within the group. LDS installed at Group in-Charge is responsible to assign a host to the MA submitted to the group impartially and balancing the load of each hosts. In case, either a host or MAS installed on host fails, it is responsible to distribute the load of failed host among active members of group.

**Global Daemon Server (GDS):**

It is responsible for receiving the Mobile Agents from other networks and then passing them to the appropriate group of its own network. It log an arrival entry for each incoming MA to the network into LogTable, also a departure entry is logged for each migrating MA. These entries in log table are used for recovery in case MA is lost during migration. It is also responsible to perform all function required for fault tolerant migration of MAs in the global network of networks by implementing rear guard concepts. In case all members of a group fail, it recovers MAs running in failed group from last checkpoint state.

## 3 Failure Cases And Recovery Procedure

In the following section we give the various faults that may occur during the life cycle of a MA and the schemes used by HFTP to tolerate them.

### 3.1 Mobile Agent Failure

MA is a piece of code which itself may fail during its execution due to some programming/data error or due to some uncaught exception. This fault can be minimized by providing the exception handling code for all known cases. But still if it fails, its fault is detected by the PDS which then rollback all uncommitted transactions and send a request to its MAS to create a new MA to carry the partial result to the user.

### 3.2 Mobile Agent System Failure

MAS or any of its components may fail/crash due to overload, resource unavailability, programming error or due to some other reasons as it is also a piece of code. Due to failure of MAS, all MAs running on it will get lost.

PDS watches MAS by maintaining a thread for it. MAS crash is recognize by PDS which then informs its LDS about this failure and reloads the MAS. LDS informs other members as well as in-charge of the group which then distributes the load of failed system among other active members. Newly selected hosts recover the MAs from last checkpoint state [2] and continue their execution.

### 3.3 Host Failure

Host is a machine in the network that provides a logi-

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cal execution environment MAS to host and execute MAs. It may go down at any time; consequently MAS as well as all the MAs running on that system will get lost. All group members watch each other and fault of a host within the group is detected by other members of the group. After detecting the host failure, in-charge distributes the load of failed host among remaining group members. If failed host is the in-charge, then remaining members of the group will cooperatively elect a new group in-charge based on predefined priorities. If failed host is the only host in the group then GDS is responsible to perform the recovery. Failed host is recovered by using network own fault tolerance mechanism.

### 3.4 Communication Link Failure

All hosts within the network as well as all the networks are connected with each other through communication links. These links are not fault free and may fail any time. If communication link fails during the migration of MA, then mobile agent will be lost in its way. In order to tolerate link failure, HFTP uses two different strategies. For agent transfer within the network TCP has been used. TCP has been designed specially for a reliable, point-to-point, and sequenced communication; it suits agent transfer functionality very nicely. Link failure within the network is tolerated by TCP as it can recover an agent loss during migration from one host to another within LAN. Link failure may affect the group communication services to execute and make it difficult to detect the faults. We assume that group communication services efficiently implemented within the network and LAN is capable to tolerate such faults.

For agent transfer in the global network UDP has been used. Since MA may be lost during the migration from one router to other, precaution has been taken to avoid transferring MA to a failed host by providing alternative list of hosts to be visited by MA [11], [12], [13]. GDS installed at router is responsible to implement Migration protocol.

**Migration protocol**

Migration of mobile agent from one network (router) to other uses migration protocol, which is inspired by the concept of rear guard [4], [5], [15]. In this approach one witness agent is created to watch the actual agent. This agent ensures that MA successfully received at destination router (see Figure-2).

Assume that currently mobile agent is at the router $R_{i-1}$ and ready to migrate to router $R_i$, but before migrating MA first spawn [5] a witness agent at $R_{i-1}$ and then migrate to $R_i$. On arrival of MA at $R_i$ its GDS first log an entry $log^i_{arrive}$ in the log table, saves the agent and then send an acknowledgement message $MSG^i_{ack}$ to $R_{i-1}$.Witness agent at Ri-1 is waiting for acknowledgement and if there is no fault, it will receive the message on time. The case that the witness agent at Ri-1 fails to receive acknowledgement includes –

a. Message lost due to unreliable network
b. Message arrive after time out
c. MA is lost due to unreliable network after leaving $R_i$ and before arriving at $R_{i+1}$

All components at router is reliable except the link, so MA or Acknowledgement is lost due to link failure or delayed due to network traffic.

Once fault is suspected by the witness agent, it takes following actions-

1. Creates a probe (another agent), which travels to $R_{i+1}$. It carries checkpoint data with it as it may require recovering lost agent for case 1.
2. For the next two cases probe will find a log entry in the log table of $R_{i+1}$ and just resend $MSG_i^{ack}$ to $R_i$.
3. For case 1, probe will first recover lost agent and then send $MSG_i^{ack}$ to $R_i$.
4. After sending the probe witness agent again
5. waits for acknowledgement.

If again it does not receive acknowledgement, it assumes the network fault and wait for network to resume

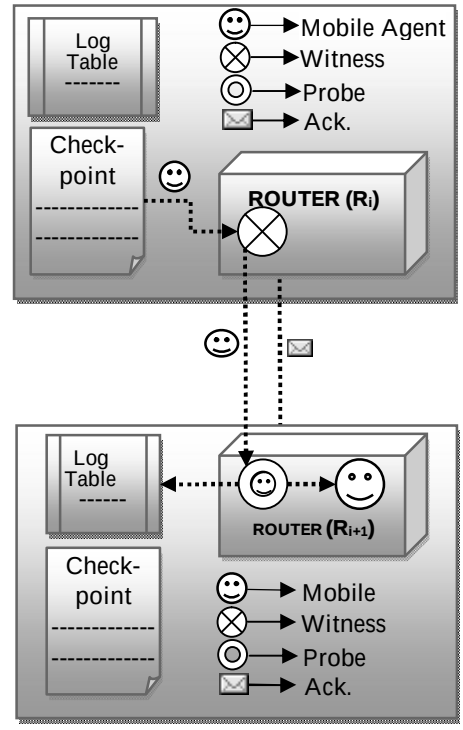


Fig. 2. Migration Protocol

and keeps on sending probe until receives the acknowledgement or detects fault of router.

## 4 Modelling with Colour Petri Net (CPN)

CPN [3], [7], [8], [14] is a very powerful, interactive and widely used tool for modeling and simulations. It supports hierarchical designed as well. Its support for markup language provides the flexibility to model different components of the system according to user's requirements. By using different features of the CPN tools

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various components of HFTP has been declared and protocols has been modeled by using many places and transitions organized as hierarchy of pages. Concepts of substitution pages and fusion places have also been used to model the hierarchical behavior of the protocol.

Various tools provided by CPN such as monitoring, state space and user controlled simulation tools have been used to check the correctness of the modeled system. Various data gathering and report generation tools have also been used to generate and collect the data required for analysis.

### 4.1 Performance Analysis

Before starting the simulation, some parameters are required to be assumed while some are generated randomly or calculated during simulation. The assignment is based on the assumption that packet transmission time is fixed and it is independent of place, time or load of network. The MA takes constant time to execute on any host.

| | |
|---|---|
| Transmission time for MA | = 200 TU |
| Transmission time for Acknowledgement | = 100 TU |
| Logging (Arrival / Departure) time | = 50 TU |
| Host assignment for In-charge | = 50 TU |
| Execution Time for MA / host | = 450 TU |
| Recovery time for Mobile Agent | = 50 TU |
| Time to Checkpoint data and state | = 100 TU |

### 4.2 Overhead of using HFTP

Every fault tolerance mechanism adds some overhead to the existing systems in terms of time, space or requirement to maintain reliability. In order to observe the overhead due to HFTP, in terms of MA trip time and network overhead generated by it, we have modeled a protocol having no support for fault tolerance (without HFTP) and then compared the performance of the system using HFTP in a fault-free environment.

Figure-3 shows that trip time increases linearly for both HFTP and without HFTP. Since simulation has been performed in an ideal fault-free environment, here all the steps including execution and migration of MAs takes constant time. Trip time is higher for HFTP because it requires logging the arrival and departure at the router, also the in-charge has to execute a deterministic algorithm to assign a host to the arrived MA in the group. Checkpointing is also required, even if no faults occur during MA execution.

Figure-4 shows that, although network overhead increases linearly for both cases, HFTP generates more overhead as the number of servers increase. This is because HFTP requires sending an acknowledgement for every migrating MA to detect link failure. Number of acknowledgements increases with the number of servers in the MA itinerary. Further implementation of group communication services generates network overhead in Local Area Networks.

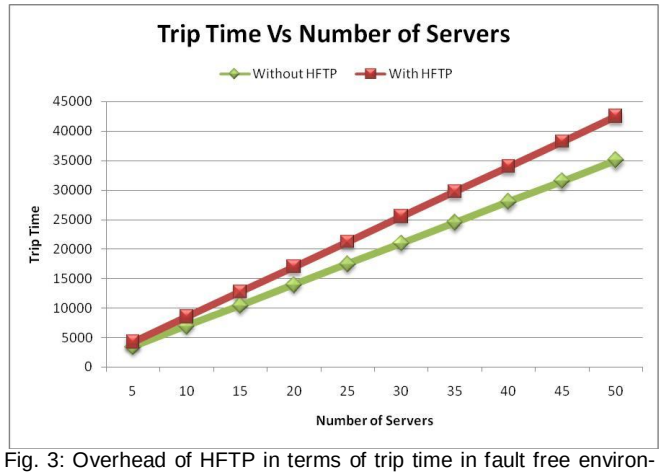


Fig. 3: Overhead of HFTP in terms of trip time in fault free environment

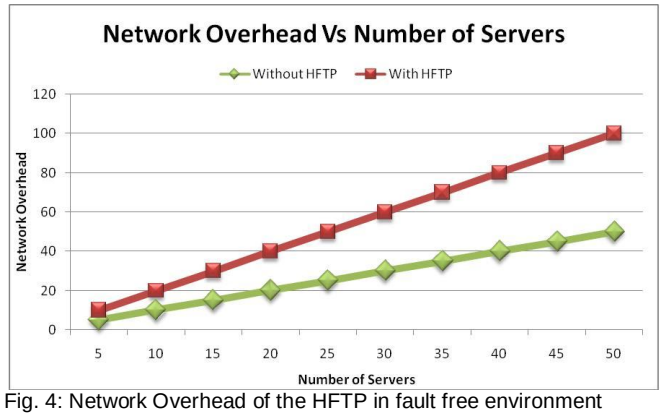


Fig. 4: Network Overhead of the HFTP in fault free environment

### 4.3 Fault cases and tolerance through HFTP

In order to observe the performance of HFTP in the presence of faults, we have generated various faults in the CPN model of HFTP by changing the failure probability rate and then measured its performance in terms of trip time, network overhead and number of execution steps.

In a real system, many faults may occur simultaneously, but for performance measurement we have generated one fault at a time. For each case, a MA with ten servers in its itinerary is launched. Simulation has been repeated hundred times and its average value has been used to predict the performance pattern.

**Case 1: Mobile Agent System Failure**

The MAS fails during execution of a MA according to its failure probability rate. Here it is assumed that in spite of failure, there is always at least one active host within each group to share the load of the failed host and MA does not get blocked.

Figure-5 shows that system failure rate is tolerated by HFTP. The global network overhead remains constant, while the local network overhead increases exponentially with failure rate, because a recovered agent may fail again and again. Every time a failed agent recovers, it adds some network overhead locally as it is required to transfer the recovered agent to its new host.

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Figure- 6 show that trip time increases exponentially as failure rate increases, because every time the system fails, more time and extra execution steps required for detecting the fault, recovering the agent and resuming its execution on the new host. For small failure rates, the performance does not degrade too much.

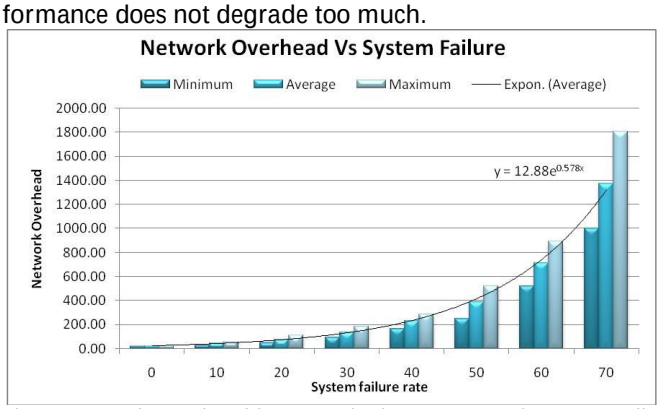


Fig. 5: Network Overhead by HFTP in the presence of System Failure

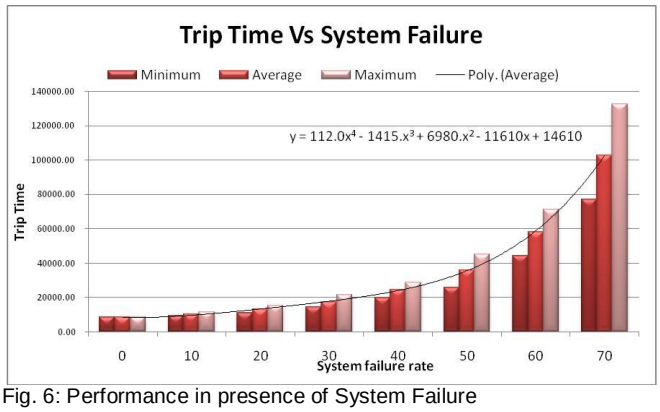


Fig. 6: Performance in presence of System Failure

**Case 2: Host Failure**

During the execution of MA, the host machine may go down and all MAs hosted by it are lost. HFTP tolerates host failure provided there is at least one active host per group to avoid blocking. Host failure is tolerated in the same way as system failure so the performance is expected to be similar as in case of system failure.

Unlike system failure, where a fault is detected by a thread, host failure is detected by other members of the group watching it. The fault detection mechanism does not increase any load, as it is always watching the hosts. Again, in case of host failure, only local network overhead increases, global package transfer remains constant.

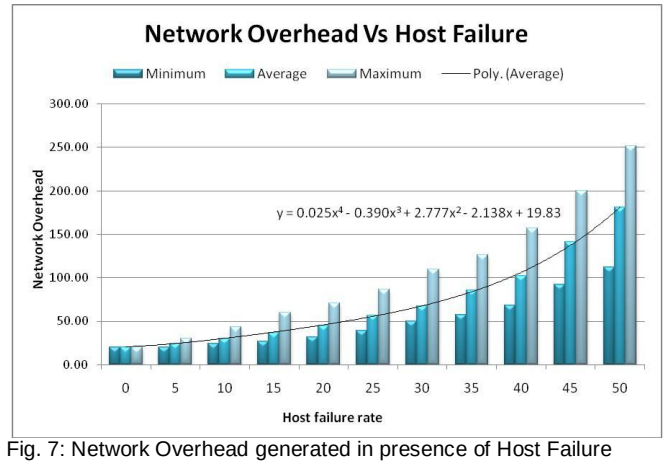


Fig. 7: Network Overhead generated in presence of Host Failure

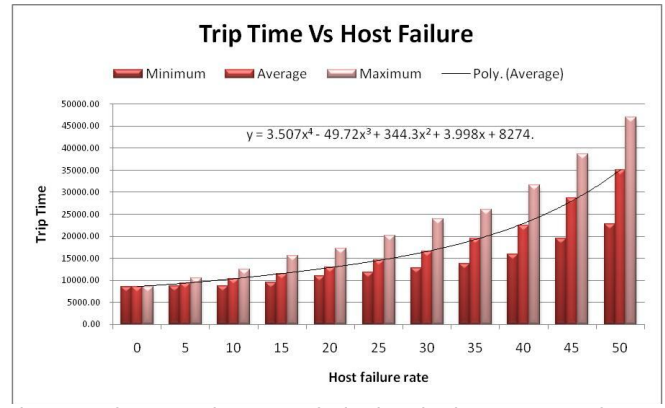


Fig. 8: Performance in terms of trip time in the presence of Host Failure

Figure-7 shows that local network overhead increases almost exponentially with host failure rate. Result is same as in case of system failure, but slightly better as recovery of a failed host is the responsibility of network manager and has not been considered while system recovery is initiated by PDS. Figures-8 verify our claim that host failure is tolerated by HFTP and gives a similar performance as in case of system failure provided blocking does not occur. Trip time grows polynomial with host failure rate.

**Case 3: Link Failure**

A link may fail during the migration of a MA from one host to another within a Local Area Network or between networks. Due to link failure, a MA may get lost on its way. HFTP tolerates link failure unless it leads to network partitioning. Link failure during migration within a network is tolerated by using TCP and has not been used for performance analysis. Due to link failure, a MA or acknowledgement may get lost in a global network and require retransmission of acknowledgements or probes, which not only increase network overhead and execution steps but also trip time. Since failure is detected only after waiting time is over, so delay increases more as compared to network overhead and number of execution steps.

Figure-9 shows the pattern of network growth overhead as link failure rate increases. It also proves our claim that

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HFTP is able to tolerate link failure. However when failure rate is more than 25%, overhead increase significantly. Figures-10 shows that if failure rate is more than 25%, performance of the system degraded significantly and more time is required while for low failure rate performance is comparable.

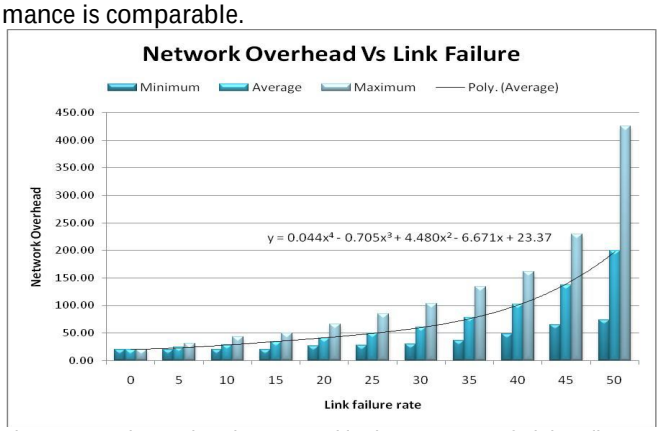


Fig.9: Network Overhead generated in the presence of Link Failure

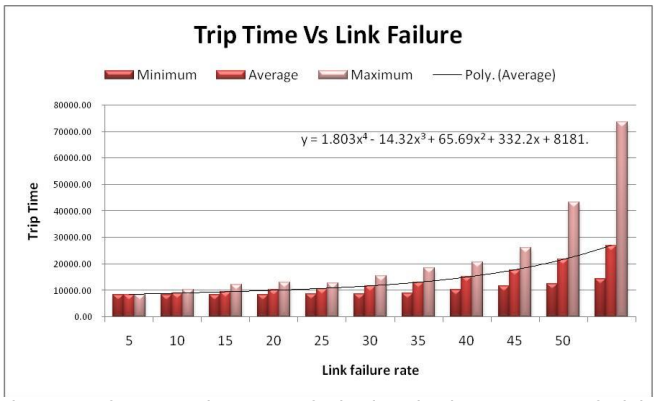


Fig.10: Performance in terms of trip time in the presence of Link Failure

**Case 4: Agent Failure**

Since MA failure detection and recovery takes place only at the host, it does not increase network overhead and not been observed. Figure-11 shows that trip increases almost linearly and performance is not degraded much until failure rate goes beyond 30%.

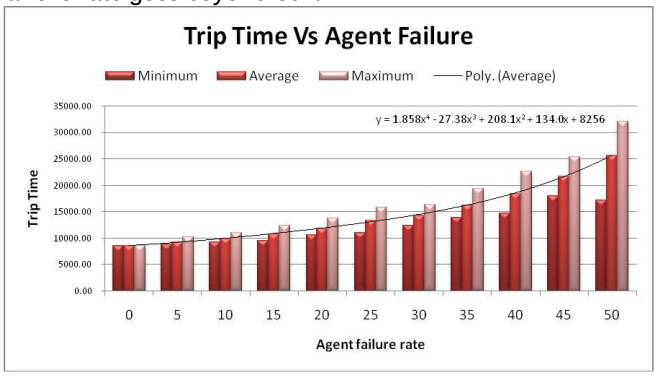


Fig. 11: Performance in terms of trip time in the presence of Agent Failure

## 5 Conclusion

The results show that HFTP is able to tolerate all kinds of faults without degrading the performance significantly. For low failure rate, the survivability of MA in HFTP is ensured and it is able to achieve tolerance without increasing network overhead or time delay substantially.

If host/system failure rate increases, then the MA may be blocked within a group. This blocking may be avoided by properly selecting the group size. But these failures are not frequent so the results are acceptable. Link failures in the global network may lead to network partitioning. This extreme case of link failure is tolerated by HFTP, if an alternative list of hosts is defined in its itinerary.

Also, if the order of the itinerary is not fixed, the MA can visit some other host in its itinerary and may try to visit the disconnected host latter when at least one of the links resumes. In the worst case when all the target hosts are disconnected with current network, MA will be blocked within the network.

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# Image Processing For Biomedical Application

Gauri Bhoite

**Abstract—** Karyotyping, a standard method for presenting pictures of the human chromosomes for diagnostic purposes, is a long standing, yet common technique in cytogenetics. Automating the chromosome classification process is the first step in designing an automatic karyotyping system. However, even today, karyotyping is manually performed. Here we intend to automate Karyotyping completely. Karyotyping is a common technique in cytogenetics, to classify human chromosomes into 24 classes. Karyotyping can be used to predict genetic disorders or abnormalities in pre-natal stage which may happen to occur in future generation.

**Index Terms—** Classification, Feature extraction, Karyotyping, Segmentation, Straightening Algorithm.

## 1 INTRODUCTION

Chromosomes analysis is an essential procedure for detecting genetic abnormalities in cells. Traditionally, cells are classified according to their karyotype ,which is a tabular array where the chromosomes are aligned in pairs. Karyotyping is a useful tool to detect deviations from normal cell structure since abnormal cells may have an excess or a deficit of chromosomes. Normal cells contain 46 chromosomes which consist of 22 pairs of similar, homologous chromosomes and two sex-determinative chromosomes (XY: male and XX: female). Normally, the procedure of assigning each chromosome to a class (karyotyping) is based on the visual scanning of chromosome images by experts (biologists, cytogeneticists). This visual inspection is a time consuming process and expensive. Hence, many attempts have been made to improve visual analysis of chromosomes.

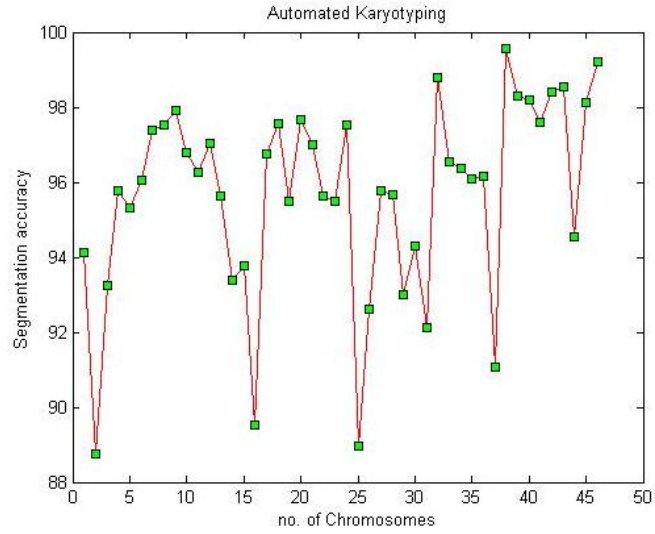


Fig. 1 Shows as the number of chromosomes increases the segmentatinon accuracy also increases.

## 2. THE OBJECTIVES OF THE PROPOSED WORK ARE AS FOLLOWS:

2 Perform segmentation of the metaphase image to separate out each chromosome

3 Application of the straightening algorithm to each separated chromosomes.. F

4 Extract features from each chromosome.

5 Classification of chromosomes based on the feature extracted

### 2.1 Segmentation (Watershed Transform)

The goal of this stage is to create a mask of pixels to be classified. First the image gradient magnitude of the initial image is computed. In order to reduce the number of minima of the gradient magnitude we apply the grayscale transform. The watershed transform is a popular segmentation method originated in the field of mathematical morphology. The image is considered as a topographical relief, where the height of each point is related to its grey level. Imaginary rain falls on the terrain. The watersheds are the lines separating the catchment basins.

### 2.2 Straighten curved chromosomes

From the segmented image obtained in above step a chromosome is taken at a time. Greyscale chromosome image is one in which an object (chromosome) is lying on a uni-color background with a different gray scale value.. An effective threshold value to separate the object from the background can be determined by locating the global minimum of the histogram Using this threshold all those pixels with a gray value smaller than the threshold are set to 1 (white) and the remaining pixels are set to 0 (black) producing the binary format of the input image.For horizontal projection vector, the pixel values of each row are summed up in the binary image. Considering that the binary image includes only 1s (white pixels) and 0s (dark pixels). The location of the extracted global minimum in the horizontal projection vector of the target image corre-

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sponds to the bending centre. The horizontal line passing through the point on the chromosome image represents the bending axis of the chromosome. The most outward intersecting point between the bending axis and the chromosome body is the so called bending centre of the curved chromosome.

The binary image is first separated into two sub-images along the bending axis. The two sub-images must now be rotated so that the two arms to be vertical. Now we apply the same procedure to the real gray scale image rather than its binary version. Next, the two aligned gray scale images of the chromosome arms must be connected to produce the final straightened chromosome picture

.

### 2.3 Feature extraction

1. Length

   The total length of the chromosome is obtained.

2 Centromeric index:

The centromeric index (C.I.) is the ratio of the length of the short arm to the whole length of a chromosome.

3 Normalized density profile:

Density profile is a one-dimensional graph of the banding pattern property of the chromosome computed at a sequence of points along the possibly curved chromo some medial axis. The density profile for a chromosome is obtained from measurements made along a transverse line, perpendicular to the tangent of the medial axis.

It is another significant morphological feature used to identify the chromosome.

### 2.4 Neural Networks Classification.

Neural Network; it is the second stage of initiation of the Multi-Layer Neural Network with Back-Propagation algorithm and the suitable architecture form, train and transfer functions.

After creating the Neural Network, the typical chromosomes have been inserted in it to be the target in the training process. The output of the segmentation algorithm, which will be an array of objects, will be converted from matrix form into vector form. This vector represents the new input to the Neural Network. This Neural Network uses Back-Propagation algorithm.cap.

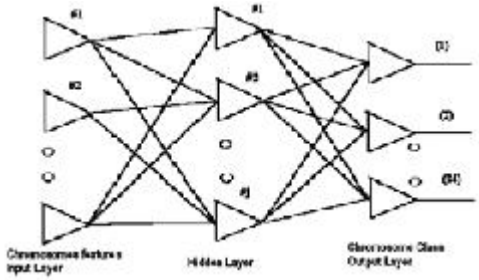

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Fig.1 Neural network architecture for multilayer network.

## 3. RESULTS

Fig.2 Metaphase stage of human chromosomes

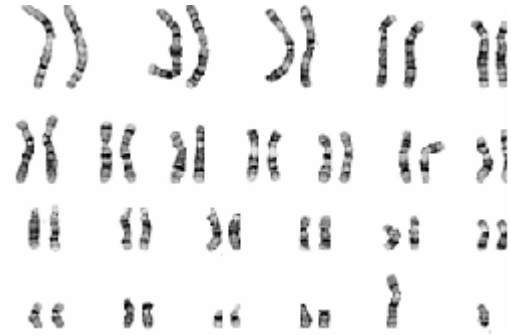

Fig:3 Karyotyped image of human chromosome.

## 4. CONCLUSIONS

By using the following method we found that is an efficient way of classifying the chromosomes. It introduces chromosome imaging and the concept of karyotyping. We studied various characteristics of chromosome images and features of chromosomes that are used for karyotyping and classification

## 5. ACKNOWLEDGMENT

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# A Role of Query Optimization in Relational Database

Prof.M.A.Pund, S.R.Jadhao, P.D.Thakare

**Abstract**— Nowadays, we are flooded with information through and from the Databases. We have to deal with a constantly increasing amount of facts, figures and dates. Therefore, it is necessary to somehow store this information in an adequate way. This is what database systems were developed for. One particular approach is the relational databases. In a relational database all information can be found in a series of tables in which data is stored in rows and columns. The problem with SQL query, its declarative – does not specify a query execution plan and also we have to deal with as a consequence is the question as how to find the specific facts that might interest us amongst all the information stored in the described tables. And as one might put it, "Time is Money" in our society, it is not only important to find the required information, but also with proper execution plan so that it takes less time. The solution is to convert SQL query to an equivalent relational algebra and evaluates it using the associated query execution plan.

This paper will introduce the reader to the basic concepts of query processing and query optimization in the relational database domain. How a database processes a query as well as some of the algorithms and rule-sets utilized to produce more efficient queries will also be presented. I will discuss the implementation plan using join orderingto extend the capabilities of Database Engine program through the use of randomized algorithms iterative improvement method in the database area in the context of query optimization. More specifically, large combinatorial problems such as the multi-join optimization problem have been the most actively applied areas [9].

**Index Terms**—SQL Query optimization, relational database, Query Processing

## 1. INTRODUCTION

Query optimization plays a vital role in query processing. Query processing consists of the following stages:

1. Parsing a user query (e.g. in SQL)
2. Translating the parse tree (representing the query) into relational algebra expression.
3. Optimizing the initial algebraic expression.
4. Choosing an evaluation algorithm for each relational algebra operator that would constitute least cost for answering the query.

Stages 3-4 are the two parts of Query Optimization. Query optimization is an important and classical component of a database system. Queries, in a high level and declarative language e.g. SQL, which require several algebraic operations, could have several alternative compositions and ordering. Finding a "good" composition is the job of the optimizer. The optimizer generates alternative evaluation plan for answering a query and chooses the plan with least estimated cost. To estimate the cost of a plan (in terms of I/O, CPU time, memory usage, etc but not in pounds or dollars) the optimizer uses statistical information available in the database system catalogue [5].

## 2. QUERY OPTIMIZATION

### 2.1 What is a Query: A First Approach?

In a relational database all information can be found in a series of tables. A query therefore consists of operations on tables. Here a list of the most commonly performed operations:

- Select ($\sigma$): Returns tuples that satisfy a given predicate
- Project ($\pi$): Returns attributes listed
- Join ($\bowtie$): Returns a filtered cross product of its arguments
- Set operations: Union, Intersect, and Difference

The most common queries are Select-Project-Join queries. In this paper, we will look at queries, which consist of these three operations on tables only, focusing on the join-ordering problem we will see in the following example.

### *2.2 Example*

To illustrate how a query is performed and why query optimization might be necessary, we will look at the following basic database:

**Student**: { stud_id, name, semester }
**Lecture**: { lect_id, title, lecturer }
**Professor**: { prof_id, name }
**Enrolment:** { stud_id, lect_id }

The question we want to ask is:
Which semester are the students in, which are enrolled in a course of professor Newton?
If we translate this into an SQL query, in a first step, we might get:

**Select** distinct s.semester
**From** student s, professor p, enrolment e, lecture l
**Where** p.name = 'Newton' **and**

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l.lecturer = p.prof_id **and**
l.lect_id = e.lect_id **and**
e.stud_id = s.stud_id
This query gives us the following access plan:
We see very quickly that this query cannot be the best way to reach our answer. We have three cross products, which means that we create a table whose number of rows is |s|*|e|*|l|*|p|. For large tables s, e, l and p this result is not acceptable.
One possible way of improving this is to perform the selections (here done in the very last step) earlier on in the search as shown in Fig.1.
This way, we get the following result:

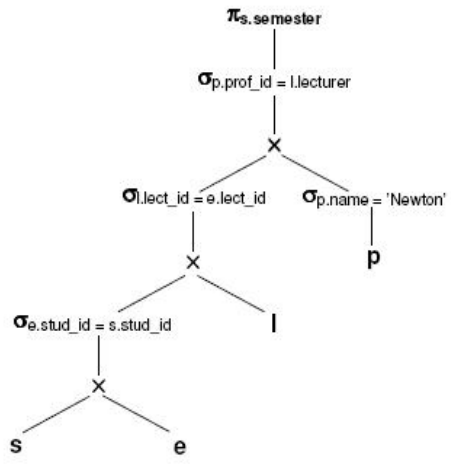


Fig.1. Query Plan 1

By doing the selections earlier on, we make restrictions and our final table is of smaller size than the former one.
We can improve our result even more by substituting the cross with join operators as shown in Fig.2.

The result is:

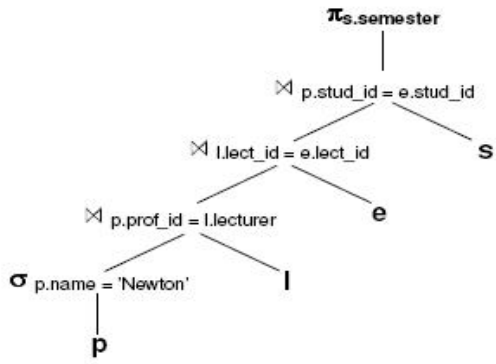


Fig.2. Query Plan 2

We have improved our original query model. But now we are at a point were it gets harder to tell how to further improve our model: Knowing that the join operator is commutative as well as associative, we don't know which order of these joins would suit us best to minimize the resulting table at each step. Even though the result of the joins will be the same, it makes a difference, which join ordering we use. [5].
To illustrate this, we look at an example:
We consider the three relations S, R and T as shown in Table 1, 2, 3.

Each one of the tables consists of a number columns and rows. By illustrating the join procedure for the cases (R⋈S) ⋈T or R ⋈(S⋈T), we will see, why the join ordering does indeed matter. The result of these operations will be the same, as expected. But we will see, that the tables produced at the intermediate step will vary considerably with regards to their size:

TABLE 1
Relation R

| R | | |
|---|---|---|
| A | B | C |
| a1 | b1 | c1 |
| a1 | b2 | c1 |
| a1 | b3 | c2 |
| a2 | b3 | c1 |

TABLE 2
Relation S

| S | | |
|---|---|---|
| C | D | E |
| c1 | d1 | e1 |
| c1 | d2 | e2 |
| c1 | d3 | e1 |
| c2 | d2 | e1 |

TABLE 3
Relation T

| T | |
|---|---|
| C | F |
| c2 | f1 |
| c3 | f2 |
| c4 | f3 |
| c6 | f1 |

Case 1 : (R⋈S) ⋈T

TABLE 4
Result of (R⋈S)

| R⋈S | | | | |
|---|---|---|---|---|
| A | B | C | D | E |
| a1 | b1 | c1 | d1 | e1 |
| a1 | b1 | c1 | d2 | e2 |
| a1 | b1 | c1 | d3 | e1 |
| a1 | b2 | c1 | d1 | e1 |
| a1 | b2 | c1 | d2 | e2 |
| a1 | b2 | c1 | d3 | e1 |
| a2 | b3 | c1 | d1 | e1 |
| a2 | b3 | c1 | d2 | e2 |
| a2 | b3 | c1 | d3 | e1 |
| a1 | b3 | c2 | d2 | e1 |

⇩

TABLE 5
Result of (R⋈S) ⋈T

| (R ⋈S) ⋈T | | | | | |
|---|---|---|---|---|---|
| A | B | C | D | E | F |
| a1 | b3 | c2 | d2 | e1 | f1 |

Case 2: R ⋈(S ⋈T)

TABLE 6
Result of (S ⋈T)

| S ⋈T | | | |
|---|---|---|---|
| C | D | E | F |
| c2 | d2 | e1 | f1 |

⇩

TABLE 7
Result of R ⋈(S ⋈T)

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We see that in the first case, a temporary relation with many rows has to be stored as shown in Table 4 even though it is reduced to only one row as shown in Table 6 in the second step.

In the second case, however, we have chosen a better join ordering. The temporarily stored relation contains only one row. Hence, the great importance of the join ordering is notified.

### 2.3 Some Definitions and Terms

In this elaboration, we will use following notations:

In query optimization we are looking at a *state space* consisting of all *access plans* that compute the same result to a query.A solution of any given problem is described in a *processing tree*.

Every one of the access plans is associated with a certain *cost*, which is given by a *cost function*. I will not introduce exact cost models in this elaboration. For now we just assume, that the cost function usually takes as input the number of pages that have to be read from or written to secondary memory to calculate a cost estimate for the access plan.

If the database is assumed to be much larger than the available memory, we can neglect al costs except for the I/O costs. The processing tree is, as we have encountered it in the previous chapter, a binary tree. It consists of leaves that are the base relations, internal nodes which are the join operators and edges, which represent the data flow [8],[ 9].

All possible access plans to a query define our state space E.This state space might become very large, for some cases. Therefore, we might choose to simplify it and reduce the amount of access plans by only allowing access plans of a certain shape.

In general, a node in a processing tree can have operands, which are composites themselves. This is what we call a *bushy tree*. If we want to form a binary tree out of n base relation (all of which can figure only once in the processing tree) we find $(n^{2(n-1)}-1)(n-1)!$ different solutions. This means that the state space becomes very large for growing n. A common restriction that is often made to reduce the size of the state space, is to allow only so called *linear trees*. A linear tree is a tree, whose internal nodes all have at least one leaf as a child. To take this even further, many algorithms consider only the space of all left-deep trees, meaning that only trees of the following form are allowed.This restriction reduces the number of accepted access plans significantly. The set of all possible left-deep access plans with n base relations is reduced to n! [3].

### 2.4 Formal Approach

With the notations given above, we can attempt to state the general problem of query optimization as follows:

*Given a query q, a space of access plans E, and a cost function cost(p) that assigns a numeric cost to an execution plan p∈E.*

Find the minimum cost access plan that computes q. This minimal cost access plan is called an optimal solution to the query.

| R ⋈ (S ⋈ T) | | | | | |
|---|---|---|---|---|---|
| A | B | C | D | E | F |
| a1 | b3 | c2 | d2 | e1 | f1 |

## 3. Query Optimization Algorithms: An Overview

When developing query algorithms, the optimality of the produced access plans is a very important issue. Therefore, many different algorithms have been developed and proposed as a good approach to the query optimization problem. So far, all of these algorithms can be divided into three major categories:

1) Deterministic Search Algorithms
2) Genetic Algorithms
3) Randomized Algorithms

**Evaluation:**

In Deterministic Search Algorithms:-On the other hand, it is known that the dynamic programming algorithm has high memory consumption for storing all the partial solutions found in the different loops.

Another downside of dynamic programming is its exponential running time. This makes an application involving more than about 10 – 15 queries prohibitively expensive.

Still, for queries with only a few joins, this approach works very well.

In Genetic Algorithms:- A problem with this approach might be that one member of the population is so prominent that it dominates the whole wheel. This way, it causes the disappearance of the other members' features. The evolution converges toward a generation, consisting of one super member. Even if the extinct members of the population might not have provided a high quality solution, they could still contain some valuable information.

Randomized algorithms are based on statistical concepts where the large search space can be explored randomly using an evaluation function to guide the search process closer to the desired goal. Randomized algorithms can find a reasonable solution within a relatively short period of time by trading executing time for quality. Although the resulting solution is only near-optimal, this reduction is not as drastic as the reduction in execution time. Usually, the solution is within a few percentage points of the optimal solution which makes randomized algorithms an attractive alternative to traditional approaches [6],[7].

### 3.1 Randomized Algorithms

The problem of finding an optimal plan is NP hard. Therefore we might try, if randomized algorithms could improve our search of an optimal plan.

A randomized algorithm is an algorithm that makes random choices as it proceeds. In our case, this means, that the algorithm performs random walks in the state space. Itmoves from state to state with the goal of finding a state with the minimum cost [1],[5],[6].

The advantages of randomized algorithms:

- Simplicity: There are many examples, where a randomized algorithm can match or even outperform a deterministic algorithm
- Speed: There are cases where the best known rando-

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mized algorithm runs faster than the best known deterministic algorithm.
_ Lower time bounds are expected in many cases.

Possible inconveniences of randomized algorithms:
- Often, the required solution is found only with high probability
- A randomized algorithm might not find the correct answer at all [1].
- There might exist cases, where a randomized algorithm could take very long to find the correct answer.
In the following sections, The best known randomized algorithm, As per study,I will suggests the randomized because this is the only approach which is better suited for join optimizations.
Which again are two different randomized algorithms named Iterative Improvement (II) and Simulated Annealing (SA).
But for a start I will start with Iterative Improvement method; it will be necessary to introduce some terminology which is commonly used when working with randomized algorithms [1].

### 3.1.1 Terminology

Randomized algorithms consider access plans as points in the solution space.
Different access plans are connected through *edges*, allowing us to move around the solution space. These edges are defined by a set of allowed *moves*.
This set depends very much of the solution space. A commonly used set for left-deep processing trees would for example be the following:
S = {Swap, 3Cycle}, where swap simply exchanges the positions of two arbitrary relations and 3Cycle performs a cyclic rotation of three arbitrary relations in the processing tree (Note that this is allowed due to the commutativity and associativity of the join operator.)
*Neighbour(A)* is the set of access plans that can be reached from the access plan A by performing moves defined in S.
Further, we call a state A a *local minimum* if for paths starting at A any downhill move comes after at least one uphill move, whereas a state is considered to be a *global minimum* if it has the lowest cost among all states in the solution space[2].

### 3.1.2 Iterative Improvement (II)

The Iterative Improvement algorithm starts at a random state. It then performs a number of downhill moves in order to find a local minimum. These moves are chosen as follows:
Starting at a random state S, II explores the set of neighbours of S for possible moves. II determines the cost of S as well as that of a randomly chosen neighbour. If the neighbour's cost is lower than cost(S), then, the move is a downhill move and is therefore accepted. If the neighbour's cost is higher, no move is performed. Instead,II will repeat the cost calculation with a different neighbour, in the hope of finding one of lower cost than S.
Further moves are performed until reaching a local minimum. The procedure above is repeated various times, each time starting at a new random state, until a stopping-condition is met. At that point the algorithm compares the local minima it found and chooses the state with the lowest cost. If there were enough repetitions of the first steps, we can hope that the algorithm has found a state that is close to the global minimum [1].

```
==============================================
function II()
minS = S
while not (stopping_condtition) do {
S = random state
while not (stopping condition) do {
S' = random state in neighbours(S)
if cost(S') < cost(S)
then S = S'
}
if cost(S) < cost(minS)
then minS = S
}
return minS
==============================================
```

## 4 CONCLUSIONS

We have met three types of algorithms in this elaboration. First, we looked at a deterministic algorithm, namely the exhaustive search dynamic programming algorithm.
We have seen that it produces optimal left-deep processing trees with the big disadvantage of having an exponential running time. This means, that for queries with more than 10-15 joins, the running time explodes.
Genetic and randomized algorithms on the other hand don't generally produce an optimal access plan. But in exchange they are superior to dynamic programming in terms of running time.
Since we have chosen a better join ordering the temporarily stored relation contains only one row. So consider the great importance of the join ordering for minimizing the number of rows.Iterative Improvement algorithms have shown that it is possible to reach very similar results with randomized algorithms depending on the chosen parameters.
Seeing that in future it will become more and more important to be able to deal with larger size queries, it is necessary to further explore these algorithms and try to improve them in terms of longer running time.

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# Agent-Based CBR for Decision Support System

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**Abstract** — The aim of this paper is to describe about Case Based Reasoning (CBR) which is based on agents and the implementation in Decision Support System (DSS). The Introduction Section gives a introduction about Data Mining, integration of Data Mining concepts with CBR, and defines the characteristics and process cycle of CBR. The Second Section describes about the Agents, DSS, and Agent-Based DSS. The Third Section describes about the CBR in Decision Support System. The Fourth Section describes the CBR (Agent-Based) for Decision Support System and Interaction between CBR Agents and components of Decision Support System. The Final section gives a conclusion about the paper.

**Index Terms**— CBR, Data Mining, Integration of Data Mining and CBR, Agents, Decision Support System,

## 1. INTRODUCTION

### A. Data Mining

Data Mining (DM) has become a popular method for extracting information from large databases. During the last few years, new technology has reduced the cost of storing data, and better technology in database management has made it easier to handle databases with gigabytes or terabytes of data. Most enterprises, organizations and governments now have huge databases, and the focus is thus changing from data collection to data analysis. If the size of the data base, dimension and the complexity of data representation are given, even then it is difficult for human to analyse the data.

### B. Case Based Reasoning

Case-Based Reasoning (CBR) is a method for solving problems by comparing a problem situation to previously experienced ones. The aim is to store information about earlier situations, and when new ones arrive, find the situation that is most similar, and reuse it to match the new problem if the most similar problem does not match sufficiently. This may involve using background knowledge or asking a user.

Information about the problem solving experience is learned by the Case-Based Reasoning system and the aim is to be able to handle an increased number of situations and also reason more on each situation to certify that it is handled correctly. Each case is a set of features, or attribute-value pairs, that encode the context in which the ambiguity was encountered. The case retrieval algorithm is mostly a simple k-nearest neighbour's algorithm. The basic case-based learning algorithm performs poorly when cases contain many irrelevant attributes. Unfortunately, deciding which features are important for a particular learning task is difficult.

At the highest level of generality, a general CBR cycle may be described by the following four processes: [1]

CBR methods can be divided into four steps, retrieve - find the best matching of a previous case, reuse - find what can be reused from old cases, revise - check if the proposed solution is correct, and retain - learn from the problem solving experience.

1) Retrieve

Retrieving a case means to start with a (partial) new case, and retrieve the best matching previous case. It involves the following subtasks:

Identify features - this may simply be to notice the feature values for a case. This can be filtering out noisy problem descriptors, infer other relevant problem features, check whether the feature values make sense in the given context, or generate expectations of other feature values.

Initially match - usually done in two parts, first an initial matching process which gives a list of possible candidates, which are then further examined to select the best. There are three ways of retrieving a case or a set of cases: By following direct index pointers from the problem features, by searching an index structure, or by searching in a model of domain knowledge.

Select - select a best match from the cases returned by the initially match. The reasoner tries to explain away non-identical features. If the match is not good enough, a better one is sought by using links to closely related cases. The selection process can generate consequences and expectations from each retrieved case, by using an internal model or by asking the user.

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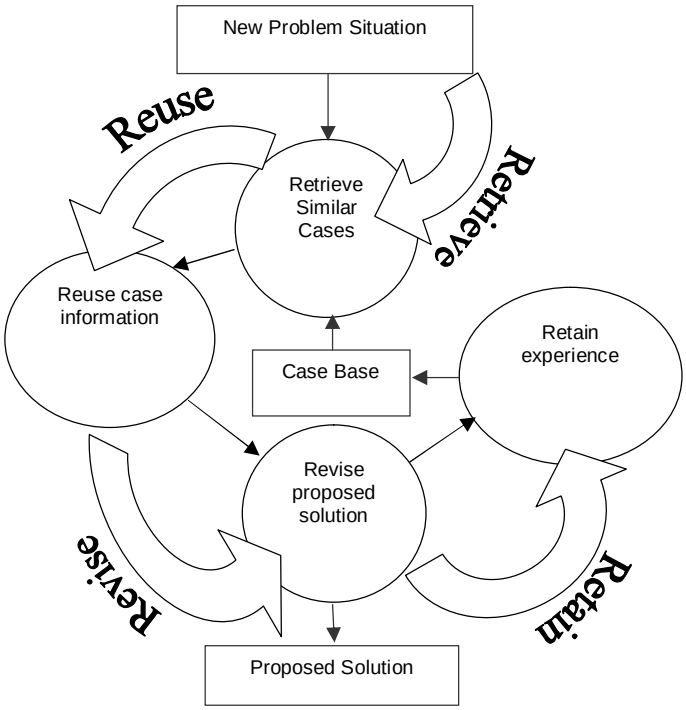


**Figure 1 The Case Based Reasoning Processing Cycle**

2) Reuse

The focus of reuse is to find the difference between the new and the old case, and find what part of the old case that can be used in the new case. It either involves copying the old solution or adapting it:

Copy - in simple classification, the differences between the old and new case are abstracted away, and the solution is simply copied from the old case.

Adapt - either the solution itself can be (transformed and) reused, or the past method that produced the solution can be used.

3) Revise

If the solution generated by the last phase is not correct, the system can learn from its failures. This involves:

*Evaluate* - try the solution proposed by the reuse-phase in the real environment, and evaluate it.

*Repair fault* - If the solution evaluated badly, find the errors or flaws of the solution, and generate explanations for them.

4) Retain

Incorporate what is useful to learn from the problem solving experience into the existing knowledge.
Sub processes are:

Extract - if the problem was solved using an old case, the system can build a new case, or generalize an old case to include the new case as well. If the user was asked, a new case should be constructed. Explanations may be included in the case.

Index - decide what types of indexes to use for future retrieval.

Integrate - modify the indexing of existing cases after the experience, strengthen the weight of features that were relevant, and decrease the weight of features that lead to retrieval of irrelevant cases.

### C. Data Mining and Case Based Reasoning Integration

Both methods are used for decision support, to organize and process information to make it available for improving the quality of decisions. The decisions might be taken by humans within an organization or by a computer system.

CBR relies heavily on the quality of the data collected, the amount of data, the amount of background knowledge and a way of comparing cases to decide which is most similar. The method is best suited for domains that change, and where we have little knowledge of underlying processes that govern the domain.

Data Mining is a way of extracting information from databases and can thus be used for extracting information which is relevant for a problem situation. It could also be used to find ``unexperienced'' problem situations from a database and represent it as a case, possibly by interacting with a user. Data Mining can infer rules, classifications and graphs from the data which can be used as background knowledge in a CBR system, and also to compute the similarity between cases.

Some Data Mining algorithms require background knowledge, which can be taken from a CBR system. By integrating the methods, we hope to make better use of information, and that this can lead to a growth for computer systems as well.

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## 2. AGENTS AND AGENT BASED DSS

### 2.1. Agents

An Agent is an idea, or concept provides a convenient way to describe software entity. Various authors have proposed different definitions of agents; these commonly include concepts such as

- ***Persistence*** (code is not executed on demand but runs continuously and decides for itself when it should perform some activity)
- ***Autonomy*** (agents have capabilities of task selection, prioritization, goal-directed behavior, decision-making without human intervention)
- ***Social ability*** (agents are able to engage other components through some sort of communication and coordination, they may collaborate on a task)
- ***Reactivity*** (agents perceive the context in which they operate and react to it appropriately).

The *Agent* concept is most useful as a tool to analyze systems. The concepts mentioned above often relate well to the way we naturally think about complex tasks and thus agents can be useful to model such tasks

### 2.2. Decision Support System

Decision support system is an interactive computer-based system intended to help decision makers use communications technologies, data, documents, knowledge and/or models to identify and solve problems, complete decision process tasks, and make decisions. The concept of decision automation is deceptively simple and intriguingly complex. From a narrow perspective, a decision is a choice among defined alternative courses of action. From a broader perspective, a decision involves the complete process of gathering and evaluating information about a situation, identifying a need for a decision, identifying or in other ways defining relevant alternative courses of action, choosing the 'best', the 'most appropriate' or the 'optimum' action, and then applying the solution and choice in the situation.

### 2.3. Agent Based DSS

In knowledge engineering, agents offer the flexibility to integrate many different categories of processing within a single system. Agent definitions range from descriptions based on a functional analysis of how agents are used in technology to far more ranging expositions based on different interpretations of the role and objectives of artificial intelligence and cognitive science. Artificial intelligence is a very diverse field and agents are used as metaphors for work in many areas.

Multi-agent systems are appropriate for domains that are naturally distributed and require automated reasoning. Agents should perform the following capabilities to some degree:

- Planning or reacting to achieve goals,
- Modelling the environment to properly react to situations,
- Sensing and acting,
- Inter-agent coordination,
- Conflict resolution (coordination is a continuous process; conflict resolution is event-driven, triggered by conflict detection).

To design a multi-agent system for a given problem, the designer has to understand how should agent and AI techniques be applied to the domain, what competencies agents need, and which techniques implement those competencies. Thus, multi-agent system design consists of

(1) Dividing resources and domain responsibilities among agents,

(2) Determining which core competencies satisfy which domain responsibilities, and

(3) Selecting techniques to satisfy each core competency.

According to distributed domain-specific responsibilities agent-based systems may be heterogeneous, with each agent responsible for a different set of goals or homogeneous, where agents share the same goals. Agents in the proposed system work according to simple workflow that is specified by user in terms of required support. [6]

Decision support systems are used by people who are skilled in their jobs and who need to be supported rather than replaced by a computer system. The broadest definition states that decision support system is an interactive computer-based system or subsystem intended to help decision makers use communications technologies, data, documents, knowledge and/or models to identify and solve problems, complete decision process tasks, and make decisions. Five specific decision support system types include:

- Communications-driven DSS,
- Data-driven DSS,
- Document-driven DSS,
- Knowledge-driven DSS,
- Model-driven DSS.

## 3. CBR IN DECISION SUPPORT SYSTEM

CBR is concerned with the solution of problems by identifying and adapting similar problems stored in a library of past experience/solutions. In our approach, CBR techniques are encapsulated into a Stimulus Agent, which dynamically influences the decision making process by assuming the dual roles of a *story teller* and an *advise.* [2]

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In the *story teller* role, the CBR agent helps in gaining alternative perspectives on the problem at hand by intervening autonomously during a decision making session and exposing them interactively to how problems are different, but relevant contexts have been approached and solved. The main two functions of the story teller role are to stimulate lateral thinking (associative thinking affecting the way problems are perceived and structured), to serve as a tutoring aid to inexperienced.

In the *advisory* role, the CBR agent attempts to exploit the knowledge stored in the case library to provide specific, context-related suggestions during the decision making process. In both cases, the CBR agent provides suggestive guidance to replace the judgment.

While many CBR systems have been designed for case-based problem solving, relatively fewer systems have

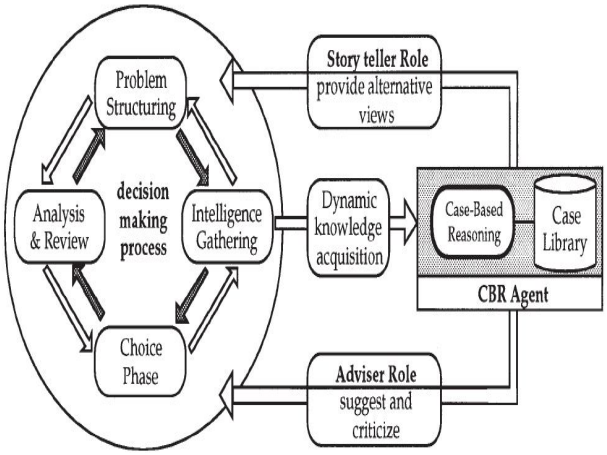


**Figure 2 Impact of CBR Agent in decision making process**

been designed for aiding decision making processes in which human judgment plays a central role. These systems tend to embody an outcome oriented view in which the emphasis is on *why* a solution works for a particular problem, ignoring the process by which the solution is obtained. [3]

## 4. INTERACTION BETWEEN CBR AGENTS AND COMPONENTS OF DSS

The kernel is the main part of the DSS and has as role to manage all the decision-support process. The environment includes essentially the actors and Distributed Information Systems (DIS) and feeds permanently the system with information describing the state of the current situation. In order to apprehend and to deal with this information, specific knowledge related to the domain as ontology and proximity measures are required. The final goal of the DSS is to provide an evaluation of the situation by comparing it with past experimented situations stored as scenarios in a Scenario Base (SB). The kernel is a MAS operating on three levels. It intends to detect significant organizations that give a meaning to data in order to support finally the decision making. [4]

### 4.1. Situation representation:

One fundamental step of the system is to represent the current situation and its evolution over time. Indeed, the system perceives the facts that occur in the environment and creates its own representation of the situation thanks to a factual agent's organisation. This approach has as purpose to let emerge subsets of agents.

### 4.2. Situation assessment:

This mechanism is studied "manually" by an expert of the domain and is similar to a Case-Based Reasoning (CBR), except it is dynamic and incremental. According to the application, one or more most pertinent scenarios are selected to inform decision-makers about the state of the current situation and its probable evolution, or even to generate a warning in case of detecting a risk of crisis. The evaluation of the situation will be then reinjected in the perception level in order to confirm the position of the system about the current situation. This characteristic is inspired from the feedbacks of the natural systems. In that manner, the system learns from its successes or from its failures.

### 4.3. Automating decisions:

Outcomes generated by the assessment agents are captured by a set of performative agents and are transformed in decisions that may be used directly by the final users.

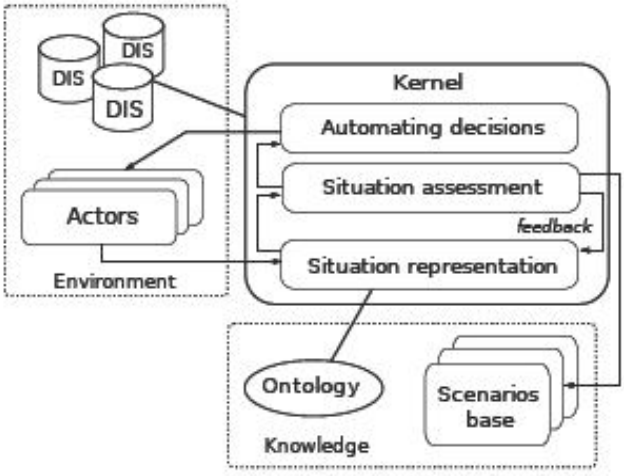


**Figure 3 Architecture of Decision Support System**

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## 5. CONCLUSION

We have described in this paper an agent-based approach which is also based on Case Reasoning that aims to build a DSS. The system intends to help emergency planners to detect risks and to manage crisis situations by perceiving, representing and assessing a current situation. Decision Support Systems (DSS) are the need of the hour to assure results at a faster rate that best match the buyers' preferences and give valid recommendations. The Case-Based Reasoning (CBR) approach is used, which is a novel paradigm that solves a new problem by remembering a previous similar situation and reusing the information on and knowledge of that situation to bring out similar cases at a faster rate. With the rapid development of case-based reasoning (CBR) techniques, CBR has been widely applied to real-world applications such as agent-based systems for ship collision avoidance. A successful Agent Based CBR relies on a high-quality case base.

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# Probiotics In Oral HealthCare - A Review

Dr. Sumit Narang, Dr. Ruby Gupta, Dr. Anu Narang

**Abstract—** This review focuses on the use of probiotics as preventive and therapeutic products for oral healthcare and the potential risks associated with dietary probiotics. Probiotics are live microbial food supplements or components of bacteria, which have been shown to have beneficial effects on human health. Current data suggest that dietary probiotics do not confer a major risk for oral health.There is a great need to elucidate the role of the oral beneficial microbiota, to identify and conduct proper large-scale studies on the usefulness of probiotics to maintain or improve oral health.

**Index Terms—**aging probiotics, oral health, beneficial bacteria, periodontics

## INTRODUCTION

The age-old quote by Hippocrates, 'Let food be thy medicine and medicine be thy food', is certainly the tenet of today. The market for functional foods that promote health beyond providing basic nutrition, is flourishing. Within the functional foods, is the small but rapidly expanding arena of probiotics.1 The term probiotic is derived from the Greek, meaning "for life" are microorganisms proven to exert health-promoting influences in humans and animals.2 The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) have stated that there is adequate scientific evidence to indicate that there is potential for probiotic foods to provide health benefits and that specific strains are safe for human use.2 In 1994, the World Health Organization deemed probiotics to be the next-most important immune defense system when commonly prescribed antibiotics are rendered useless by antibiotic resistance. The use of probiotics in antibiotic resistance is termed microbial interference therapy (replacement therapy or bacteriotherapy) and is sometimes used interchangeably with probiotics. With increasing understanding that beneficial microbes are required for health, probiotics may become a common therapeutic tool used by health care practitioners in the not-too-distant future.[3]

## PROBIOTIC BACKGROUND, CONCEPT

The idea of probiotics dates back to the first decade of 1900 when the Ukrainian bacteriologist and Nobel Laureate Ilya Metchnikof (1908) proposed that lactic acid bacilli may have beneficial health effects and attributed his own longevity to regular probiotic ingestion. The currently used consensus definition of probiotics was put forward by the World Health Organization and by the Food and Agriculture Organization of the United States and officially adopted by the International Scientific Association for Probiotics and Prebiotics term outlining the breadth and scope of probiotics as they are known today: Live microorganisms which when administered in adequate amounts confer a health benefit on the host.4,5,6,7

The term probiotics, the antonym of the term antibiotics, was introduced in 1965 by Lilly & Stillwell as substances produced by microorganisms which promote the growth of other microorganisms.8

Probiotics are live bacteria that can resist the rigors of the human digestive system, compete with pathogens, and that help to improve the gut flora balance. There are several basic characteristics of bacteria that may be effective probiotics. They should be preferably of human origin, innocuous, able to withstand processing conditions, and able to survive transit through the gut and colonize mucosal surfaces. They also should act against pathogens by means of multiple mechanisms and elicit minimal resistance to their effects. The onset of beneficial effects should be rapid in comparison with the time required for a vaccine to be fully protective. Optimally, they should function with or without antibiotics.9

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## COMPOSITION OF PROBIOTICS

Probiotics can be bacteria, moulds, yeast. But most probiotics are bacteria. Among bacteria, lactic acid bacteria are more popular.1 Fuller10 in 1989 listed the following organisms as species used in probiotic preparation: Lactobacillus bulgaricus, Lactobacillus plantarum, Streptococcus thermophillus, Enterococcus faecium, Enterococcus faecalis, Bifidobacterium species, and Escherichia coli. With the exception of L. bulgaricus and S. Thermophilus, all the other organisms are all intestinal strains.

A probiotic may be made out of a single bacterial strain or it may be a consortium as well (may contain any number up to eight strains). The advantage of multiple strain preparations is that they are active against a wide range of conditions and in a wider range of animal species.1 Probiotics can be in powder form, liquid form, gel, paste, granules or available in the form of capsules, sachets, etc.

## Characteristics of good probiotics

Fuller10 in 1989 listed the following as features of a good probiotic:

It should be a strain, which is capable of exerting a beneficial effect on the host animal, e.g. increased growth or resistance to disease.

It should be non-pathogenic and non-toxic.

It should be present as viable cells, preferably in large numbers.

It should be capable of surviving and metabolising in the gut environment e.g. resistance to low pH and organic acids.

It should be stable and capable of remaining viable for periods under storage and field conditions.

## Probiotics and general health[11]

Probiotics have traditionally been used to treat diseases related to the gastrointestinal tract. Studies suggest that probiotics may be useful in treatment of patients with hypertension, uro-genital infections, lactose intolerance, and elevated levels of cholesterol. Other areas of application include probiotic effects against Helicobacter pylori infections in the stomach, alcoholic liver disease, small bowel bacterial overgrowth, ulcerative colitis, allergy to milk protein, juvenile chronic arthritis, antioxidative effects, asthma, hepatic encephalopathy and their use as vaccine delivery vehicles.

## Probiotic strains in the oral cavity[4]

An essential requirement for a microorganism to be an oral probiotic' is its ability to adhere to and colonize surfaces in the oral cavity. Microorganisms generally considered as probiotics may not have oral cavity as their inherent habitat and, subsequently, their possibility to confer benefit on oral health is then questionable. Studies suggest that lactobacilli as members of resident oral microflora could play an important role in the micro-ecological balance in the oral cavity. The studies further demonstrated that lactobacilli strains with probiotic properties may indeed be found in the oral cavity. Yet there is no evidence whether these lactobacilli strains were detected due to the frequent consumption of dairy products leading to temporary colonization only, or if the oral environment is their permanent habitat.

## Probiotics and periodontal disease[8,4,12]

The oral microbiota is at least equally as complex as the gastrointestinal or vaginal microbiota. The many and varied microbial associations within the oral cavity include some that appear critical for maintaining health, according to Socransky. DNA probe studies of 40 taxa of oral bacteria obtained from subgingival plaque samples of healthy individuals and others with periodontal disease indicate that several bacterial taxa, including those associated with gingival health, co-occur in the periodontal crevice.

This group, designated the "green cluster," includes Capnocytophaga species, Campylobacter concisus, Eubacterium nodatum, and Streptococcus constellates. Moreover, dental biofilms are considered to be difficult therapeutic target. The current view on the etiology of plaque-related periodontal inflammation considers three factors that determine whether disease will develop in a subject: a susceptible host; the presence of pathogenic species; and the reduction or absence of so-called beneficial bacteria. In 1954, a beneficial effect of lactic acid bacteria on inflammatory infections of the oral mucosa was reported.5 The presence of periodontal pathogens could be regulated by means of antagonistic interactions. A decrease in

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gum bleeding and reduced gingivitis has been observed by Krasse et al with the application of L. reuteri. Koll-Klais et al reported that resident lactobacilli flora inhibits the growth of Porphyromonas gingivalis and Prevotella intermedia in 82% and 65%, respectively. Probiotic strains included in periodontal dressings at optimal concentration of 108 CFU ml were shown to diminish the number of most frequently isolated periodontal pathogens: Bacteroides sp., Actinomyces sp. And S. intermedius, and also C. albicans. These authors registered a 10- to 12-month remission period after periodontal treatment by application of the periodontal dressing that comprised collagen and L. casei.

Studies Mohammad S. Al-Zahrani13 have shown an inverse association between the intake of dairy products and prevalence of periodontitis. Yoshihiro Shimazaki14 concluded that the routine intake of lactic acid foods may have a beneficial effect on periodontal disease.

Candida albicans is among the most common infectious agents in the oral cavity. The incidence of yeast infections is higher at older age and under conditions of impaired immunity. Testing the pattern of colonization of L. acidophilus and L. fermentum, Elahi et al showed a rapid decline in C. albicans in mice after the intake of probiotic strains. Continuous consumption of probiotics led to almost undetectable numbers of fungi in the oral cavity, maintaining the protective effect for a prolonged period after cessation of application.

However, there is not yet any true evidence on the effect of probiotic therapy on periodontal disease, and the effect of the ingested probiotics needs further investigation.

## Probiotics and dental caries[4]

The impact of oral administration of probiotics on dental caries has been studied in several experiments utilizing different test strains. Lactobacillus rhamnosus GG and L. casei have proved their potential to hamper growth of these oral streptococci. C. Aglar et al registered definite S. mutans count reduction after a 2-week consumption of yoghurt containing L. reuteri. A temporary reduction in S. mutans was observed during the period of yogurt intake and few days after cessation of consumption, indicating the necessity of continual administration of the probiotic in order to achieve an effect. Considering the growing body of evidence about the role of probiotics on caries pathogens, however, it has been suggested that the operative approach in caries treatment might be challenged by probiotic implementation with subsequent less invasive intervention in clinical dentistry. However, more studies are definitely needed before this goal could be achieved.

## Probiotics and imbalanced oral ecosystem[4,8]

Halitosis, the oral malodor, is a condition normally ascribed to disturbed commensal microflora equilibrium. It has recently been positively affected by regular administration of probiotics. Given that oral microorganisms, especially those on the tongue, are the primary cause of halitosis, current treatments focus on the use of chemical or physical antibacterial regimes to reduce the numbers of these bacteria. However, most of these treatments exhibit only a temporary effect or are associated with undesirable side-effects when used over a long period of time.

Kang et al (2006) have shown a definite inhibitory effect on the production of volatile sulfur compounds (VSC) by F. nucleatum after ingestion of Weissella cibaria both in vitro and in vivo. In children, a marked reduction in the levels of H2S and CH3SH by approximately 48.2% ($P < 0.01$) and 59.4% ($P < 0.05$), respectively, was registered after gargling with W. cibaria containing rinse. The possible mechanism in the VSC reduction is the hydrogen peroxide generated by W. cibaria that inhibits the proliferation of F. nucleatum. Streptococcus salivarius, also a possible candidate for an oral probiotic, has demonstrated inhibitory effect on VSC by competing for colonization sites with species causing an increase in levels of VSC.

However, the few studies published on the role of probiotics in the treatment of halitosis do not entitle any evidence-based conclusions.

## Safety aspects[4,5]

The issue of safety is of special concern during the past few years due to the increased probiotic

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supplementation of different food products. Probiotics are often regulated as dietary supplements rather than as pharmaceuticals or biological products. Thus, there is usually no requirement to demonstrate safety, purity, or potency before marketing probiotics. This can lead to significant inconsistencies between the stated and actual contents of probiotic preparations, as shown in a recent South African study.

From the safety point of view, the putative probiotic microorganisms should not be pathogenic, should not have any growth-stimulating effects on bacteria causing diarrhea, and should not have an ability to transfer antibiotic resistance genes. The probiotics should rather be able to maintain genetic stability in oral microflora (Grajek et al, 2005) The most important area of concern with probiotic use is the risk of sepsis. One theoretical concern with the safety of probiotics is that some have been designed or chosen to have good adherence to the intestinal mucosa, and this is considered important for their mechanism of action. Adherence to the intestinal mucosa may also increase bacterial translocation and virulence. The most potent probiotics, therefore, may have increased pathogenicity. The relation between mucosal adhesion and pathogenicity in Lactobacillus spp. is supported by the finding that blood culture isolates of Lactobacillus spp. adhere to intestinal mucus in greater numbers than do isolates from human feces or dairy products. Lactobacillus bacteremia is a rare entity, and data on its clinical significance are mainly found through case reports. For the last 30 years there have been approximately 180 reported cases (Boriello et al, 2003). Clinical characteristics of Lactobacillus bacteremia are highly variable, ranging from asymptomatic to septic shock-like symptoms. Any viable microorganism is capable of causing bacteremia, however, especially in patients with severe underlying diseases or in immunocompromised state. Nevertheless, the present literature supports the conclusion that the incidence of Lactobacillus bacteremia is unsubstantial and that all the cases where it has been registered are individuals with other systemic diseases such as diabetes, cardiovascular diseases, gastrointestinal disorders, malignancies, or organ transplant patients. However, it is evident that careful monitoring is needed in this regard in the future.

The absence of acquired antibiotic resistances is another safety criterion to be tested in potential probiotic candidates. Some probiotics are closely related to opportunistic bacteria and this may also cause transferral of antimicrobial resistance genes in between microorganisms. Several results from antibiotic susceptibility tests claim that the tet(W) and tet(S) genes in some probiotic lactobacilli and bifidobacteria strains are responsible for gentamycin, sulfamethoxazole, polymyxin B, and tetracycline resistance. These investigations emphasize the need for a minimal safety evaluation during the selection of strains for probiotic use.

## The way forward[2]

The use of probiotics in general clinical practice is not far away. Molecular tools will continue to be used to understand and manipulate lactic acid bacteria with a view to producing vaccines and new and improved probiotic products. The critical step in wider application will be to make products available that are safe and clinically proven in a specific formulation easily accessible to physicians and consumers. Efforts are needed to advance the scientific knowledge of probiotics and determine their mechanisms of action, as well as describe when and why they fail in certain situations.

## Conclusion

Probiotic agents are living microorganisms belonging to the normal flora, with low or no pathogenicity and a positive effect on the health and well-being of the host. Probiotic therapy uses bacterial interference and immuno-modulation in the control of several infectious, inflammatory, and immunologic conditions. Similar to their better known actions in the gastrointestinal tract, probiotics exert their effects in many ways also in the oral cavity. Based on the currently available clinical data, it seems that dietary probiotics do not confer a major risk for oral health. However, the risk of transferring antibiotic resistance from probiotics to virulent microorganisms requires more evaluation.

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However data on oral probiotics' are yet insufficient and it is not known whether the putative probiotic strains could modulate, for example, immune response in the oral cavity as has been suggested to take place in the gut mucosa.

In conclusion, probiotics have made their way into oral healthcare and are more likely to be our friend than our enemy. Despite our rapidly increasing knowledge of pathogen–host interactions, the role of beneficial bacteria in preventing the emergence of pathogenic species and oral health remains obscure. There is a great need to elucidate the role of the oral beneficial microbiota, to identify beneficial bacteria and to conduct proper large-scale studies on the usefulness of probiotics to maintain or improve oral health.

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# GPS Based Voice Alert System for the Blind

Rishabh Gulati

**Abstract**— GPS is employed to find the position of the user on the earth. This information is provided by the GPS with the help of the data it receives from the satellites. GPS based voice alert system for the blind uses the current location and gives the alert to the blind man if it was his destination area. This paper describes the concept using a microcontroller based system. The system has a dynamic user interface and is easily operable. The system is realised using a GPS module (SR-92) and a Voice Module (APR9600) interfaced with a PIC16F877 microcontroller. The working of the system incorporates two stages; first the location based audio recording stage and second, the navigation of the blind person using the signal from the GPS receiver. The system employs a user friendly design and provides for an automatic location name announcement system.

**Index Terms**— Navigation, Audio input-output, User Interfaces, PIC microcontroller.

## 1 INTRODUCTION

The Global Positioning System (GPS) is a U.S. space-based radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. For anyone with a GPS receiver, the system will provide location and time. GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world.

GPS based blind man device with user input interfacing (voice based) intellectually finds the current location and gives the alert to the blind man if it was his destination area.

Microcontroller is the heart of the device. It stores the data of the current location which it receives from the GPS system, so that it can make use of the data stored to compare with the destination location of the user. By this it can trace out the distance from the destination and produce an alarm to alert the user in advance.

This device is designed to provide a voice based announcement for the user, i.e, the user gets the voice which pronounces his destination location as and when he is about to reach the destination. Here instead of an alarm sound the blind man can directly hear the location recorded by the user itself.

## 2 SYSTEM REQUIREMENTS

### 2.1 Hardware

#### 2.1.1 Voice Module (APR9600)

APR9600 is a low-cost high performance sound record/replay IC incorporating flash analogue storage technique. Recorded sound is retained even after power supply is removed from the module. The replayed sound exhibits high quality with a low noise level. Sampling rate for a 60 second recording period is 4.2 kHz that gives a sound record/replay bandwidth of 20Hz to 2.1 kHz.

However, by changing an oscillation resistor, a sampling rate as high as 8.0 kHz can be achieved. This shortens the total length of sound recording to 32 seconds. Total sound recording time can be varied from 32 seconds to 60 seconds by changing the value of a single resistor. The IC can operate in one of two modes: serial mode and parallel mode. In serial access mode, sound can be recorded in 256 sections. In parallel access mode, sound can be recorded in 2, 4 or 8 sections. The IC can be controlled simply using push button keys. It is also possible to control the IC using external digital circuitry such as microcontrollers and computers.

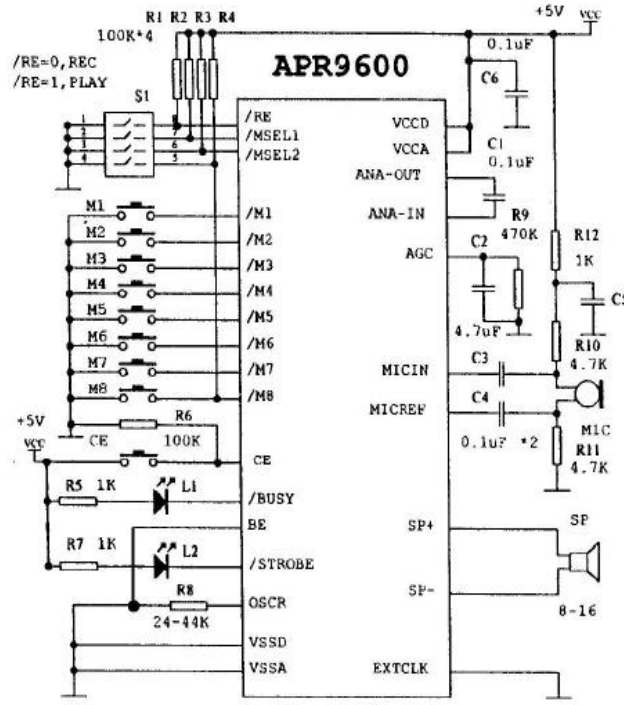


Figure1: circuit diagram of voice module

#### 2.1.2 GPS Module (SR-92)

The GPS Module SR-92 is a low power and ultra-high performance module which is perfectly suited for this system. It has a 5 pin I/O interface. The module comes with a GPIO control pin for controlling the power. This

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module has an upgradeable Firmware for future potential performance enhancements.

**Specification:**

*General*

Tracking sensitivity – "-159dBm"
Chipset - SiRF StarⅢ
Channels - 20 channel all-in-view tracking

*Power*

Power input - 3.3V
Power consumption at full tracking - 40mA

*Interface*

Update time - 1 second
NMEA output protocol - V.3.00
Baud rate - 4800 (default), 9600, 19200, 38400, 57600
Bps (8-N-1)

### 2.1.3 Microcontroller

The microcontroller used for this system is PIC16F877A. The PIC families of microcontrollers are developed by Microchip Technology Inc. Currently they are some of the most popular microcontrollers, selling over 120 million devices each year. There are basically four families of PIC microcontrollers:

PIC12CXXX 12/14-bit program word
PIC16C5X 12-bit program word
PIC16CXXX and PIC16FXXX 14-bit program word
PIC17CXXX and PIC18CXXX 16-bit program word

#### 2.1.3.1 Features

The CPU uses Harvard architecture with separate Program and Variable (data) memory interface. This facilitates instruction fetch and the operation on data/accessing of variables simultaneously. Basically, all PIC microcontrollers offer the following features:

- RISC instruction set
- On-chip timer with 8-bit prescaler
- Power-on reset
- Watchdog timer
- Power saving SLEEP mode
- Direct, indirect, and relative addressing modes
- External clock interface
- RAM data memory
- EPROM (or OTP) program memory

Some devices offer the following additional features:

- Analogue input channels
- Analogue comparators
- Additional timer circuits
- EEPROM data memory
- Flash EEPROM program memory
- External and timer interrupts
- In-circuit programming
- Internal oscillator
- USART serial interface

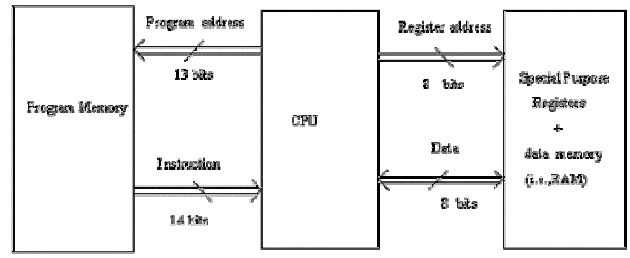


Figure2: architecture of PIC microcontroller

#### 2.1.3.2 Pin Description

PIC16F877 is a 40 pin microcontroller. It has 5 ports port A, port B, port C, port D, port E. All the pins of the ports are for interfacing input output devices.

Port A: It consists of 6 pins from A0 to A5
Port B: It consists of 8 pins from B0 to B7
Port C: It consists of 8 pins from C0 to C7
Port D: It consists of 8 pins from D0 to D7
Port E: It consists of 3 pins from E0 to E2

The rest of the pins are mandatory pins these should not be used to connect input/output devices.

Pin 1 is MCLR (master clear pin) pin also referred as reset pin.

Pin 13, 14 are used for connecting the crystal oscillator to generate a frequency of about 20MHz.

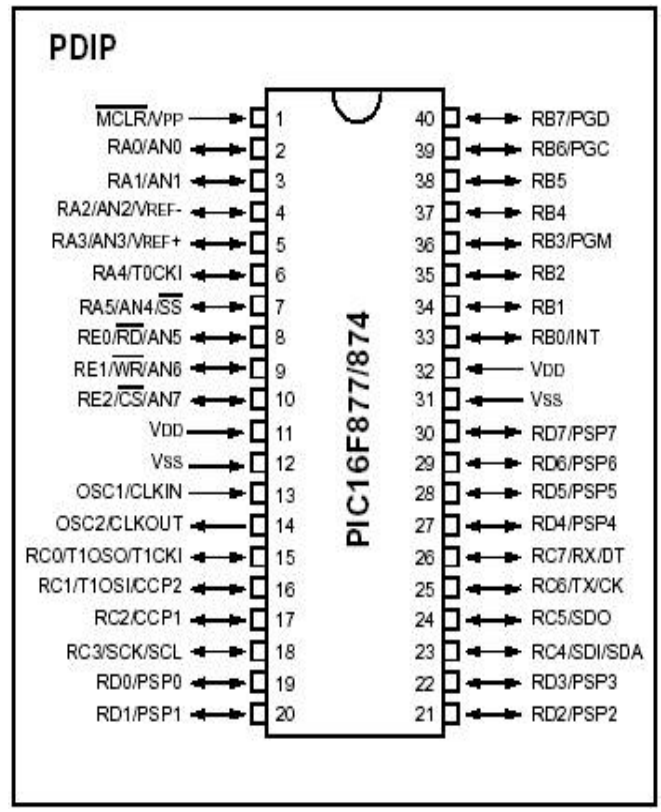


Figure3: pin diagram for PIC16F877

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### 2.1.4 Regulated Power Supply

A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

A power supply may include a power distribution system as well as primary or secondary sources of energy such as

- Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics.
- Batteries.
- Chemical fuel cells and other forms of energy storage systems.
- Solar power.
- Generators/alternators.

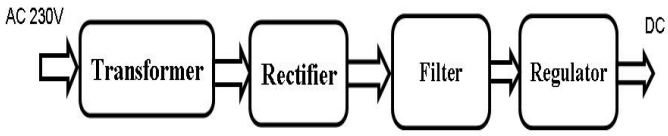


Figure4: Regulated Power Supply

### 2.1.5 Micellaneous items

• An LCD display is incorporated for a better user interface. Its primary use is to display the latitude and longitude of the current location.
• Two different coloured LED's for indicating the type of data received from the GPS receiver.
• A Speaker, for announcing the message's, recorded using the voice module.

## 2.2 Software

### 2.2.1 Express PCB

This software is used for designing the circuit. Breadboards are great for prototyping equipment as it allows great flexibility to modify a design when needed; however the final product of a project, ideally should have a neat PCB, few cables, and survive a shake test. Not only is a proper PCB neater but it is also more durable as there are no cables which can yank loose.

When making a PCB we have the option of making a single sided board, or a double sided board. Single sided boards are cheaper to produce and easier to etch, but much harder to design for large projects. If a lot of parts are being used in a small space it may be difficult to make a single sided board without jumpering over traces with a cable. While there's technically nothing wrong with this, it should be avoided if the signal travelling over the traces is sensitive (e.g. audio signals).

A double sided board is more expensive to produce professionally, more difficult to etch on a DIY board, but makes the layout of components a lot smaller and easier. It should be noted that if a trace is running on the top layer, check with the components to make sure you can get to its pins with a soldering iron. Large capacitors, relays, and similar parts which don't have axial leads can NOT have traces on top unless boards are plated professionally.

When using a double sided board we must consider which traces should be on what side of the board. Generally, we put power traces on the top of the board, jumping only to the bottom if a part cannot be soldered onto the top plane (like a relay), and vice- versa.

### 2.2.2 PIC Compiler

PIC compiler is a software in which the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. PIC compiler also supports C language code.

It's important that we know the C language for microcontrollers which is commonly known as Embedded C. The PCB, PCM, and PCH are separate compilers. PCB is for 12-bit opcodes, PCM is for 14-bit opcodes, and PCH is for 16-bit opcode PIC microcontrollers. These compilers are specifically designed to meet the unique needs of the PIC microcontroller. When compared to a more traditional C compiler, PCB, PCM, and PCH have some limitations. One of the limitations being function recursion is not allowed.

This is due to the fact that the PIC has no stack to push variables onto, and also because of the way the compilers optimize the code. The compilers can efficiently implement normal C constructs, input/output operations, and bit twiddling operations. All normal C data types are supported along with pointers to constant arrays, fixed point decimal, and arrays of bits.

### 2.2.3 Proteus

Proteus is a software which accepts only hex files. Once the machine code is converted into a hex code, that hex code has to be dumped into the microcontroller and this is done by Proteus. Proteus is a programmer which itself contains a microcontroller in it other than the one which is to be programmed. This microcontroller has a program in it written in such a way that it accepts the hex file from the PIC compiler and dumps this hex file into the microcontroller which is to be programmed.

The program which is to be dumped into the microcontroller is edited, compiled and executed. After the successful compilation of the program, it is dumped into the microcontroller using a dumper.

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## 3 VOICE RECORDING AND WORKING PROCEDURE

In this system, the GPS receiver and the control buttons are the input modules to the microcontroller while the Voice module and the LED indicators are the output modules to the microcontroller.

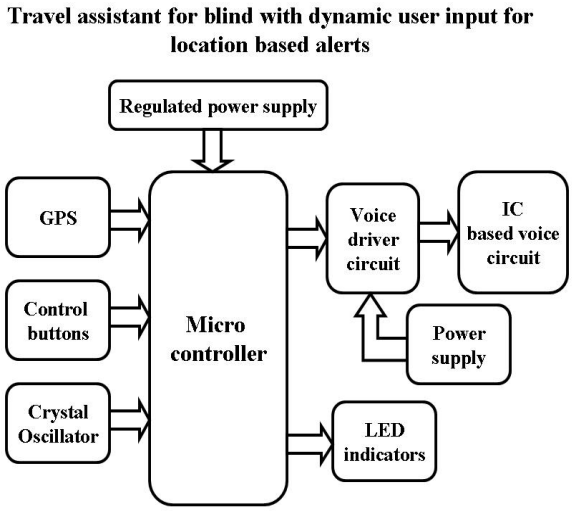


Figure5: system block diagram

The working of the system can be divided into two phases. The first phase would involve recording of the voice in the voice module. For this, we have to switch ON the voice module by connecting the power supply (batteries). Then, using a push button and different selection buttons we record the voice. Since we are using eight selection buttons in this system we can record eight different voice messages.

There is a simple process involved in recording these eight messages. For recording a message we need to press the push button, followed by the selection button. While both the buttons are pressed, we hear a beep sound from the speaker, indicating that we can release the push button. While still holding the selection button, we can record a 5sec message. When we finish recording, the selection button is released.

In order to hear what we have recorded, we just need to press and hold the corresponding selection button for 1sec and the recorded message would be replayed.

The second phase deals with receiving the signal from the GPS receiver and actuating the voice module using the microcontroller. To implement this phase, we switch ON the main power supply to the microcontroller. Next, we show the GPS to the open sky for receiving the satellite signal. When the satellite signal is receieved by the GPS, the latitude and longitude of the current location is displayed on the LCD. If the data received from the GPS receiver is Active data then the yellow LED will glow, if the data is Void data then the red LED will glow. Active data means, when the GPS receiver gets the satellite signal it will give the current location values. Void data means if the GPS Receiver is unable to get the satellite signal it will give the previous data which may not be current location value.

After getting the signal, if we want to store the present location as an alerting location for the blind person, the following procedure will do the needful –

i. Press and hold the control button
ii. Press the restart button
iii. Release the restart button after 1sec
iv. Hold the control button until the LCD displays 'the current location is saved'

Like this we can store 3 different locations by using the control buttons. These values will be stored into the EEPROM which is a non-volatile memory. We just have to make sure that the distance between the two locations is greater than 100 meters. After storing the location(s), we need to restart the system.

Now when the blind person enters these regions (locations) with this system the voice module will announce the location names as we had recorded them with respect to the stored locations.

## 4 RESULT

The "GPS based voice alert system for the blind" is designed so as to alert the blind person through voice alerts when he enters into a particular location by announcing the location name. The locations names are pre recorded in the voice circuit and are announced when the person reaches those particular locations.

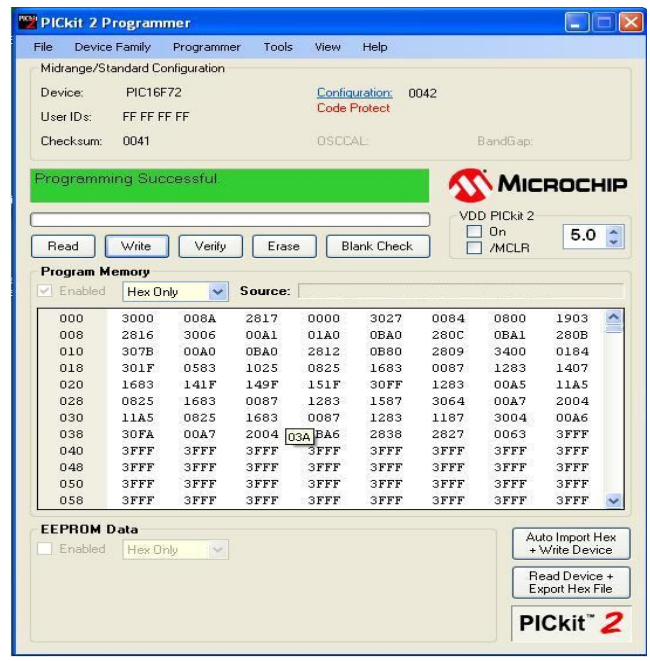


Figure6: successful program dumping using PICkit 2

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Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the system. This system has been successfully designed and tested using the PIC16F877 microcontroller.

## 5 CONCLUSION

The system designed consists of a GPS receiver and a voice circuit which is interfaced to the microcontroller. The microcontroller is programmed in such a way that depending on the satellite information of location the predefined location name will be announced.

The only major disadvantage of this system is the time taken by the GPS to receive its initial signal from the satellite, i.e, when it is switched ON. The above disadvantage can be removed by using a higher efficiency GPS receiver.

## 6 FUTURE SCOPE

This project can be extended by incorporating a GSM module. We can interface this module to send messages to the near and dear ones of the Blind person regarding his/her current position. Doing so, we can track the movement of the Blind person in a very efficient manner.

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# Methods Used to Handle Overloading of Information in Usenet

Deepika Saxena, Monika Saxena

**Abstract**— Usenet is the name of a worldwide network of servers for group communication between people. From 1979 and onwards, it has seen a near exponential growth in the amount of data transported, which has been a strain on bandwidth and storage. There has been a wide range of academic research with focus on the WWW, but Usenet has been neglected. Instead, Usenet's evolution has been dominated by practical solutions. This paper describes the history of Usenet in a growth perspective, and introduces methods for collection and analysis of statistical data for testing the usefulness of various caching strategies. A set of different caching strategies are proposed and examined in light of bandwidth and storage demands as well as user perceived performance.the advanced caching methods for news offers relief for reading servers' storage and bandwidth capacity by exploiting usage patterns for fetching or prefetching articles .i have shown the problems occurs in this type of methods with little bit solutions.users may want to read, but it will not solve the problem of near exponential growth nor the problems of Usenet'sbackbone peers.

## INTRODUCTION

Usenet was created in 1979 . Since, Usenet is the name of a worldwide network of servers for group communication between people. It has seen an impressive rowth from a small academic community to a network used by millions of people from a wide variety of backgrounds all over the world. The total size of the data flowing through Usenet has been more than tripling every year between 1993 and 2001.This growth has not been without problems, and has raised significant challenges in how to handle the ever-increasing volume of Usenet data flow. Very few are able to handle all of Usenet, and as the amount of users and data they produce increase, as do the challenges with having enough network bandwidth and storage capacity. Spending great sums of money on hardware components relieves the situation, but it does not solve it. My motivation for this thesis was to find a way to reduce the problems we see today. I have introduced the idea of advanced caching methods as a general improvement for parts of the Usenet distribution network, as well as discussed other work that has been done to relieve network bandwidth and storage capacity. I also introduce methods for analyzing and evaluating caching strategies based on statistical data from news servers.

I first provide an introduction to Usenet architecture and technology, followed by Usenet's history from the perspective of growth and the challenges of this growth, as well as a brief mention of some other trends and suggestions for dealing with the volume of Usenet data traffic. I present advanced caching strategies that may help handling these challenges. I then pose questions about what 1 way these methods may improve on Usenet.To my knowledge; there are no peer-reviewed sources for the growth of Usenet in a historical perspective or for caching of news in particular. The development of Usenet technology has been a community effort rather than an academic one, and many of the conventions and standards have been informal at first to be standardized later. I have attempted to structure and word the paper for an audience and people that is not familiar with Usenet, its historical background, how it used to work, what the protocols are, or how it works today. It is an advantage to have some familiarity with the Internet, the WWW, e-mail and networks. Readers familiar with how Usenet works, its history of growth, and the problems arising from. Definitions that I introduce are marked clearly, while Usenet specific terminology is explained as it is used with the terms *emphasized*.

## What Is Usenet?

News is a distributed platform for group communication mainly between human based on a network of servers all around the world."Usenet" is an Abbreviation for "Unix User Network", but is also known under other names, specifically "NetNews", simply "News" or "Usenet News". News is a slightly misleading name for what Usenet is meant for: asynchronous communication between people, as opposed to news items distributed by mass media.

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Usenet defines the following way:

Usenet is the set of people who exchange articles tagged with one or more universally recognized labels, called "newsgroups" (or "groups" for short). There is often confusion about the precise set of newsgroups that constitute Usenet; one commonly accepted definition is that it consists of newsgroups listed in the periodic "List of Active Newsgroups" postings, which appear regularly in news.lists.misc and other newsgroups. An even broader definition includes even newsgroups that are restricted to specific geographic regions or organizations.Each Usenet site makes its own decisions about the set of groups available to its users; this set differs from site to site.

The communication between users is largely controlled by local administrators of the news service the *news administrators* at a news service provider (NSP). An NSP can also be a full Internet Service Provider (ISP).
While Usenet is today mostly a part of the Internet, using the same basic network protocols for communicaion between servers, it has been common to say that “Usenet is not the Internet”. The reason for this is that the transport of news itself is not fundamentally dependent on the Internet; it just is the most used platform today.
There is much more to Usenet than I mention in this chapter, which is intended as an introduction and overview of what I consider relevant for understanding
this paper. Some parts have been simplified in order to avoid too much excruciating detail.

## The Usenet Model

The Usenet News model has the following major aspects to consider:
_ Message format
_ Message distribution
_ Message storage
The main flow of Usenet is commonly through the Internet, using the Network News Transfer Protocol (NNTP) , a TCP[1] based protocol for transmission. Most Internet standards are described in RFCs[2], and the IETF[3] is working on several new standards. Usenet’s standards are described in RFCs, but there are de facto Usenet standards not included in the RFCs, although the IETF is working on standardising these enhancements.

### 1.2.1 Message Format

Message format are logically divided into two separate parts, *head* (also called *headers*) and *body*. The headers contain meta-information about the article,such as who allegedly posted the article, from where, at what time, to which

```
From:Jan           Ingvoldstad           <ja-
ni+news@tsathoggua.rlyeh.net>
Subject: How do newsadmins deal with news
traffic today?
Newsgroups: news.software.nntp
Date: 30 Apr 2001 13:03:01 +0000
Message-ID:                          <ygtlmoiw-
nei.fsf@tsathoggua.rlyeh.net>
Sender: jani@tsathoggua.rlyeh.net
Path:
nntp.uio.no!uio.no!news.tele.dk!148.122.208.6
81!
news2.oke.nextra.no!nextra.com!news.klingenbe
rg.no!
tsathoggua.rlyeh.net!not-for-mail
```

Some example news headers

newsgroups, with what subject of discussion, a unique message ID, and the path through which servers the article has been passed to avoid re-relaying to those servers. Other headers may be used, but these are not relevant here; I will discuss some of these when necessary.The article’s body contains the actual message, which must be plain text, including quotations of former articles in the same discussion. casually the author adds a *signature*, which contains information about the author, a quip,a quote from a book or movie, or all of these at the same time. This signature is considered part of the body.**A Note on the Path Header** The Path header has a syntax from before the DNS[4] was created, and each news server identifier is separated by a “bang”– ’!’. This ID is either a name registered in the UUCP[5] maps or, since the introduction of DNS, the full DNS name of the server. The identifier must only be in place for relaying servers where the article passed as a news article, so if it passes via e.g. an e-mail server, there should be no entry for that. The last entry is not considered part of the path entry, and is in the case of a user agent normally the *local part* of an e-mail address, and the “not for-mail” entry is there in case it is difficult or impractical to supply that local part. With this last exception, it is supposed to be possible to send an e-mail to each entry in the path list, plus the local part after the path list.

### Message Distribution and Storage

While the news article format is compliant with the Internet mail message format, news distribution is significantly different from mail distribution.

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Many mailreaders are also newsreaders[6], which causes some initial confusion for users on this issue.News articles are commonly spread by a flooding algorithm between news servers, also known as *news feedrs/feeding servers* or *peers*. Where each *downstream peer* gets a *newsfeed* of articles from their *upstream peer*. This is called a "pushed" stream, similar to the "push" technology used for WWW The receiving servers reject articles they already have instead of requesting the ones they do not have. This is called a *pull stream*, like clients pulling documents off the WWW. Note that it is possible for the downstream peer to request articles from their upstream peer, but it is not commonly used.

So far, this is deceptively similar to Internet mail, which is also can be sent from server to server until finally received by the user's mailbox, although the current practice is to send e-mail directly to the server local to the receiving user. However, users do not get this feed directly in their own mailbox, as would be the case with Internet mail and mailing lists. Instead, their newsreader fetches a list of newsgroups and articles from the news server, using NNRP[7]. This kind of news server is called a *reader/reading server*. I will refer to this function as *reading server* from now on, in order to avoid confusion between human reader, newsreader program and reader server.The user then chooses which newsgroups to read articles from from his newsreader's *subscription list*. This list of *subscribed* newsgroups is updated by the user. When the user has chosen a newsgroup, he then can choose which articles to read within that newsgroup.**Note on Built-in Filtering in Newsreaders** Many newsreaders offer filtering methods based on patterns in article headers and body in the form of a so-called *kill file*. If an article matches this pattern, the newsreader will not download the article, and if it is already downloaded, it will not display it.

Some newsreaders offer additional functionality in form of a *score file*. This is also a kind of filter, but unlike a kill file, the choice is not black or white. *Scoring* is more flexible, and allows the user to set positive or negative values for various patterns. These values are cumulative. In addition to setting values for patterns, the user specifies a score threshold for which articles should be displayed. This way, it is possible to e.g. ignore certain authors, unless they post with a subject the user finds more interesting (high score for the subject pattern) than he finds the author uninteresting or annoying (low score for the author pattern). Articles are stored on these central news servers, making them shared as opposed to mailing lists, where each user effectively stores his own message copy in his mailbox. This does not prevent the user from downloading and storing his own copy.

Another way to explain the distribution of news from peer to peer, is to compare it to the message transfer system (MTS) of relaying mail transfer agents (MTA) in OSI's message handling system (MHS, from the X.400 recommendations . This is close enough to Internet e-mail in how it works that the comparison makes sense; Internet e-mail only issues receipts upon failed delivery, and then to the sender of the message. Messages are stored and forwarded for each node on the path from the sending UA to the receiving UA in both models. The important difference is that for Usenet news, messages are not distributed directly to the end users; they have to request them from their local reading server.

As opposed to e-mail, is that news is not a reliable medium of transport for messages. News was not designed for reliability, and there are control mechanisms that allow people to remove their own articles after they were posted.It is possible for one reading server to offer articles within one same newsgroup that another news server does not, yet responses to these articles may show up on both servers. This will typically happen if an article is attempted sent from one of the servers to the other, and the other does not respond or accept it before a predefined timeout at the first server. Where e-mail via SMTP usually will generate a response to the message sender if the message could not be delivered, news offers no such service. This is good for the users, whose mailboxes would be overflowing with such responses if there should be one generate for each of the news servers that could not receive it, considering that there are tens of thousands of news servers the article may have been attempted distributed to.

Even, it does not show that peers do not transport exactly the same amount of articles everywhere to everyone. What really happens is that each of the news administrators has made agreements with one or several news administrators about which newsgroups or hierarchies they will distribute between themselves. Some of these transport as much data as they can get a full newsfeed and can be considered part of a Usenet "backbone". Others transport other amounts of data. In addition to these differences in newsfeed size, these peers do not necessarily connect with the closest other peer. These issues are attempted visualized in the fairly complex . The real Usenet distribution network is far more complex.

**Information Structure**

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Articles are organized in *newsgroups* (discussion groups), similar to mailing lists in that they each have a name and a particular topic of discussion. In difference from mailing lists, newsgroups are organized in named hierarchies. It is possible for an article to be posted to several newsgroups simultaneously; this is called *crossposting*. The newsgroup names are on the form:

**Hierarchy What**

| | |
|---|---|
| comp | -Computers |
| humanities | -Arts and humanities |
| misc | -Miscellaneous |
| news | -Usenet |
| rec | -Recreational |
| sci | -Science |
| soc | -Social/Sociology |
| talk | -General discussions |

The names bear some significance to what the topic of discussion on that particular group is, both in that it has influence on what is to be discussed there, and in that it shows what actually is discussed. In addition to its name, most groups have a brief description stored at the reading server.

hierarchy *alt*, which is more "free" in how groups are created and organized, is also considered part of the core by many users and news administrators.

There are also national and local hierarchies that not necessarily followthis organization scheme for choice of top level names, but use similar schemes for their own subhierarchies.

## Handling the Challenges

Compared to Usenet, documents on the web live a long time. The web site Deja[19], later bought by Google[20] and renamed Google Groups[21], have attempted to store all news articles, with the exception of most binaries, for eternity. They have failed in that they do not have all news articles for the time period they are covering. Some of these are missing because authors have reserved themselves against being stored by use of the optional **X-No-Archive** header, which Google honors by not storing these articles. It is not uncommon for regular news servers to not get all articles that are posted to Usenet,but it is regrettable that those who set out to store and provide "everything" are unable to do so. Note that Google Groups does not try to store binary articles, which makes their task more manageable. The National Library of Norway preserves articles posted to the *no* hierarchy as a part of Norway's cultural heritage.

A news article cannot be changed once it is posted, but it can be cancelled and replaced by other articles, or simply be expired (deleted) because the news server attempts to conserve storage space. Such removal of articles happen all the time, since news administrators want to limit the use of storage space, and partially because there are automated utility news programs which cancel spam .To handle the ever-increasing traffic on Usenet, WWW for a few years, this has not been the case for Usenet .

DEFINITION 1 (PROXY)

*In the context of Usenet, a proxy is an intermediate server that transparently to user agents or downstream peers provides articles that it itself doesnot have, but are available from one of the proxy's upstream peers.*

DEFINITION 2 (CACHING)

*For Usenet, caching means copying and storing incoming data, and keepingthat data for a period of time.*

In terms of usability, flow and group control.

DEFINITION 3 (PREFETCHING)

*Fetching data from an upstream peer before it is requested by user agentsor downstream peers.*

It is useful to note that Usenet's flooding algorithm can be viewed as a time based prefetching caching mechanism, in that everybody gets a recently posted article as soon as possible after it is posted, and that it is then only up to the leaf nodes the reading servers to decide how many of these are available to their users.

## The History and Development of Usenet

In 1999, Usenet News turned 20 years. In those 20 years, many things have changed, but some underlying principles have remained. When BBSes (Bulletin Board Systems) were very popular, many people expressed that Usenet was just another BBS.Where BBSes (with few exceptions) were limited to single computers and people connected with their modems (or whatever means they had) to post their messages and discuss with others of like or different mind, Usenet was from the beginning a distributed system, where messages were transmitted between different computers to be available from more servers. Usenet was probably best compared with a network of BBSes, each carrying the same discussions.In 1999, Usenet News turned 20 years. In those 20 years, many things havechanged, but some underlying principles have remained. When BBSes (Bulletin Board Systems) were very popular, many people expressed that Usenet was just another BBS.Where BBSes (with few exceptions) were limited to single computers and people connected with their

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### The Beginning of Usenet

The birth of Usenet is linked to a single event: An operating system upgrade rendered existing bulletin board software non-functional, which caused two graduate students at Duke University in North Carolina, Tom Truscott and Jim Ellis, to develop the idea of a distributed news system. This was in the fall of 1979 [Hauben and Hauben, 1995].At first, Usenet was a substitute for a broken bulletin board system, an experiment with UUCP, based on a 3-page Unix shell script. The script allowed people to subscribe to different groups, post and read notes in sequence, and also post to different groups at the same time (crossposting) [Hauben and Hauben, 1995].Steve Bellovin, one of the people who Truscott and Ellis presented their design to, wrote the shell script using Unix V7 to test the design concept. The first Usenet was a two-server setup, but it evolved quickly.

## Conclusion

I have presented the history of Usenet from a growth perspective, and shown that there are technical problems with the its continued growth. Smaller sites cannot afford to offer their users all the newsgroups they might want to read, and the problem seems to be growing. While other solutions than caching such as filtering greatly reduce the size of a full newsfeed, they are rigid and do not adapt the incoming flow depending on usage, as caching will. The world wide web has used various caching methods for years, and a lot of work and research has been done to optimize caching for the web.However, nobody has worked with solutions for news.My proposed advanced caching methods for Usenet will help the smaller sites to appear to offer a greater amount of newsgroups and articles, but does not address the problem of the seemingly exponential growth. However, even a linear reduction in newsfeed size will buy the news administrators time to postpone the next hardware upgrade, which means they will save money.

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# Face Modeling using Segmentation Technique

M.Priya, Dr.S.Purushothaman

**Abstract -** This work focuses on 3D facial modeling using three images of a face. Each image is taken at $90^{o}$. Each image is segmented to identify skin, to locate eye centres, nose profile, mouth profiles. All the three images are combined to form a 3D facial model. The segmented portions of the images are placed on a standard computer plastic model. Subsequently, the various features of the plastic model are animated corresponding to the various positions of the features in the subsequent images.

Index Terms – Modeling, Contextual segmentation, Facial parameters.

## 1. Introduction

Modeling virtual human has attracted more and more attention from both the research and industrial community. 3D-modeling of human has wide applications from Virtual Reality application (requires real-time) to medical application (requires high accuracy). With the growing power of computer speed and multimedia ability, people would like to have their virtual counterpart as 3D data on the computer screen and utilize it for various applications as follows:

- human-machine interface
- advanced multimedia
- augmented reality
- immersive Virtual Reality
- simulation of human behavior with virtual human
- medical application
- communication (through network)
- multi-media games

There are two basic types of techniques for obtaining 3D human models, according to the different requirements for the models. The first technique focuses on the accuracy and precision of the obtained object model shapes, such as those used in computer aided design (CAD) systems for industrial purpose or medical application. The second technique concentrates on the visual realism and speed for animation of the reconstructed models, such as those used in virtual reality applications.

Systems using the second type of technique focuses on more practical aspects such as how cheap the hardware is and how easy it is to use. These techniques are usually model-based. There are several approaches to the reconstruction of either a face or a body from photographs. These approaches concern mainly visual realism using a high quality image input.

Some methods take a generic model and then both structural and shape information extracted from photographs is used to modify the generic model while others use silhouette information in several views to reconstruct the shape.

The approaches are simple and efficient, but the shape is not as accurate as the one from a laser scanner. The virtual reality application, usually the fast animation capacity with efficient shape representation with less numbers of points compensate with the accurate shape.

In this work, more on real-time applications since it is no longer fantasy to imagine that one can see herself / himself in a virtual environment moving, talking and interacting with other virtual figures or even with real humans. By advances in algorithms and new developments in the supporting hardware, this fantasy has become a reality. In addition, newly defined moving picture experts group (MPEG-4) supports the standard parameters for communication through network in real-time.

The issues involved in realistic modeling a virtual human for the real-time application purposes are as follows:

- acquisition of human shape data
- realistic high-resolution texture data
- functional information for animation of the human (both face and body)

For the photograph input, use the frontal view and the side view of a face while the frontal view, the side view and a back view are used for a body. Photographs of the whole body cannot provide sufficiently high-resolution for facial information in order to construct a good face model and further facial animation.

## 2. Schematic Diagram

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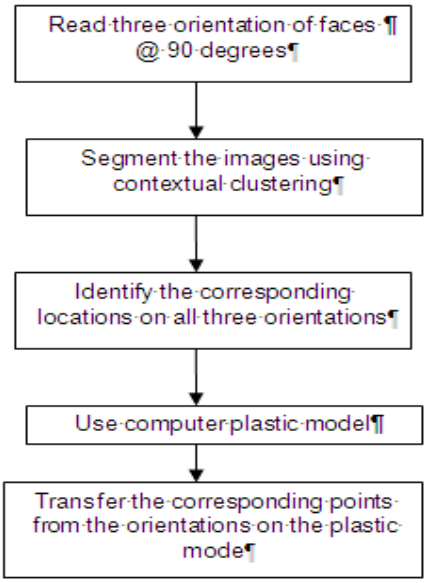


## 3. Contextual segmentation

Segmentation refers to the process of partitioning a digital image into multiple regions (sets of pixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. The result of image segmentation is a set of regions that collectively cover the entire image, or a set of contours extracted from the image. Each of the pixels in a region is similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly different with respect to the same characteristics. Several general-purpose algorithms and techniques have been developed for image segmentation.

Contextual clustering algorithms which segments an image into background ($\omega_0$) and object region ($\omega_1$). The pixel intensities of the background are assumed to be drawn from standard normal distribution.

1. Define decision parameter $T_{cc}$ (positive) and weight of neighborhood information $\beta$ (positive). Let $N_n$ be the total number of pixels in the neighborhood. Let $Z_i$ be the intensity value of pixel i.
2. Initialization: classify pixel with $z_i > T_\alpha$ to $\omega_1$ and pixels to $\omega_0$. Store the classification to $C_0$ and $C_1$.
3. For each pixel I, count the number of pixels $u_i$, belonging to class $\omega_1$ in the neighborhood of pixel i. Assume that the pixels outside the image area belong to $\omega_0$.
4. Classify pixels with

$$z_i + \frac{\beta}{T_{cc}}\left(u_i - \frac{N_n}{2}\right) > T_\alpha$$

to $\omega_1$ and other pixels to $\omega_0$. Store the classification to variable $C_2$.

5. If $C_2 \neq C_1$ and $C_2 \neq C_0$, copy $C_1$ to $C_0$, $C_2$ to $C_1$ and return to step 3, otherwise stop and return to $C_2$.

## 4. Facial parameter

The Face and Body animation Ad Hoc Group (FBA) has defined in detail the parameters for both the definition and animation of human faces and bodies. Definition parameters allow a detailed definition of body/face shape, size and texture. Animation parameters allow the definition of facial expressions and body postures. These parameters are designed to cover all natural possible expressions and postures, as well as exaggerated expressions and motions to some extent (e.g. for cartoon characters).

The animation parameters are precisely defined in order to allow an accurate implementation on any facial/body model. Here we will mostly discuss facial definitions and animations based on a set of feature points located at morphological places on the face.

The FAP are encoded for low-bandwidth transmission in broadcast (one-to-many) or dedicated interactive (point-to-point) communications. FAPs manipulate key feature control points on a mesh model of the face to produce animated visemes (visual counterpart of phonemes) for the mouth (lips, tongue, teeth), as well as animation of the head and facial features like the eyes or eyebrows. All the FAP parameters involving translational movement are expressed in terms of Facial Animation Parameter Units (FAPU).

These units are defined in order to allow the interpretation of FAPs on any facial model in a consistent way, producing reasonable results in terms of expression and speech pronunciation. They correspond to fractions of distances between some essential facial features (e.g. eye distance). The fractional units used are chosen to allow enough accuracy.

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## 5. Results and discussion

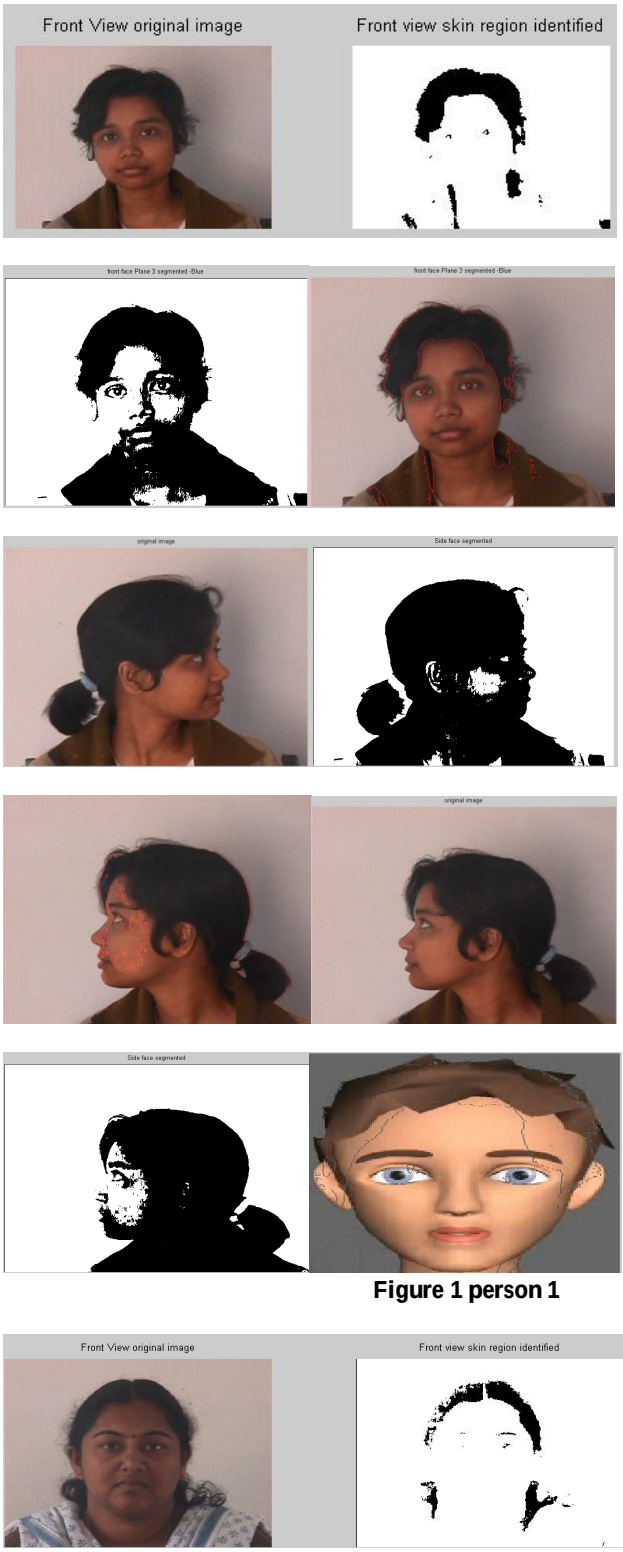


Figure 1 person 1

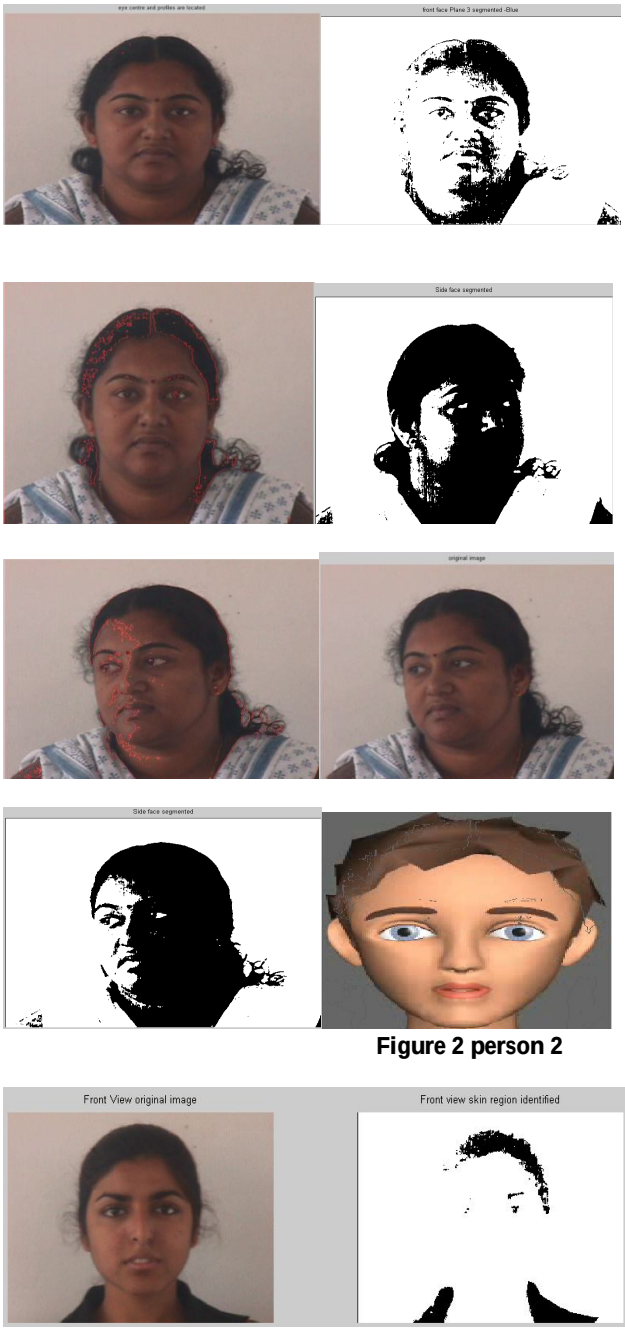

Figure 2 person 2

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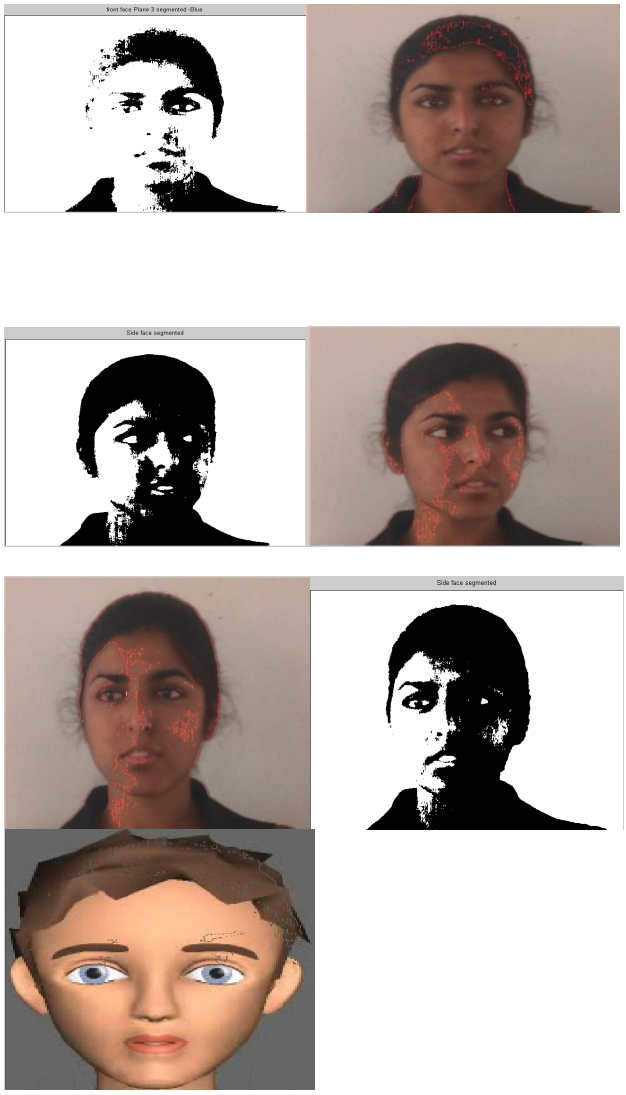

**Figure 3 person 3**

## 6. Conclusion

In this work, 3 persons facial expressions have been considered. For each person, left, front and right postures were considered. This work focuses on 3D facial modeling using three images of a face. Each image is taken at 90o. Each image is segmented to identify skin, to locate eye centres, nose profile, mouth profiles. All the three images are combined to form a 3D facial model. The segmented portions of the images are placed on a standard computer plastic model. Subsequently, the various features of the plastic model are animated corresponding to the various positions of the features in the subsequent images.

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# A Study of Application of Data Mining in Demonstrating Business Intelligence

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*Abstract*: -Business intelligence (BI) has been referred to as the process of making better decisions through the use of people, processes, data and related tools and methodologies. Data mining is the extraction of hidden stating information from large databases. It is a powerful new technology with large potential to help the company's to focus on the most necessary information in the data warehouse. This study gives us an idea of how data mining is applied in exhibiting business intelligence thereby helping the organizations to make better decisions.

*Keywords*: - The keywords, which are used in this project, are Business Intelligence, Data Mining, Data Base, Information Technology and Management Information System.

## I. Introduction

Data mining, is the extraction of hidden stating information from large databases, is a powerful new technology with large potential to help the company's to focus on the most necessary information in the data warehouse [Quinlan J R, 1993]. The tools of Data mining predict the future behaviours and trends and allow the business to make knowledge driven and proactive decisions. The prospective and automated analysis offered by data mining moves beyond the analysis of past events provided by contemplating tools of decision support systems. The tools of data mining can answer the questions of business that were traditionally too much consumption of time to solve. The tools of data mining clean the databases for the hidden patterns, and find the stating information that the experts may miss because it lies outside the expectations. Most of the companies already refine and collect the large quantities of data. Techniques of data mining is implemented rapidly on the hardware platforms and existing software to enhance the value of the consisting resources of information that is integrated with the new systems and products as they are brought online [Fayyad U, 1996].

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## II. Foundations of Data Mining

The figure below shows the knowledge extraction process from the available data by application of data mining techniques [Srikant R, 1997]:

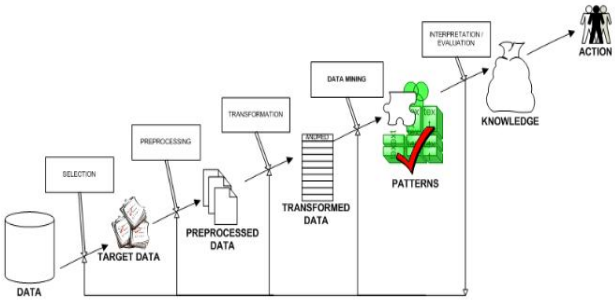


Figure 1: Knowledge Extraction Process

Data mining techniques are a result of long process of product and research development. This evolution started when the business data was 1st stored in the computers, continued with the improvements in access of data and recently, the generated technologies allow the users to navigate through their data in real time. Data mining takes the evolutionary process beyond the contemplating access of data and navigates to proactive and prospective delivery of information [Berry M, 1997]. Data mining is ready for the application in the community of business because it is supported by 3 technologies that are now adequately developed as the:

- Powerful multiprocessor computers.
- Massive collection of data.
- Algorithms of Data mining [Liu B, 1996]

## III. Introduction to Business Intelligence

Business intelligence is used to refer the number of company activities, which may undertake to collect information about their competitors or their market. Some areas are always included under the heading of business intelligence are: industry analysis, competition analysis and market analysis. Some people also consider the industrial espionage to operate for collection of information purposes to be a form of business intelligence. In most cases, the company will create their own dedicated group of business intelligence or hire outside agency. The business intelligence group will collect information from inside the company about how the company is performing and where the improvements are made. A business intelligence group then looks for outside sources, which include the public records of other business in the same

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sector, customer survey information and analysis of market by third parties. A business intelligence group will drive further into particular competitors, both by examining the business model and public information, in some cases an industrial spy is used to collect the information [Weiss S M, 1998].

The systems of business intelligence are contrasted to more classic forms of collection of information by their interdepartmental focus and their general overview towards the performance of business. They are also different in their use of advanced techniques and technology to crunch and mine the data in most optimal manner. A business intelligence group change the analysis of market have a strong understanding of the specific sector of the market in which business operates, their lack of same detailed understanding about the inner management of the company and particular competitors make their information useful. In the model of business intelligence all the various forms of improvement of business are tied together so that the communication is easy and quick and each segment helps to inform the other segments to be more valuable than they would be their own [Shafer J C, 1996].

### *A.* Importance of Business Intelligence in Organisations

When the companies are seeking cut in cost to regain the margins of profit the intelligent system of software provide better insight of the critical statistics of the data of company, which may be proven as a useful tool to build the future strategies of gain in profit. A company cannot analyze the data within the organization but can perform research market by collecting external data from web interface to analyze the trend with the help of software of Business intelligence. The software for Business Intelligence is the future of any business because it is not only the software but its intelligent system for the business provide total information of the business like personal data, analyze database data, supply chain information, sales marketing activity and customer database etc [Ferias A, 1998].

Applications of Business Intelligence are one of the systems and tools that play the major role in the process planning of business strategy. In addition, it allows the corporation to analyze, store, collect and access the necessary corporate data, which is helpful in the strategy of decision-making. The software for Business Intelligence is covering the areas of business like market research, customer, market segmentation, statistical analysis, profiling, products profitability and customer support etc. Business Intelligence system uses the data from the data mart or data warehouse of business. The corporation or an organization can use the software solution of Business Intelligence for different purposes [Jain A K, 1988].

- Handle the consumer better
- To balance the expense streams and revenue
- Market Research
- Altering levels of staff
- Customer support
- To forecast the sales

Applications of Business Intelligence are used for different support of Management Information System. Business Intelligence helps top-level management for making strategies as the application of Business Intelligence provides some functions [Muller F, 1998]:

- Strategic planning process for an organization
- It performs optimal solution gathering, planning, data mining and data warehousing, financial analysis, etc [Mehta M, 1996].
- It provides critical Decision Support System for organization
- Gathers data from web interface along with Business Intelligence platform
- It runs against all Enterprise Resource Planning data sources

Typical software for Business Intelligence follows certain steps to carry out the meaningful information of data for an organization to use it for future decision-making and prediction.

- Analysis
- Planning
- Prediction
- Execution of reports
- Gathering of legends by AS

Software for Business Intelligence has not become very useful and important only for small organization but also for big software organizations like Microsoft, which admires and supports the support given by the applications of Business Intelligence [Chan P, 1993].

## IV. Need for Applying Data Mining in Business Intelligence

Data mining is a process by which raw data or the computer programs analyze large amounts of information. The computer programs employ different types of criteria to decide which information is important, to show the trends and to sort the information. In business intelligence data mining is an essential tool, due to the fact that the understanding trends help the managers to improve the share of market by capitalizing certain trends and avoids negative trends [Augural R, 1993]. Examples of this are:

- Sales Analyzing as per Date: A business use techniques of data mining to maximize the sales by increasing the product availability that sells more during days of the week.
- Analyzing Website Traffic: Website owners analyze patterns of website traffic to determine which advertisements is more effective, based on overall success of the site, click patterns and time spent on each page. This allows the owners of site to remove the ads which improves the overall profitability of website

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ineffective and increases the effective ad campaigns [Haussler D, 1996].

- Analyzing patterns of Foot-Traffic: Owners of Casino uses analytic tools to find the patterns in choice of slot machines. If certain type of style of machine is picked up, regardless of placement, it is likely to be placed again. If certain location is favoured, regardless of the machine, the management uses that information to change the placement of the machines, and ensure that more traffic of gambling goes to more expensive machines. Retail establishment analyzes the patterns of foot-traffic in the store, compared with sales of various items in each location, to make decisions of placement of products [Chen M S, 1996].

The below figure shows the value created to an organization by the application of data mining in Business Intelligence:

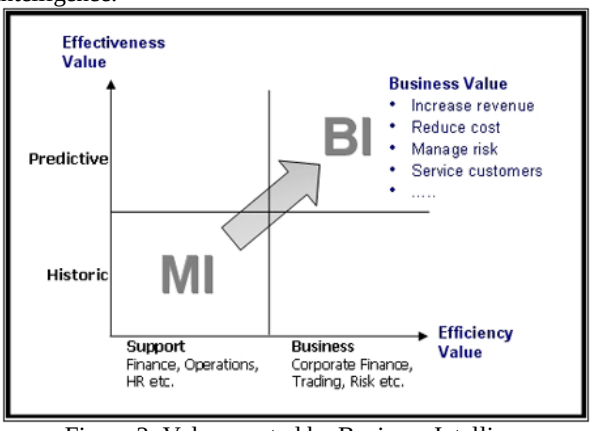


Figure 2: Value created by Business Intelligence

### *A.* The process of using Data Mining for Business Intelligence

Business intelligence is information about company's past performance that is needed to predict the future performance of company. It reveals the evolving trends from which the company may get profit. Data mining allow users to put large amount of available information in data warehouses and it also put the process in which the gems of business intelligence are found [Hand D J, 1998].

Data mining is not a framework or intelligence tool. Business intelligence is drawn typically from an enterprise data warehouse, which is used to uncover and analyze the information about past performance in an aggregate level. Business intelligence and Data warehousing provides a method for the users to foresee future trends from analyzing past patterns in the organizational data. Data mining is more spontaneous, that allows increased insight beyond data warehouse. Implementation of data mining in an organization will serve as a guide to uncover inherent tendencies and trends in the historical information. It also allows for classifications of data, statistical predictions and groupings [Mitchell T M, 1997].

Most companies deduce, gather and refine large quantities of data. Techniques of data mining is implemented rapidly in the hardware platforms and existing software to enhance the value of existing resources of information and can be integrated with new systems and products as they become a part of the system. When it is implemented on high performance parallel processing computer or client/server, tools of data mining analyze large databases to deliver the answers to different types of twist questions [Madigan D, 1996].

Software of data mining allows the users to analyze large databases to solve the problems of business decision-making. The tools of data mining predict future behaviours and trends, allows the business to make knowledge driven and proactive decisions. Data mining is an extension of statistics with few machine learning twists and artificial intelligence thrown in. Like statistics, data mining is not a solution for business it is a technology [Stafford B, 1997].

## V. Case Study- Netezza Performance Server

An infrastructure of the Business intelligence company is a great challenge with the demand for analyzing and storing information. It is a technology of patchwork that has piled up for different reasons over a long period. Many flavours of the Database Management System software, is implemented partially as middleware strategy or, as a collection of various assorted disk arrays, mid-tier Symmetric Multiprocessing server and myriad applications of end-user depending on various communication and database standards. Costly system administrators and databases that are fighting to keep up with the demands of user hold this technology of patchwork together. As much information is added to existing systems, they are becoming unreliable and decreasing dramatically. The initiatives of online such as analyzing and capturing click stream data, threatens to defeat the infrastructure entirely. As the demands of Business intelligence and customer growth of data the Vice President of the Netezza Company, the CIO and the Customer Knowledge Management are facing costly systems administrators and DBAs make multi-billion-dollar investments in software, networking and storage and hardware to lose battle to maintain the present levels of performance [Website. Download 101].

This situation is common for 2000 companies across many industries. Over the past few decades, high profile initiatives of management strain the present infrastructure with their need for access to data across the enterprise are:

- Operations management
- Customer Relationship Management
- Enterprise Resource Planning
- Supply Chain Management
- Partner Relationship Management.

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With all these stresses on the present infrastructure of Business intelligence it is not surprised that many technical pain points and business has evolved:

- Slow access of information inhibits spontaneous queries, which results in lost opportunities.
- Complex reports and queries require days or even hours to process.
- Speeds up processing, and the data are summarized and sampled limited analysis of depth.
- Collecting useful information requires training. A person who needs the data are not the same people who runs the queries. This results in lost opportunities and creates bottlenecks in the organization.
- Produces predictive models that is critical and often requires statistician's staff.
- Scalability suffers growth in databases beyond 100s of gigabytes.
- Costs increases discontinuously and unpredictably and the performance remains poor.
- Loading of data is painful and slow and requires medley of tools of Extract Transform Load tools;
- Queries run on outdated information yielding inaccurate and misleading results.
- Combining or standardizing data is difficult and time-consuming because data is held on different legacy systems and formats [Website. Download 101]..
- Analysis of data marts from large warehouse data extract data is critical to achieve in an acceptable frame of time.
- Teams of system administrators and database are required to tune queries and systems to achieve acceptable performance.

The below figure shows the multiple sources which contributes to the stresses of infrastructure of Business intelligence:

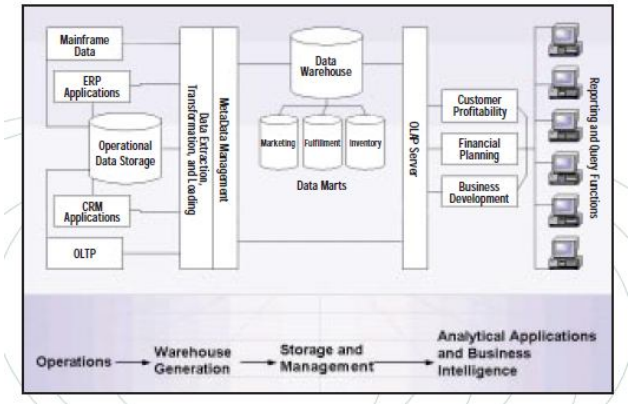


Figure 3: Existing BI Infrastructure

## VI. Future infrastructure of Business intelligence

Today, new platform of Business intelligence is needed to revitalize and rationalize the existing infrastructure. In today's business environment this new platform of Business intelligence provides a foundation for the growth of exponential data. It merges large parallel software and hardware and storage, which focus directly to provide optimal scalability and response times at the terabyte level. The new platform of Business intelligence eliminates yesterday's patchwork of storage, hardware and software, and enables optimized access to information. As technical and business demands continue to change and grow in the new century, the new platform of Business intelligence is designed to scale with the need, scope and performance and size of data. And it does all this in a predictable and affordable price [Website, Netezza].

The below figure shows the Netezza Performance server:

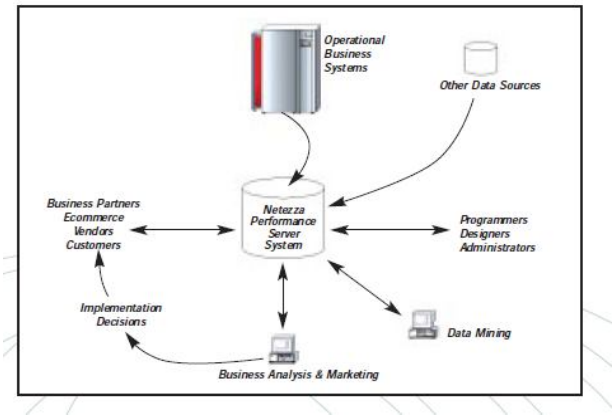


Figure 4: Netezza Performance Server Architecture

The new platform of Business intelligence offers large parallel processing, scalability and open architecture and allows growing without painful integrations of new systems or complex upgrades.

The Netezza Performance server of 7000 series is the realization of the new platform of Business intelligence. The Netezza Performance server system is an enterprise-class data warehouse appliance that delivers ease-of-use and breakthrough performance in a fraction of cost of traditional data warehouse. The Netezza Performance server appliance offers:

- 20 to 60 times the performance of existing data warehouse systems is half the price and finally affordable solution to users of business performance needs.
- Tight integration of database components, storage and server is largely parallel architecture that provides complex analysis and reports and rapid optimized execution of interactive queries.
- Extreme reliability and ease-of-use and a part-time DBA that requires to manage the system.
- Self-tuning data storage, real-time data loading and high throughput on complex and large workloads.

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- Straightforward integration, through open Application Programming Interfaces with all main elements of the Business intelligence environment: Business intelligence tools and applications, Enterprise Application Integration and Extract Transform Load tools, data sources and legacy systems [Website, Download 101].

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# ROLE OF SiCp ON THE SOLIDIFICATION RATE AND FORGEABILITY OF STIR CAST LM6/SiCp MMCs

Rabindra Behera, A.Datta, D.Chatterjee, Goutam Sutradhar

**ABSTRACT -** The present paper aims to investigate the solidification behavior and the forgeability of Aluminum alloy (LM6)-SiCp composites at different section of three-stepped composite castings. The temperature of the cast composites during solidification has measured by putting K-type thermocouples at the center of the each step/section, from which the solidification curves were constructed. The forgeability of the as cast MMCs were also measured at different section of the casting. The results show that the forgeability of cast metal matrix composites at the middle section of the casting is minimum compared to both end section of a three-step casting. Experiments were carried out over range of particle weight percentage of 7.5 - 12.5 wt% in steps of 2.5wt%. The solidification curves of Aluminum alloy (LM6)-SiCp composites compared with the unreinforced alloy (LM6) and the results reveal that significant increase in solidification time with the addition of SiC particles. The curves also show that the rate cooling and the solidification time are different at different section of the castings. This practical research analysis and test results on solidification behavior and the forgeability of Al/SiC-MMC will provide useful guidelines to the present day manufacturing engineers.

**Keywords:** Metal matrix composites (MMCs), Solidification, Cooling curve, Forgeability.

## 1. INTRODUCTION

Metal–matrix composites (MMCs) have been one of the key research subjects in materials science during the past two decades **[1].**MMCs have emerged as potential alternatives to conventional alloys and are widely used in aerospace and automobile industries because of their excellent physical, mechanical and development properties. However, the difficulties in production and the high manufacturing cost restricts their wider application in modern industry, although potential benefits in weight saving, improved mechanical properties and increased component life. Now a day, even in those terms, MMCs are still significantly more expensive than their competitors. Only simple production methods, higher production volumes, and cheaper reinforcements **[2,3]** can achieve the cost reductions. The search for cheaper, easily available reinforcement has led to the wider use of SiC and $Al_2O_3$ particles **[3]**. Therefore, the application of particle reinforced MMCs are now dominating the MMC market. There are several methods are used for the manufacturing of MMCs, of which, stir casting method is quite popular due to its unique advantages **[4-7]**. In this casting method, the reinforcing particles has introduced into the melt and stirred thoroughly to ensure their proper mixing with the matrix alloy. The properties of particle-reinforced metal matrix composites produced by stir cast method has influenced by various parameters such as type, size & weight fraction of reinforcement particles and its distribution in cast matrix metal. It also depends on their solidification behavior during casting. The rate of solidification has a significant effect on the microstructure of cast composites, which in turn affects their mechanical properties. From the moment of crystallization and solidification commencement, the crystalline phase begins to grow. Its growth proceeds in a direction opposite to the particles' movement. Thus, apart from the geometric factor, i.e. the type, volume fraction and size of reinforcing particles, it is the crystallization rate and the casting's solidification time that determine the structure obtained and particles' distribution in the matrix.

Particulate metal matrix composites have produced economically by conventional casting techniques. However, the stiffness, hardness and strength to weight ratio of cast MMCs are increased, but a substantial decrease in ductility has obtained. It has observed that some improvements in strength and ductility has found with the application of plastic forming processes i.e. forging to the cast composites. The forged MMCs having better mechanical properties compared to cast MMCs, such as it improves density, hardness and tensile strength etc. the forging process also avoids the use of secondary operation like machining. The forgeability is one of the important parameter, which gives information regarding the limitation of forging **[8-11].**

The study aims at determining and comparing the cooling curves obtained at different section of the castings (three-stepped casting) in sand mould for the matrix (LM6) and for its composites containing varying weight percentage of SiCp.

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The forgeability of as cast MMCs at different section of the castings have also studied.

## 2. Experimental procedure

LM6, is a well-known alloy of aluminum, is used as the base/matrix metal in the experiments for the fabrication of the composites that has been reinforced with 7.5 to 12.5 wt% in steps of 2.5% of SiCp of average 400 mesh size. The chemical composition of the matrix material (LM6) and the thermo physical properties of aluminum alloy, SiCp & sand have given in the **table-1 & table-2**. The composites are fabricated by the liquid metal stir casting technique. The aluminum alloy is melted in an electric resistance furnace and 3wt.% Mg has been added with the liquid metal, in order to achieve a strong bonding by decreasing the surface energy (wetting angle) between the matrix alloy and the reinforcement particles. The addition of pure magnesium has also enhanced the fluidity of the molten metal. The pre-heated silicon carbide particles (about 850-900$^0$C) added with the liquid metal and then mechanically stirred by using an impeller. The processing of the composite has carried out at a temperature of 750$^0$C with a stirring speed of 400-500 rpm. The melt has poured at a temperature of 745 $^0$C into a stepped silica sand mould. Three (i.e.$T_1$, $T_2$ & $T_3$) K-type thermocouples of 0.3 mm size has used at the centre of the different section of the mould to measure the temperature variation in the casting during solidification has shown in **Fig.1**. One thermocouple has inserted into the sand to measure the temperature variation of the molding sand after pouring of molten metal and during solidification of the castings. The solidification curves of the castings and the variation of temperatures at different sections in the mould are recorded with the help of a computer aided data acquisition system, the schematic sketch of the computer aided temperature data acquisition set up has shown in **Fig.2**. The figure of composite casting with thermocouples has shown below in **Fig.3.** Experiments carried out for a wide range of particle weight percentage varying from 7.5% to 12.5% in steps of 2.5%. Finally, the solidification curves of LM6-SiCp composites have compared with the unreinforced LM6 matrix alloy at different section of the casting. The micro structural characteristics of the alloys and composites at different section of the castings have also evaluated.

TABLE-1

**Chemical Composition (LM6)**

| Elements | Si | Cu | Mg | Fe | Mn | Ni | Zn | Pb | Sb | Ti | Al |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Percentage (%) | 10-13.0 | 0.1 | 0.1 | 0.6 | 0.5 | 0.1 | 0.1 | 0.1 | 0.05 | 0.2 | Remaining |

TABLE-2

**Thermo physical properties of the matrix, reinforcement particle and sand**

| Properties | LM6 | SiC particulates | Sand |
|---|---|---|---|
| Density(gm/cm$^3$) | 2.66 | 3.2 | 1.6 |
| Average particle size ( mesh) | ------- | 400 | ----- |
| Thermal conductivity(W/m-K) | 155 | 100 | 0.52 |
| Specific heat (J/Kg-K) | 960 | 1300 | 1170 |

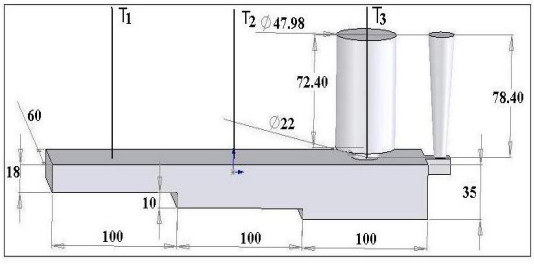


Fig1.The geometry of mould cavity with K-thermocouples ($T_1$,$T_2$&$T_3$). (All dimensions are in mm)

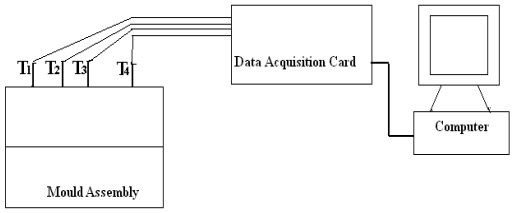


Fig2.Schematic sketch of the computer aided temperature data acquisition set up.

Thermocouples ($T_1$, $T_2$ & $T_3$ } connected with different section of casting and $T_4$ inserted into the sand

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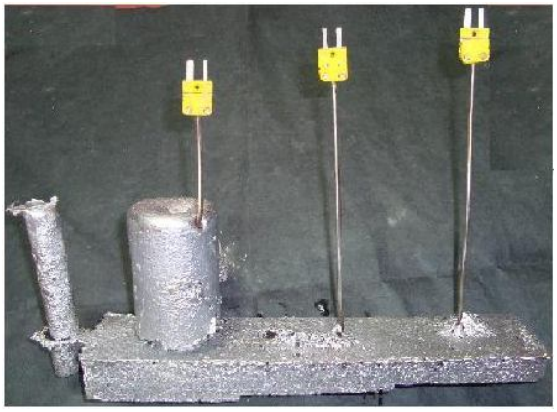

Fig3. Composite casting with thermocouples

**3. Addition of alloying elements and particle treatment**

The addition of reactive elements with the liquid metal during the production of composites by liquid metallurgy techniques promotes excellent bonding between reinforcement particles and molten matrix **[12].** For examples, the addition of magnesium, calcium, titanium, or zirconium with the liquid metal may promotes its wettability by reducing the surface tension of the melt, decreasing the solid- liquid interfacial energy of the melt, or by chemical reaction. It has been observed that in case aluminum based composites, magnesium has a greater effect incorporating reinforcement particles in the melt and improving their distribution than other elements such as cerium, lanthanum, zirconium, titanium, bismuth, lead, zinc and copper **[13-15].**

Magnesium is a powerful surfactant element, the addition of magnesium with the liquid aluminum and its alloy melt improves its wettability because of its lower surface tension (0.599 $Nm^{-1}$) compared with that of aluminum (0.760 $Nm^{-1}$) or aluminum-11.8 wt% Si (0.817 $Nm^{-1}$) **[16].** The addition of 3 wt% magnesium to melt reduces its surface tension from 0.760 to 0.620 $Nm^{-1}$ at 720$^{o}$C. In the work of Sukumaran et al**.[16]** they concluded that the addition of magnesium is necessary during the synthesis of A356-SiCp composites by a stir casting route, and found the optimum addition of magnesium for obtaining the best distribution and maximum 10-15 min., the metal tapped immediately and poured into the mold cavity.

**4. Results and Discussion**

**4.1. Microstructural Analysis**

Samples of as cast MMCs for metallographic examination were prepared by grinding through 320, 400, 600, 800, 1200 and 1500 grit papers followed by polishing with 6 µm diamond paste. Then the samples were etched with the etchant i.e. Keller's reagent. The microstructure of etched and dried sample has observed by using optical microscope (Olympus, CK40M). The microstructure of the as cast LM6 MMCs are shown in Fig.**4-6** at different section of the casting. The micrograph of MMC castings at different section shows that the distributions of SiC particles are not uniform throughout the casting and segregation of particles are more in the eutectic region. This tendency may be attributed to the fact that the rate of cooling is not uniform throughout the casting

mechanical to be 1 wt%. the addition of magnesium lower than the optimum value results in the formation of agglomerates of reinforcement particles and their non-uniform dispersion in the melt. Magnesium is also acts as a powerful scavenger of oxygen, it reacts with the oxygen present on the surface of particles, thinning the gas layer, and thus improving wetting and reducing the agglomeration tendency. A composite prepared by the liquid metallurgy route with SiCp in A356 alloy matrix, shown that the addition of magnesium helped in thinning the gas layer, which was present over the SiC particles **[17].** So, it has concluded that the presence of magnesium in aluminum alloy matrix during manufacturing of composites, not only enhance the fluidity of the liquid matrix, but also scavenges the oxygen from the surface of the particles, leading to an increase in the surface energy of the particles. But, the excess addition of magnesium in an aluminum melt will alter the microstructure of the matrix alloy and deteriorates the mechanical properties.

The heat treatment of particles before dispersion in the liquid metal aids their transfer by causing description of adsorbed gases from the particle surface. Agarwala and dixit **[18]** observed that the importance of preheating in the incorporation of graphite particles in an aluminum alloy. There was no retention when the graphite particles were not preheated, whereas the particles were retained when preheated. Heating of SiC particles to 900$^{o}$C assist in removing surface impurities, desorption of gases, and altering the surface composition due to the formation of an oxide layer on the surface**[19].** The ability of this particle oxide layer to improve the wettability of SiC particles by an alloy melt has been suggested by several investigators **[20,21]**. In the present experiment the SiC particles were heated for 2 hours at 850-900$^{o}$C in a electrical resistance muffle furnace and then introduced into the liquid metal within a short period of time of about 1-2 minutes during stirring of the melt. After stirring the liquid metal for

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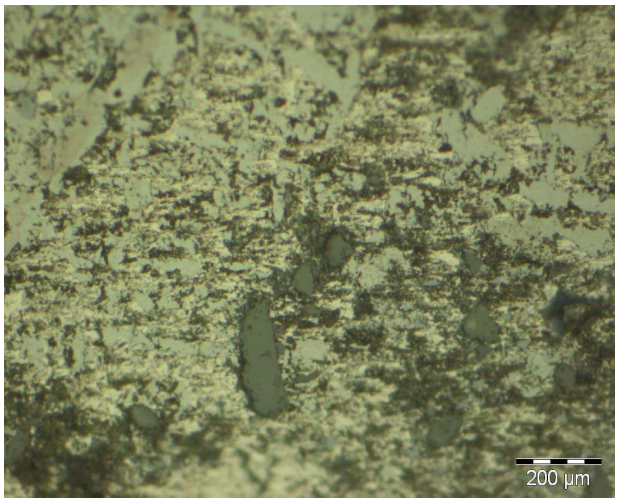
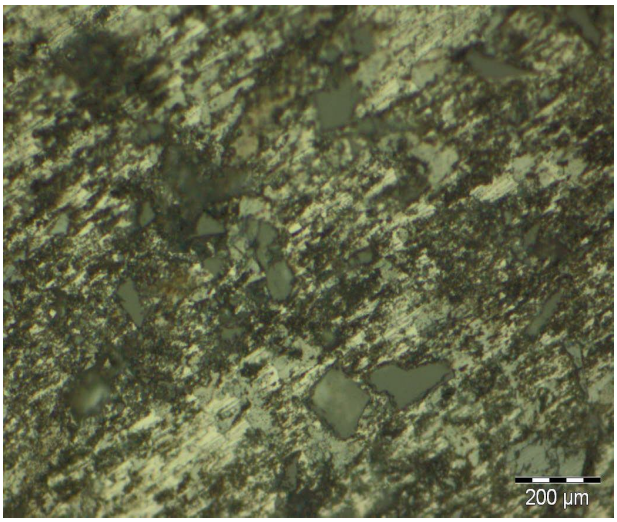
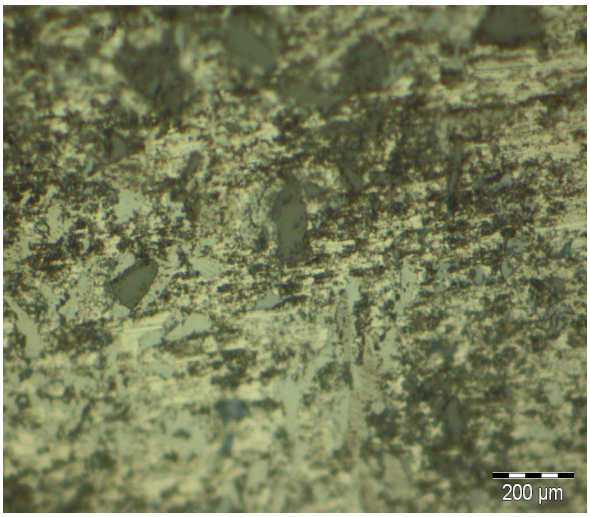
due to change in thickness of the casting and slower rate of cooling in the sand mold.




a. Section-I

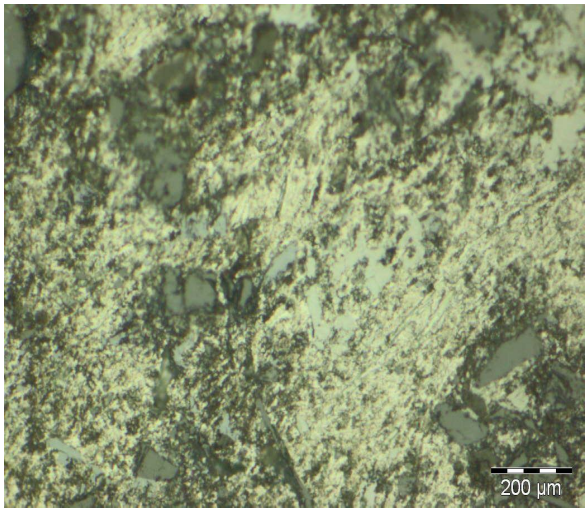



b. Section-II

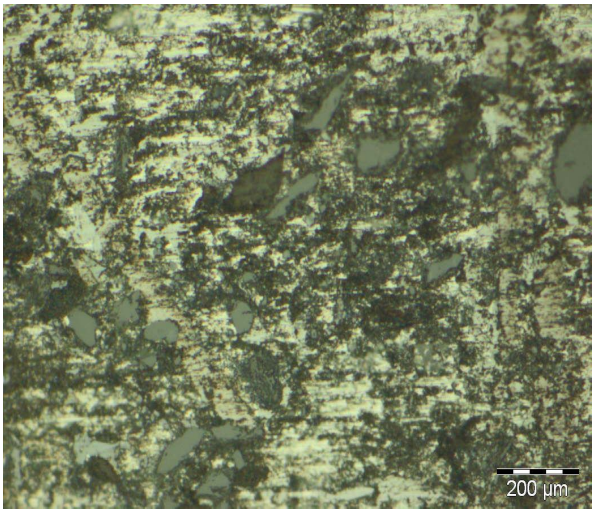



c. Section-III

Fig4. Microstructure of LM6/7.5wt% SiCp as cast MMC at different section of the casting.




a. Section-I



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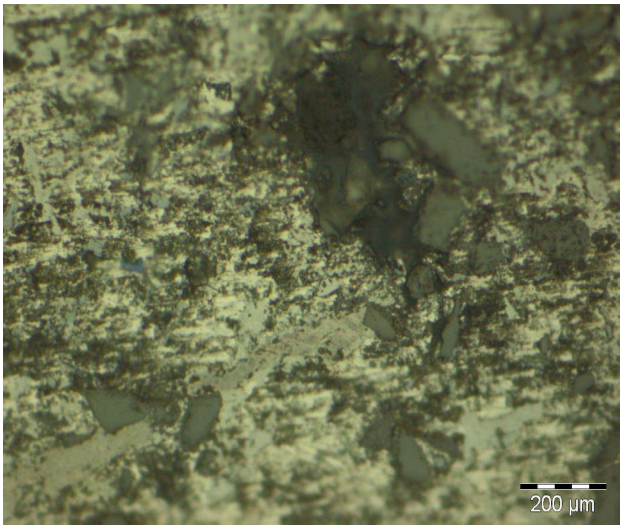
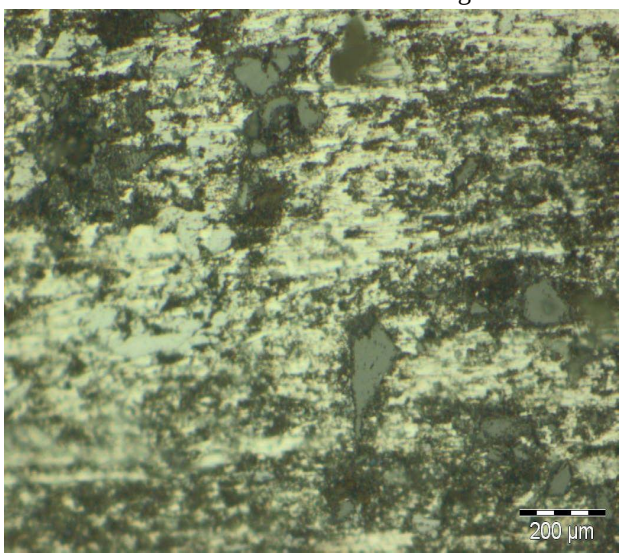
b. Section-II

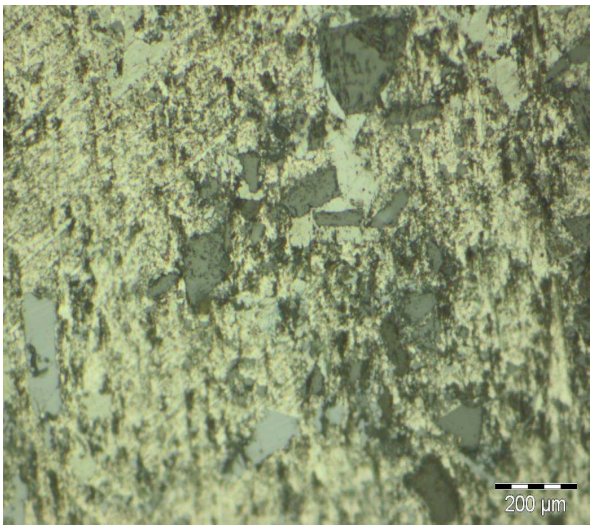



c. Section-III

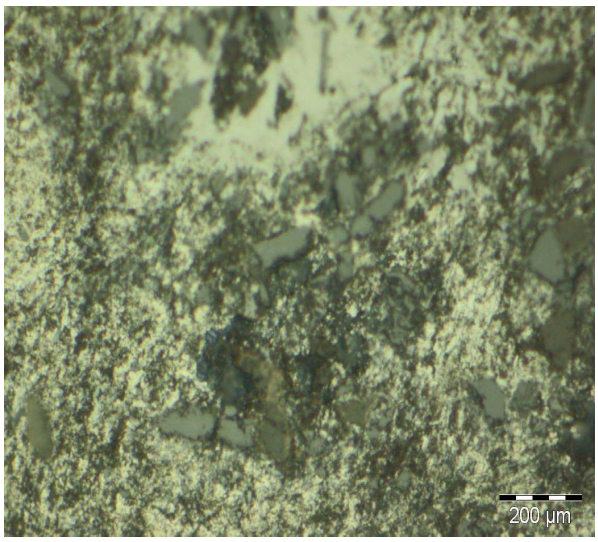
Fig5. Microstructure of LM6/10wt% SiCp as cast MMC at different section of the casting.




a. Section-I




b. Section-II




c. Section-III

Fig6. Microstructure of LM6/12.5wt% SiCp as cast MMC at different section of the casting.

**4.2. Solidification curves and their analysis**

Addition of an alloying element or second phase particles into a matrix alloy usually affects the various time and temperature parameters of its solidification curve. The variation in the nature of the cooling curve always has a significant impact on the microstructure and mechanical behavior of the material. **Fig.7-10** shows the cooling curve of the Al alloy (LM6) and LM6 reinforced with 7.5wt%, 10wt% and 12.5 wt% of SiCp metal matrix composites. The cooling curves for different section of castings at different weight fraction of SiCp indicates that the rate of cooling decreasing on increasing the weight percentage of SiCp in the cast MMCs. The cooling rate from the cooling curves it has observed that the eutectic solidification time (i.e. the time interval between the start and the end of the eutectic phase solidification) increases on increasing the weight percentage of SiC particles in the aluminum alloy matrix. It has also observed that the introduction of SiC particles in the matrix metal lowered the liquidus temperature when compared with the unreinforced alloy. **Fig.11** shows the variation of liquidus temperature with increase in weight percentage of SiC particle. This can be attributed to the unfavorable primary aluminum nucleation condition prevailing at the reinforcement surface and the depression in the freezing point due to the presence of reinforcement, which is considered as an impurity. Studies by Gowri and Samuel **[22]** have also shown that addition of particles lowers the liquidus temperature by about 10 $^{o}$C. The similar trend has also observed by T.P.D.Rajan et al. **[23]**.It is

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observed that the start of eutectic solidification of the matrix alloy (LM6) at a temperature of 574°C with the solidification ending at 572 °C. After addition of reinforcement particles i.e. SiCp in matrix alloy, the start and end temperature of eutectic solidification changes.

The addition of SiCp, increasing the eutectic solidification time as compared with the cooling curve of aluminum alloy (LM6). The eutectic solidification time also changed with the modulus of the casting, the cooling curve indicates that on decreasing the section modulus of the MMC castings the eutectic solidification time decreases at different weight fraction of SiC particles i.e. in case of lowest modulus the eutectic solidification time is less compared to highest modulus. This validates that the Chvorinov's rule still applies to the solidification process, irrespective of what additives are added to the molten metal **[24,25]**. The cooling curve shows that the eutectic solidification time enhanced on increasing the weight fraction of reinforcement particles compared to unreinforced matrix alloy. **Fig.12** shows the variation in eutectic solidification time with respect to different weight percentage of SiCp and at different section of the castings. It has observed that on increasing the weight percentage of SiCp in the cast Al alloy (LM6) metal matrix composites the eutectic solidification time increases at different modulus of the castings. That means the total solidification time (i.e. the time interval between the start of primary aluminum phase nucleation and the end of the eutectic phase solidification) increases on increasing wt% of SiCp. This trend may be attributed to the fact that the amount of heat extraction reduced on increasing the weight percentage of SiC particles in the liquid matrix metal as the presence of SiC particles in the matrix metal reduced the thermal conductivity and thermal diffusivity **[23].**

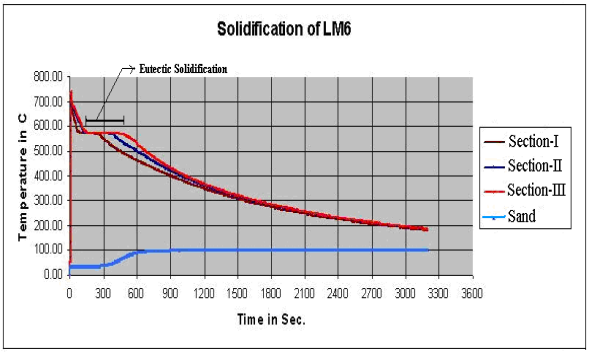


Fig7.Cooling curves of Al (LM6) composites at different section of the casting.

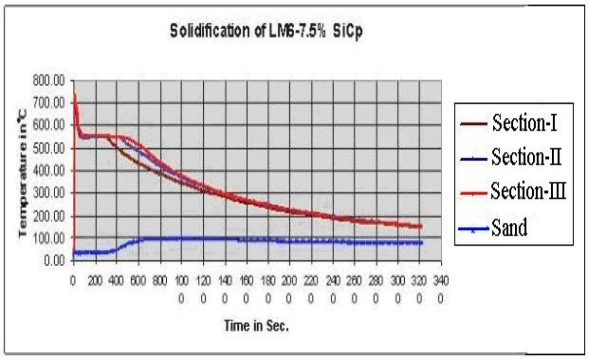


Fig8. Cooling curves of Al (LM6)-7.5wt%SiC composites at different section of casting.

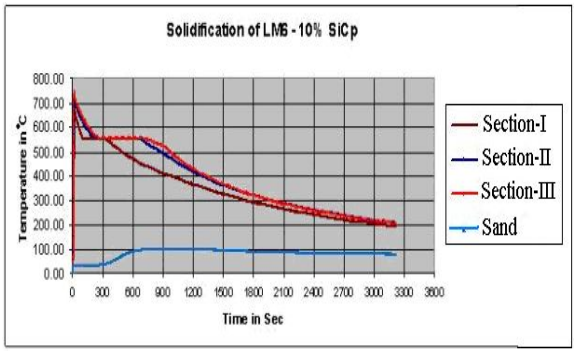


Fig.9 Cooling curves of Al (LM6)- 10wt%SiC composites at different section of casting.

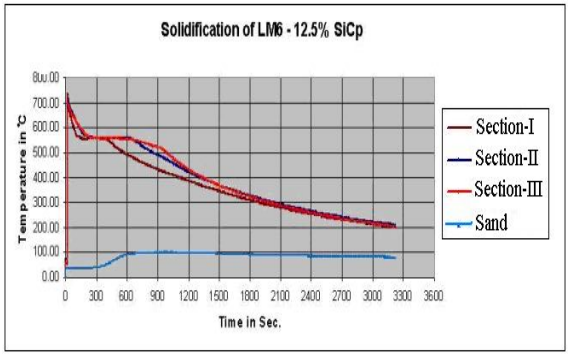


Fig.10 Cooling curves of Al (LM6)- 12.5wt%SiC composites at different section of casting.

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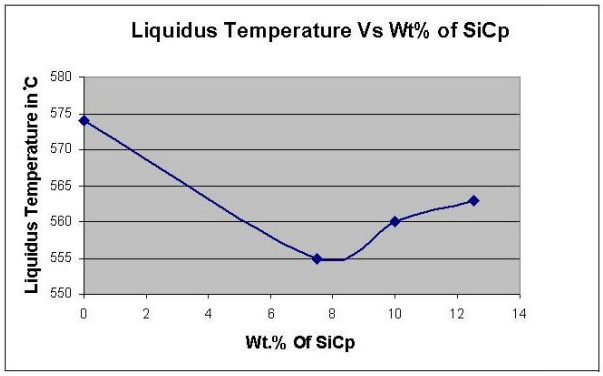


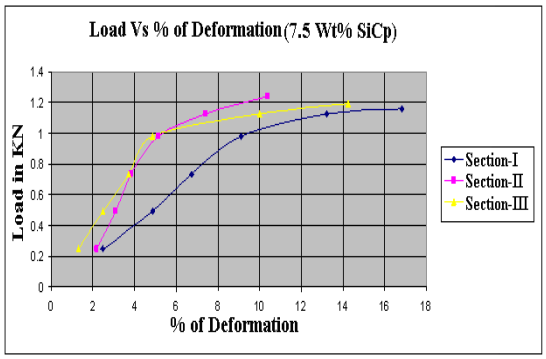

Fig11. Effect of wt% SiC on Liquidus Temperature of composite casting

### 4.3. Forgeability of cast MMCs

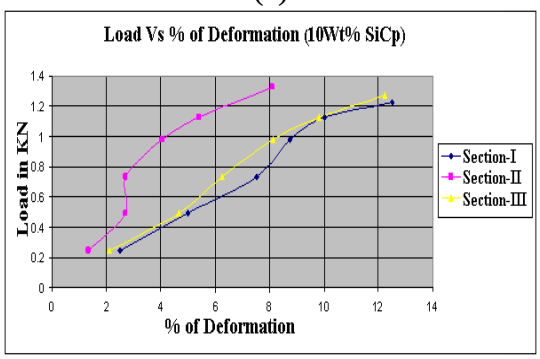
The forgeability test of as cast aluminum alloy metal matrix composites carried out by upset method at room temperature. The L/D(L-height of the cylindrical sample and D- diameter of the sample) ratio the samples is 1.5. The limit of forgeability has expressed as the critical reduction in height, by the following equation:

$$\textbf{\% of Critical reduction} = \frac{H_f - H_i}{H_i} \times 100$$

Where, Hi = the initial height of the sample in mm. and $H_f$ is the final height of the sample in mm.




(a)




(b)

Critical reductions under unlubricated conditions only were compared to assess the forgeability of the experimental materials. The load was applied at room temperature on samples of different section of as cast MMCs reinforced with 7.5 wt%, 10 wt% &12.5WT% SiCp. At different load, the percentage of deformation investigated. These results have presented in **Fig.12.** The figure shown the percentage of deformation due to acting load is different at different section of the casting i.e. the percentage of deformation is lowest in section –II (middle section) comparison to Section-III & I. The percentage of deformation is highest in section-I and the percentage of deformation in section-III are remains in between section-I&II. This indicates that the higher percentages of SiC particles have accumulated at the middle section of the casting i.e. at section-II, in comparison to the section-III & I. The above result indicates that the distributions of silicon carbide particles are not uniform through out the casting. This has occurred because of non-uniform rate of solidification of liquid metal at different section of the casting. It has also observed that on increasing the weight percentage of silicon carbide particles in cast composites the percentage of deformation decreases that means the forgeability of cast composites decreases on increasing the reinforcement ratios, as the presence of very hard SiCp in the cast MMCs decreases its ductility and enhance its hardness & brittleness.


(c)

Fig.12. Load Vs % of Deformation curve of as cast MMCs at different section of MMCs casting reinforced with (a) 7.5wt%SiCp ,(b) 10wt%SiC and (c) 12.5 wt%.

## 5. Conclusions

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The solidification curves have recorded experimentally for Al alloy (LM6) and its composites having varied percentage of SiC particles from 7.5 wt% to 12.5 wt% in steps of 2.5 wt% and compared with the unreinforced matrix alloy.i.e.LM6.

- The introduction of SiCp in the matrix metal decreases the cooling rate, as the presence of SiCp in matrix metal lower heat transfer rates during solidification owing to the reduction of thermal conductivity and effective thermal diffusivity of the composite system. The increase in weight percentage of SiCp in matrix metal decreases the rate of solidification rate. That indicates the solidification rate is faster in case of unreinforced matrix alloy or containing low fraction of SiCp in the matrix.
- Addition of ceramic reinforcement to alloy enhances the eutectic solidification time, as the presence of insulating dispersoids i.e. SiCp plays a dominant role in reducing the cooling rates. The solidification time has also varied with the change in thickness of castings. The solidification time is less in case of thinner section in comparison with thicker section, due to rapid cooling of thinner section. This trend is similar to the monolithic metal and its alloys.
- Additions of Mg to the composite melt has multifunctional role. Apart from its well-known function as a wetting promoter of ceramic particle with the aluminum alloy matrix, it leads to better contact at the metal/mould interface, thereby by enhancing the heat transfer rate.
- The forgeability test has carried out at room temperature by upset method. The forgeability i.e. the percentage of deformation decreases on increasing the percentage of SiCp in the matrix metal and the middle part of the casting (i.e. section–II) shows low forgeability comparison to the both end sections in the step casting component owing to accumulation of higher percentage of SiCp. That indicates the distribution of SiCp is not uniform through out the casting.

**Acknowledgements**

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# Importance of Intrusion Detection System (IDS)

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Prof. Sharad Gore (Head department statistic, Pune University)

**Abstract:** Intruders computers, who are spread across the Internet have become a major threat in our world, The researchers proposed a number of techniques such as (firewall, encryption) to prevent such penetration and protect the infrastructure of computers, but with this, the intruders managed to penetrate the computers. IDS has taken much of the attention of researchers, IDS monitors the resources computer and sends reports on the activities of any anomaly or strange patterns. The aim of this paper is to explain the stages of the evolution of the idea of IDS and its importance to researchers and research centres, security, military and to examine the importance of intrusion detection systems and categories , classifications, and where can put IDS to reduce the risk to the network.

**Keywords:** Intrusion detection, IDS, anomaly & misuse, NID

## INTRODUCTION

Security is an important issue for all the networks of companies and institutions at the present time and all the intrusions are trying in ways that successful access to the data network of these companies and Web services and despite the development of multiple ways to ensure that the infiltration of intrusion to the infrastructure of the network via the Internet, through the use of firewalls, encryption, etc.

But IDS is a relatively new technology of the techniques for intrusion detection methods that have emerged in recent years. Intrusion detection system's main role in a network is to help computer systems to prepare and deal with the network attacks.

Intrusion detection functions include:

- Monitoring and analyzing both user and system activities
- Analyzing system configurations and vulnerabilities
- Assessing system and file integrity
- Ability to recognize patterns typical of attacks
- Analysis of abnormal activity patterns
- Tracking user policy violations

The purpose of IDS is to help computer systems on how to deal with attacks, and that IDS is collecting information from several different sources within the computer systems and networks and compares this information with pre-existing patterns of discrimination as to whether there are attacks or weaknesses.

## INTRUSION DETECTION SYSTEMS: A BRIEF HISTORY

The goal of intrusion detection is to monitor network assets to detect anomalous behaviour and misuse in network. This concept has been around for nearly twenty years but only recently has it seen a dramatic rise in popularity and incorporation into the overall information security infrastructure. Beginning in 1980, with James Anderson's paper, Computer Security Threat Monitoring and Surveillance, the intrusion detection was born. Since then, several polar events in IDS technology have advanced intrusion detection to its current state.

James Anderson's seminal paper, was written for a government organization, introduced the notion that audit trails contained vital information that could be valuable in tracking misuse and understanding of user behaviour. With the release of this paper, the concept of "detecting" misuse and specific user events emerged. His insight into audit data and its importance led to tremendous improvements in the auditing subsystems of virtually every operating system. Anderson's hypothesize also provided the foundation for future intrusion detection sstem design and development. His work was the start of host-based intrusion detection and IDS in general.

In 1983, SRI International, and Dr. Dorothy Denning, began working on a government project that launched a new effort into intrusion detection system development. Their goal was to analyze audit trails from government mainframe computers and create profiles of users based

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upon their activities. One year later, Dr. Denning helped to develop the first model for intrusion detection, the Intrusion Detection Expert System (IDES), which provided the foundation for the IDS technology development that was soon to follow.

In 1984, SRI also developed a means of tracking and analyzing audit data containing authentication information of users on ARPANET, the original Internet. Soon after, SRI completed a Navy SPAWAR contract with the realization of the first functional intrusion detection system, IDES. Using her research and development work at SRI, Dr. Denning published the decisive work, An Intrusion Detection Model, which revealed the necessary information for commercial intrusion detection system development. Her paper is the basis for most of the work in IDS that followed. The subsequent iteration of this tool was called the Distributed Intrusion Detection System (DIDS). DIDS augmented the existing solution by tracking client machines as well as the servers it originally monitored. Finally in 1989, the developers from the Haystack project formed the commercial company, Haystack Labs, and released the last generation of the technology, Stalker. Crosby Marks says that "Stalker was a host-based, pattern matching system that included robust search capabilities to manually and automatically query the audit data." The Haystack advances, coupled with the work of SRI and Denning, greatly advanced the development of host-based intrusion detection technologies.

Commercial development of intrusion detection technologies began in the early 1990s. Haystack Labs was the first commercial vendor of IDS tools, with its Stalker line of host-based products. SAIC was also developing a form of host-based intrusion detection, called Computer Misuse Detection System (CMDS). Simultaneously, the Air Force's Crypto logic Support Canter developed the Automated Security Measurement System (ASIM) to monitor network traffic on the US Air Force's network. ASIM made considerable progress in overcoming scalability and portability issues that previously plagued NID products. Additionally, ASIM was the first solution to incorporate both a hardware and software solution to network intrusion detection. ASIM is still currently in use and managed by the Air Force's Computer Emergency Response Team (AFCERT) at locations all over the world. As often happened, the development group on the ASIM project formed a commercial company in 1994, the Wheel Group. Their product, Net Ranger, was the first commercially viable network intrusion detection device.

The intrusion detection market began to gain in popularity and truly generate revenues around 1997. In that year, the security market leader, ISS, developed a network intrusion detection system called Real Secure. A year later, Cisco recognized the importance of network intrusion detection and purchased the Wheel Group, attaining a security solution they could provide to their customers. Similarly, the first visible host-based intrusion detection company, Centrex Corporation, emerged as a result of a merger of the development staff from Haystack Labs and the departure of the CMDS team from SAIC. From there, the commercial IDS world expanded its market-base and a roller coaster ride of start-up companies, mergers, and acquisitions ensued.

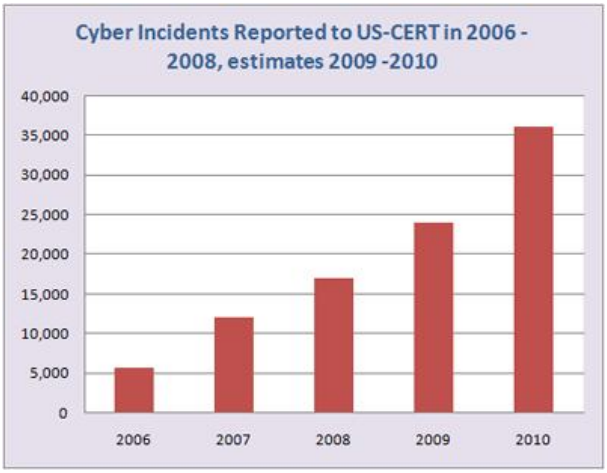


**Figure 1: Number of incidents reported**

The above chart from US-CERT shows how the cyber incidents rose in current internet network environment; this gives requirement of IDS deployment in network security model.

Network intrusion detection actually deals with information passing on the wire between hosts. Typically referred to as "packet-sniffers," network intrusion detection devices intercept packets travelling in and out in network along various communication mediums and protocols, usually TCP / IP. Once captured, the packets are analyzed in a number of different ways. Some IDS devices will simply compare the packet to a signature database consisting of known attacks and malicious packet "fingerprints", while others will look for anomalous packet activity that might indicate malicious behaviour.

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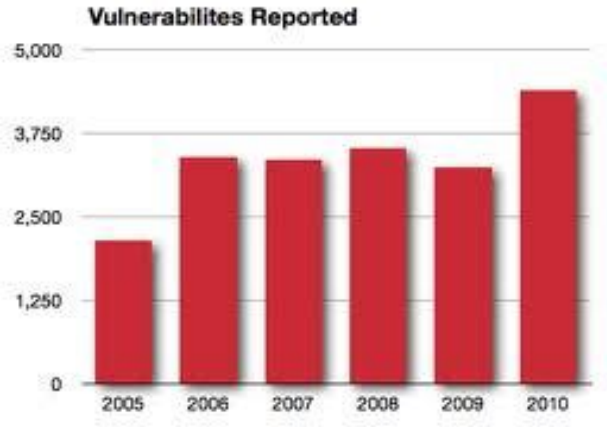


**Figure 2: Vulnerabilities reported**

The IDS basically monitors network traffic for activity that falls within the banned activity in the network. The IDS main job is gives alert to network admins for allow them to take corrective action, blocking access to vulnerable ports, denying access to specific IP address or shutting down services used to allow attacks. This is nothing but front line weapon in the network admins war against hackers. This information is then compared with predefined blueprints of known attacks and vulnerabilities.

## Categories of intrusion detection system

Intrusion detection system is classified into three categories: signature based detection systems, anomaly based detection systems and specification based detection systems**.**

## 1. Signature based detection systems

Signature based detection system (also called misuse based) , This type of detection is very effective against known attacks, and it depends on the receiving of regular updates of patterns and will be unable to detect unknown previous threats or new releases.

## 2. Anomaly based detection system

This type of detection depends on the classification of the network to the normal and anomalous, as this classification is based on rules or heuristics rather than patterns or signatures and the implementation of this system we first need to know the normal behaviour of the network.

Anomaly based detection system unlike the misuse based detection system because it can detect previous unknown threats, But the false positive to rise more probably.

## 3. Specification based detection system

This type of detection systems is responsible for monitoring the processes and matching the actual data with the program and in case of any Abnormal behaviour will be issued an alert and must be maintained and updated whenever a change was made on the surveillance programs in order to be able to detect the previous attacks the unknown and the number of false positives what can be less than the anomaly detection system approach.

### CLASSIFICATION OF INTRUSION DETECTION SYSTEM

Intrusion detection system are classified into three types

1. Host based IDS
2. Network based IDS
3. Hybrid based IDS

## 1. Host based IDS (HIDS)

This type is placed on one device such as server or workstation, where the data is analyzed locally to the machine and are collecting this data from different sources. HIDS can use both anomaly and misuse detection system.

## 2. Network based IDS (NIDS)

NIDS are deployed on strategic point in network infrastructure. The NIDS can capture and analyze data to detect known attacks by comparing patterns or signatures of the database or detection of illegal activities by scanning traffic for anomalous activity. NIDS are also referred as “packet-sniffers”, Because it captures the packets passing through the of communication mediums.

## 3. Hybrid based IDS

The management and alerting from both network and host-based intrusion detection devices, and provide the logical complement to NID and HID - central intrusion detection management.

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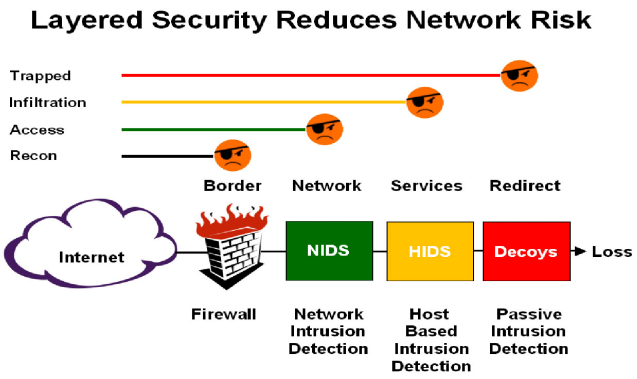
Figure3: Layered Security approach for reducing risk:




## CONCLUSION

An intrusion detection system is a part of the defensive operations that complements the defences such as firewalls, UTM etc. The intrusion detection system basically detects attack signs and then alerts. According to the detection methodology, intrusion detection systems are typically categorized as misuse detection and anomaly detection systems. The deployment perspective, they are be classified in network based or host based IDS. In current intrusion detection systems where information is collected from both network and host resources. In terms of performance, an intrusion detection system becomes more accurate as it detects more attacks and raises fewer false positive alarms.

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# A Comparative Study on Improving the Latency Time of File Access Using Standard Backpropagation Neural Networks

Mr. S. Ashok Kumar, Dr. G. M. Nasira

**Abstract**—The data or file will be required to be moved from secondary memory to main memory for executing certain instructions. The time taken to transfer the data is referred as latency time. The In this paper a detailed study on various file access predictors and caching techniques is discussed. The various file operations such as file prediction, file creation, file deletion, file modification and file access are considered and a study is made in this paper for early prediction of files. Various file access predictors have been proposed in identifying the immediate successor of file or data block to be accessed. Few predictions have also proposed in identifying the files that can be accessed upto five access ahead. The standard backpropagation neural implementation in file access by improving the latency time of the file access is also proposed in this paper.

**Index Terms**— Artificial Neural Networks, Backpropogation Algorithm, Caching, File Access, Prefetching Files, Predictors

## 1 INTRODUCTION

This paper attempts to undertake the study of comparing the existing file access predictors with the proposed neural network implementation in accessing the file or data from secondary memory to main memory. While executing an instruction, the computer processor search for data or file that is stored in the main memory i.e. RAM (Random Access Memory) of the computer. If the required data or file is not stored in the main memory, then the data or file has to be fetched from the secondary memory i.e. hard disk or floppy disk or compact disks (CD). This process is called as loading a program.

The problem is that the hard disk is a mechanical system, and not an electronic one. This means that the data transfer between the hard disk and the main memory is much slower than the data transfer between the processor and the main memory. [1]

The processor communicates with the main memory typically at a transfer rate of 800 MB/s (100 MHz bus), while the hard disks transfer data at rates such as 33 MB/s, 66 MB/s and 100 MB/s, depending on their technology. The latency time is thus very high for data transfer between the main memory and secondary memory. The latency time is the time between initiating a request and receiving the answer. [2]

## 2 FILE/DATA ACCESS

The idea of placing the likely data to be accessed together near each other has long been accepted as a wise goal in memory storage systems. Placing item nearer will reduce the latency time. To overcome latency problems two main techniques are used they are pre-fetching and predictive caching.

Caching keeps the mostly required data in the memory, likewise pre-fetching try to bring the data in memory before they are required [1].

### 2.1 Caching

The memory access time can be reduced if the most frequent accessed instruction and data are kept in a small memory. Such fast small memory is called as cache memory. The caching methodology operates as of the data which was accessed recently is likely to be accessed very soon again. Thus the cache memory contains the next data that might be requested.

The drawback of caching is to find out which data block has to be removed when cache memory is full. And when a new block of data is to be transferred to cache. When memory is full FIFO (First in First Out) and LRU (Least Recently Used) block replacement policies are used.

### 2.2 Prefetching

File prefetching is an effective technique for improving file access performance. Prefetching will fetch the required data by retrieving the data in advance. A predictive prefetching requires the prediction of sequences of file accesses far enough in advance to avoid the predictions being untimely.

The literature survey shows that a number of file access predictors are being proposed namely [1], [2]

1) First Successor (FS)
2) Last Successor (LS)
3) Stable Successor (SS)
4) Recent Popularity (RP)
5) First Stable Successor (FSS)
6) Predecessor Position (PP)
7) Prepredecessor Position (PPP)

First Stable Successor (FSS) predictor requires m successive instances of file Y immediately following in-

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stances of file X before predicting that file Y is the successor of file X. Otherwise it makes no prediction. When m = 1, the FSS predictor becomes identical to the First Successor protocol and predicts that that file Y is the successor of file X once it has encountered a single access to file Y immediately following an access to file X.

**Assumptions**

G is file being currently accessed
*F* its direct predecessor
*FirstStableSuccessor* (*F*) is last prediction made for The successor of *F*
*Last Successor* (*F*) is last observed successor of *F*
*Count* (*F*) is a counter
*M* is minimum number of consecutive identical successors to declare a First Stable Successor

**Algorithm**

if *FirstStableSuccessor*(*F*) is undefined then if
    *LastSuccessor*(*F*) = *G* then
        *Counter*(*F*) ← *Counter*(*F*) + 1
    else
        *Counter*(*F*) ← 1
    end if
    if *Counter*(*F*) = *m* then
        *FirstStableSuccessor*(*F*) ←G
    end if
end if

Fig. 1. First Stable Successor Algorithm, The figure shows the first stable successor algorithm used for predicting the file for early file access.

## 3 Artificial Neural Networks

Artificial Neural Networks (ANNs) is an abstract simulation of a real nervous system that contains a collection of neuron units communicating with each other via axon connections. Neural networks take a different approach in solving a problem than that of conventional methods.

Conventional methods use algorithmic approach, where the method follows a set of instructions in order to solve the problem. Unless we know the specific steps in prior that the method needs to follow, only then the computer can solve the problem. That restricts the problem solving capability of conventional methods to solving problems. But a method would be so much more useful if they could do things that we don't exactly tell them rather train them how to do [3].

Neural networks process information in a similar way the human brain does. The network is composed of a large number of highly interconnected processing elements called neurons which works in parallel to solve a specific problem. There are two phases in neural information processing.

They are the learning phase and the retrieving phase. In the training phase, a training data set is used to determine the weight parameters that define the neural model. This trained neural model will be used later in the retrieving phase to process real test patterns and yield classification results. A detailed literature survey was made in the area of neural network which has motivated us to apply this technique to solve this problem [4].

A standard feed forward artificial neural network is shown in the Fig. 1. It has three layers. The inputs biases and weights are labeled. Each unit outputs a function of its inputs. This function is called the activation function. Selecting values for the biases and weights is done to fit the entire ANN function to data.

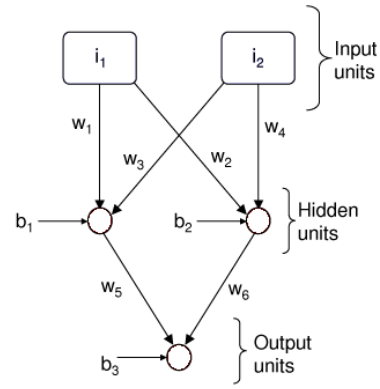


Fig. 2. Example Artificial Neural Network, showing 3 layers viz input units, hidden units and output units with artificial neurons. The figure shows the bias b and weights w applied to the network

The output of the artificial network is given by the following equation

$$\text{Output} = (b3 + w5 \cdot f(b1 + w1 \cdot i1 + w3 \cdot i2) + w6 \cdot f(b2 + w2 \cdot i1 + w4 \cdot i2))$$

Artificial Neural Network (ANN) is a small group of classic networks which are widely used and on which many others are based. These are: Back Propagation, Hopfield Networks and Competitive Networks. The Standard back-propagation (Fletcher and Powell, 1963) is the most popular method used to select values for ANN free parameters. It is done iteratively, calculating the error gradients of the data in respect to the free parameters and then updates them appropriately. The error gradients are calculated starting from the error on the outputs and works backwards. Each iteration of all the training data is called an epoch. It is a steepest decent search for a minimum value.

A Back Propagation network learns by example. You give the algorithm examples of what you want the network to do and it changes the network's weights so that, when training is finished, it will give you the required output for a particular input. The backporpogation algorithm works as follows:

1. First apply the inputs to the network and work out the output – the initial weights were random numbers.
2. Next work out the error for neuron B. The error is

$$\text{Error}_B = \text{Output}_B (1-\text{Output}_B)(\text{Target}_B - \text{Output}_B)$$

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3. Change the weight. Let $W^{+}AB$ be the new (trained) weight and $W_{AB}$ be the initial weight.

$$W^{+}AB = WAB + (Error_B \times Output_A)$$

4. Calculate the Errors for the hidden layer neurons. Unlike the output layer we can't calculate these directly (because we don't have a Target), so we back propagate them from the output layer. This is done by taking the Errors from the output neurons and running them back through the weights to get the hidden layer errors.

$$Error_A = Output_A (1 - Output_A)(Error_B W_{AB} + Error_C W_{AC})$$

5. Having obtained the Error for the hidden layer neurons now proceed as in stage 3 to change the hidden layer weights. By repeating this method we can train a network of any number of layers.

### 6.1 Artificial Neuron

An artificial neuron is a device with many inputs and one output. The neuron has two modes of operation; the training mode and the using mode. In the training mode, the neuron can be trained to fire or not for particular input patterns. In the using mode, when a taught input pattern is detected at the input, its associated output becomes the current output. If the input pattern does not belong in the taught list of input patterns, the firing rule is used to determine whether to fire or not.

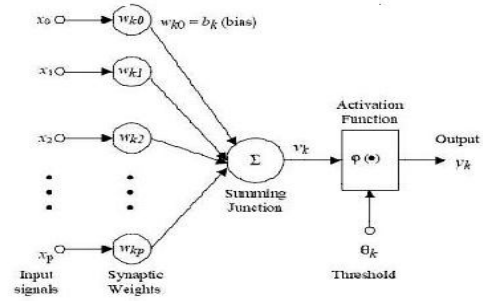


Fig. 3. Simple neuron, the figure shows a simple neuron with activation function and input weights. The output is decided based on the activation function used by the network

## 4 Related Work

Kroeger and Long [5] suggested that the file access prediction is not only used to prefetch the necessary files, but it is also used to find the related files which can be grouped under a single set.

Griffioen and Appleton [6] presented an analysis of the potential effects of predictive prefetching based on system performance. They proposed that there was relationship between successive pairs of file accesses.

Lei et. al. [7] proposed a new method which keeps track of different file access patterns observed under each application in a specific system. The method scheme stores file patterns as access tree.

Tait and Duchamp [8] investigated a client-side cache management technique used for detecting file access patterns and for exploiting them to prefetch files from servers. Darrell D.E.Long and et. al. has proposed to distinguish between the short term and long term file activity on a Unix system. This information helps to predict the files which are never used.

Purvi Shah, Jehan Paris, A. Amer and Darell D.E Long [9] have suggested in identifying a stable file access pattern using the first stable successor predictor. It is required since prefetching is built on long-lived clusters of related files. Natarjan Ravichandran and Jehan Paris [10] have proposed a perceptron based file predictor that predicts the files that need to be accessed upto give file accesses ahead.

## 5 Proposed Research

The file activity can be summarized and is presented in the Table 1

TABLE 1
VARIOUS FILE ACTIVITIES

| File Activity | Particulars of the Activity |
|---|---|
| Accesses, Creations | It is the measure of total number of files and bytes. |
| Deletions | It is similar to access, with deletions the i-nodes are reused and tracked separately |
| Modifications | It is similar to access with categories for files that are modified and increased in size, decreased in size, or remained the same. |
| Modification Differences (Deltas) | It is similar to access with categories for files that are modified and increased in size or decreased in size. Tracks files by the amount of change. Produces a two dimensional histogram of file size versus the amount of the |

Darell D.E. Long [11] in his findings suggests that the files in a computer system are relatively small and most of the file is found to be less than 8 kb size. They also suggest that only 25% of the files are larger than 8 kb.

The various file activity include, files modified, files deleted, files created and files accessed. A file modification is explained with an instance as follows. When a programmer changes a file with a text editor and saves the changes the following steps occur

a) User will command to open the required file
b) Operating System will find the i-node
c) Operating System gets the file's disk block numbers from the i-node
d) Operating System reads the disk blocks and loads the file into main memory
e) User makes the changes and saves the file
f) Operating System writes the modified file to a new set of disk blocks with a new i-node value
g) Operating System frees the old disk blocks and the old i-node is deleted

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h) Operating System updates the file name to point to the new i-node.

The modification of files relates to increase in the size of file or decrease in size of the file. By statistics it is found that mostly the file has growth rather than depreciation. The file growth rate has direct implications for operating system design. When a file needs to increase in size, some operating systems allocate additional space based on the files original size, the larger the file the more space is allocated.

In order to recover the unused disk space, the operating system must keep track of the files that has received the additional spaces and must be taken back when required. Modification of file size involves the following characteristics

a) The numeric index files are modified
b) At most, half of all numeric index modifications result in a file size increase
c) Most numeric index file size increases from modifications are less than 32 KB.

The theory of locality states that the deletion rate for used files should initially be low and increase as the files get older. This will surely increase the deletion rate for used files.

Various file characteristics are considered for the analysis of file prefetching and predictive caching. All the file characteristics can be defined and can be trained by the standard backpropagation neural network algorithm so that the algorithm will provide a mean in prefetching the required file well in advance. This activity will reduce the efforts of operating systems to deal with input-output operations of a file transfer in more efficient manner.

## 6 CONCLUSION

A detailed study on various files access predictors and caching techniques were discussed. A detailed comparative study on various file operations such as file prediction, file creation, file deletion, file modification and file access was also carried out. A standard backpropagation neural network implementation for file access will improve the latency time of file access has been proposed.

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# Cyber social-networks and social movements Case study: Tehran (2009-10)

Soran Shangapour, Seidawan Hosseini, Hashem Hashemnejad

**Abstract**— while communication scholars suggest that cyber social networks can serve as an important resource for social movement communication, few studies examine which and how special features of these social networks actually can intensify social movements and weaken government's authority.
However, our study highlights the importance of various key factors affecting the interaction between cyber social networks and social movements. The most important factors are ongoing network leadership, user practices, and online –offline participation. Furthermore, we considered prominent factors of third space and virtual societies related to Tehran citizens that can lead cyber activism to social movements. This article also seeks for considering a key question for socio-political pluralists in the digital era and virtual societies.

**Index Terms**— socio-political movements, cyber social networks, virtual societies

## 1 INTRODUCTION

In the era of virtual communication, increasingly Cyber Social Movements (CSMs) seek for organizing and campaign online, the question arises how and which characteristics can bring about a new form of socio-political activism along with consequences for constituting social demonstration in real-physical public places. Here, at first, we will discuss some arguments for and against CSMs and the role of internet by this way. The CSMs, like many new technologies before it, has been imbued with a sense of optimism that can somehow go beyond the trends of politics. It is now home to a multitude of groups, races and religions dedicated to resist and campaign against particular issues and politics. Online public communications are parts of the process of realizing the public sphere – a space where democracy can enact – allowing us to analyze how democratic values and identification shared as democratic citizens are achieved and maintained; how socio-political cultures are generated – essentially, to imagine how civil society can organize democratically for politically progressive ends (Habermas, 1989). In addition, the multiplicity of groups and ideologies which present online permits the growth of much broader networks to create a vast web of oppositional politics and social changes. These social networks have become base to mediated activity that aims to raise people's awareness, to give a voice to those who do not have one, to offer social empowerment, to permit disparate people and causes to organize themselves and form alliances, and ultimately to be used as a tool for social changes. These new networks with its additive, interwoven, interactive and polycentric form have reinvented transnational cyber activism and can accommodate radically different types of political habits within various places in different times, offering a new type of socio-political engagement. This apparently new mediated politics of the 21st century maintains a promise of political hope.

Similarly, Benkler (2006) claims that internet has a potential to change the practice of democracy thoroughly owing to its participatory and interactive characteristics. It allows all citizens to alter their relationship to the public sphere, to become creators and primary subjects, to become engaged in social production. In this sense the internet is ascribed the powers of democratization. Besides, Salter (2003) argues that the internet is a novel technological asset for democratic communications because of its decentred, textual communications system, most often with the content which is provided by users. On this basis, the requisite features of Cyber Social Movements are accorded with them which have grown out of a decrease in party allegiances and class alliances. CSMs are more fluid and informal networks of action than the class and party politics of past.

In this regard, according to Naomi Klein (2000) notion, the internet facilitates international communication among non-governmental organizations (NGOs), and thus permits protesters to respond on an international level to local events while requiring minimal resources and bureaucracy. This may be through the sharing of experience and tactics on a transnational basis to inform and increase the capacity of local campaigns. As Rheingold (2002) notes, advances in personal, mobile informational technology are rapidly providing the structural elements for the existence of fresh kinds of highly informed, autonomous communities that coalesce around local lifestyle choices, global political demands and everything in between. These multiple networks of connected citizens and activists link diverse communities, providing the basis for

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the possibility of a new politics of alliance and solidarity to overcome the limitations of postmodern identity politics (Bennett, 2004).

On the other side, Breslow (1997) argues that the internet promotes a sense of sociality, but its anonymity and shortage of spatiality and density may be counterproductive to solidarity. Just as the same as, Van d`er Donk et al. (2004) states that the extreme simplicity of mobilization may devalue it as a socio-political resource that attracts public attention and respect. The internet may also be devalued by activists since out of some forms of collective protest can cause fun and adventure. Indeed online activism can be seen as lazy politics – it provides people with feeling good but does very little. It allows like-minded individuals and organizations to talk to each other. It can be criticized for further distancing people from each other and deepening already abstract social relations as well as increasing competition among organizations. Moreover, on the basis of Klein idea, the internet is an organizing model for a new form of political protest that is international, decentralized, with diverse interests but common targets. These themes of multiplicity and poly centrality recur throughout the literature and are assessed both negatively and positively.

Smith and Smythe (2001a,2001b) note that the internet has revealed a socio-political space for the alternative political notice of this global social movement just as progressive cyber network communications has been described as serving as 'an alternative political realm' (Downing, 1989). Since the internet has not led to a greater integration within civil society due to the restrictive policies on external links adopted by civil society organizations and a lack of trust and solidarity (Kavada, 2005), this indicates the fact that new media technology itself does not cause to a brand new age of political collective radicalism. On the other hand, global network of nongovernmental organizations (NGO) is to do those whose mission is to empower and support organizations, social movements and individuals in and via the use of information and communication technologies (ICT) to build strategic communities and initiatives for the purpose of making meaningful contributions to equitable human development, social justice, participatory political processes and environmental sustainability. (APC, March 2006)

In this way, Coombs (1998) argues that the internet may increase the power of grass roots groups because it can enable networks of citizens to challenge corporate control and can set up their constitution by suggesting new identity within new socio-political territory (Cleaver, 1998). This territory can account for what have been called postmodern tendencies away from static power structures by making a means for seeing how it has become more fluid and dispersed without necessarily losing strength (Hardt & Negri, 2004). To optimists, they also appear to have opened up new flexible spaces for public and private participation as well as wide public participation in political matters (Rheingold, 1993, 2002; Smith and Smythe, 2001a;Van Aelst, 2002).

Our purpose is to undertake this subject which has two categories. Firstly, we tried to highlight and identify more important features for cyber social networks related to consequent social movements and collective identities. Though discussions of each of these features can be found in the existing social movement literature, we believe that more extensive consideration would be profitable. A secondary goal is to present a comprehensive and accessible account of an important recent example of cyber-activities which suggested it at different urban public places. Here, as a case study, we will show why and how people in Tehran are interested in using cyber social networks instead of other previous kind of communication in urban spaces. Also problems and opportunities which were brought by these networks will be discussed and criticized. In the next section, we provide a brief history of using cyber activism, locating it within the broader conflict between the protests and the totalitarian regime. The section that follows provides a detailed description of the cyber network communication system, demonstrating the utility of its various factors. Furthermore, we assume prominent factors of third space and postmodern cities related to cyber social networks that can lead activism to physical cities. In the end, we conclude with a brief discussion of the importance of our findings.

As it seems an introduction for collective identity and social movement can be useful to determine features of cyber social networks, we will begin with a brief definition of aspects.

## 2 Collective Identity

Melucci (1996) sees collective identity as a continuous, dynamic and self-reflexive process defined by its multiplicity of interactions, negotiations and conflicts among fellow participants. The internet, relying as it does on a network of networks can assist collective identity and reinforce solidarity. It takes part in the process of meaning construction. The nature and scope of the technology affects not only the way the movement communicates its aims and objectives but also its geographical scale, organizing structure and collective identity. The decentralized, non-hierarchical modes of organizing allow for diverse political agendas and identities to exist.

Collective identity is a 'shared definition produced by several interacting individuals who are concerned with the orientations of their actions as well as the field of opportunities and constraints in which their actions take place' (Melucci, 1989).

Collective identity defines boundaries of who is within the group, what the group believes, how the group sees the world and, ultimately, helps to establish trust, which is essential in getting members to take actions that may be time-consuming, uncomfortable or even dangerous (della Porta & Diani, 2000).

Collective identities are important because they help attract new members and sustain old ones; they are often what officials respond to and what make up the raw ma-

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terials from which mainstream media representations will be constructed. Social movement identities are the 'process by which social actors recognize themselves and are recognized by other actors' (della Porta and Diani, 2000). Most of observers argue that the internet is increasingly enabling new collective identities aim to change cultural codes, social movements also create new identities which both help to recruit and sustain membership.

In terms of the connections between social movement, collective identities and the internet, scholars are still struggling to understand this phenomenon. Warkentin (2001), Postmes and Brunsting (2002) are all optimistic, discussing that the anonymity and isolation found on the cyberspace may actually enhance group salience, as actors focus on commonalities rather than differences. Indeed, they believe that unity among different groups happens by giving permission to social movement which can act more easily, attract more new members than it had been possible.

## 3 Social Networks

Networks are open structures, able to expand without limits, integrating new nodes as long as they are able to communicate within the network, namely as long as they share the same communication codes. Keck and Sikkink (1998) define networks as essentially 'communicative structures'. Podolny and Page (1998) argue that, unlike markets and hierarchies, network forms of organization are characterized by enduring relationships and exchanges based on trust, legitimacy and ethical behavior.

Social networks are important actors in democratic societies. They are key spaces for formulating, advancing and leveraging the interests of civil society against elites and authorities. As such, they serve as sites of public advocacy around social and political issues, which markets and states are more reticent to address (Mueller, 2004). In essence, social movements are social networks that engage in sustained collective actions, have a common purpose and challenge the interests and beliefs of those with power (Tarrow, 2005).

Diani believes that 'recent scholarship points to the fact that interest in the relationship between social movements and social networks has grown both in the range of topics addressed, and the depth of research results' (2003: 1). Many of the authors in Diani and McAdam's book, Social Movements and Networks (2003), treat networks as a central feature of social movements.

Although transnational activist networks existed long before the internet (Keck and Sikkink, 1998), there is accumulating evidence that the internet accelerates network and social movement formation on local and global levels (Castells, 1996).

Commentators from a wide range of disciplines have noted that in recent years, society has become more network-based (Castells, 1996; Hardt and Negri, 2000). Similarly, leading theorists are beginning to recognize the prominence of networks in social movements (Diani, 2003; Gerlach, 2001). Although Keck and Sikkink (1998) remind us that activist networks are far from new, Castells (1996) makes it clear that such a pervasive 'networking logic' is gradually supplanting earlier, more linear and hierarchical paradigms, which allows for more democratic processes.

## 4 Features

New Social Movements share common characteristics with web-based communication: they lack membership forms, statutes and other formal means of organizing; they may have phases of visibility and phases of relative invisibility; NSMs may have significant overlaps with each other and are liable to rapid change in form, approach and mission. Furthermore, the ability of new communication technologies to operate globally and respond to global economic agendas in a swift and timely manner is a key to their contemporary capacity to mobilize against the vagaries of global capital. In these cases, Redden (2001) argues 'the Internet is used as a kind of metaconnection between more traditional local-level organizational activities such as meetings, telephone trees, leafleting, and posting flyers and stickers'.

According to Castells's (1997) notion, the three essential activities in which the cyberspace community engages to create a virtual nation are: working on a political project (behavioral); maintaining the signification of the nation (cognitive); and maintaining a sodality (affective). These elements should be present in the construction of a virtual nation.

To develop a design pattern of how social movements are affected by new ICTs, we must first understand exactly how and why activists acquire complex technical skills—or, alternatively, how and why technically skilled individuals or communities become activists.

### 4.1 Boundary, Consciousness and Negotiation

Taylor and Whittier (1992) offer a framework for assessing collective identity in social movements, which they believe provides a "conceptual bridge linking theoretical approaches in the symbolic interactionist tradition with existing theory in social movements". Their three categories are: boundaries, consciousness and negotiation. Boundaries indicate the territory of the group – who belongs to the movement and does not. This means that the movement should establish distinctions between itself and other societal entities in a process of self-affirmation. Consciousness includes the creation of cognitive frames or schemas for interpreting reality. Finally, their analytical framework suggests that negotiation is a category of significance to social movements as members often must resist dominant evaluations of themselves and their values and offer alternative means of thinking and acting in both public and private spheres.

### 4.2 User Practice

One of the more effective features of social networks is user practices in technical changes. A large number of studies in the history of technology underline the fact that

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extremely important shifts can be initiated not only by highly skilled designers, developers, and corporations but also by less-skilled users of technology (Bijker & Law, 1992; Fischer, 1992; Landauer, 1999). Since nowadays, democracy experience, social movements and collective identity are created in a daily practice through new media, it is essential to notice the specific ways in which activists put technologies into practice.

### 4.3 Network Leadership

Leadership arises within communities of practice whenever people work together and make meaning of their experiences and when people participate in collaborative forms of action across the dividing lines of perspective, values, beliefs, and cultures (Drath & Palus 1994; Drath 2001)" (McGonagill & Reinelt, 2010).So no longer did you have a situation where blind commands were issued which the others obediently had to carry out. The leaders were now properly informed of the situation inside the country and any suggestions they made could be corrected by those "in the field." (Jenkin, 1995, Garrett & Edwards, 2007)

### 4.4 Online-Offline Leadership

Klein (2000) argues that the cyber social networks facilitate international communication among non-governmental organizations (NGOs), and allow protesters to participate in socio-political events both online and offline. But the online participation is often about moving people to action offline (Fenton, 2008). It is about building relationships and forging community rather than simply providing information (Diani, 2001). Castells (1996) argues that the networking logic of the internet dovetails with network formation offline. This confluence greatly aided social movement groups such as the Zapatistas, who continue to wage an indigenous rights struggle in southern Mexico during the mid to late 1990s (Cleaver, 1998; De Angelis, 2000).

### 4.5 Modes of Internet Communication by Cyber Activists

Denning (2001) recognizes five general modes of internet communication by social movement activists and in a similar way, Ronfeldt and Arquilla (2001) offer a useful model for understanding the non-hierarchical structure of the cyber social network (Pickard, 2006).

- Collecting and providing information;
- Publication of information; assists action and mobilization;
- Dialogue; makes lateral linkages;
- Coordinating action; serving as an outlet for creative expression; and
- lobbying decision-makers.

Furthermore, Gibson and Ward (2000) utilize a similar typology that includes:

- Information provision;
- Campaigning to recruit voters;
- Generating resources;
- Building links between organizations; and
- Promoting participation in political processes.

As it can be seen, we have five major steps which are used by cyber activism that play an effective role.

Collecting and providing information

Cyber social networks allow for the dissemination of information regarding movement identity, views and issues to interested recipients both inside and outside the movement.

Publication of information; assists action and mobilization

CSNs serve as instruments of mobilization, defined as the organizing of collective action and initiatives aimed at producing specific outcomes. These networks can coordinate initiatives and action (Barlow, 1988; Kessler, 1984, Stein, 2009) and spread viewpoints designed to galvanize action, a process referred to as 'consensus mobilization' (Tarrow, 2005).

Dialogue; makes lateral linkages

CSNs function as relatively autonomous sites of interaction and dialog. According to Fraser (1993) such spaces are necessary to further participatory parity between dominant and subordinate groups within larger spheres of discourse. Moreover, Downing (2001) adds that the internal dialog these spaces permit, which often involve shared processes of meaning construction between activist producers and particularly active audiences, help movement participants to arrive at common understandings of their problems and strategies.

Cyber activisms use these networks to communicate laterally and build networks among movement members. The alternative media can link social change activists by making them aware of one another's views and interests and by uniting communities of interest across national and transnational space (Barlow, 1988; Kessler, 1984; Steiner, 1992). CSNs can function as a site for creative expression. As Downing (2001) points out, political communication does not always take the form of rational argumentation. Emotion, imagination and aesthetics are central aspects of much political expression, taking such forms as satire, irony, cartoon, caricature, slander and pornography (Downing, 2001).

Lobbying decision-makers, fundraising and resource generation

People use CSNs, have more chance to succeed at presenting their issues to decision-makers. They use bureaucratic advocacy to influence the agenda, however at a slower pace.

Also social movements can use the CSNs to engage in fundraising and resource generation. Movement groups attempt to raise financial support and resources through a variety of means, including requests for donations, sale of merchandise, building member databases and recruiting new members, personnel and volunteers (Costanza-Chock, 2003; Van Aeist & Walgrave, 2002).

Scince architecture has been a significant part of a repertoire of cultural symbols that political and cultural elites have used to 'flag' the nation (Billig, 1995), 'invent tradition' (Hobsbawm & Ranger, 1983) and 'discursively

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construct' identities (Wodak, 1999), it can be useful for designing these virtual environments. In the next section, we investigate the features of "third space" and postmodern urbanism experiences in creating real public spaces which can be useful for designing cyber social networks.

## 5 THIRD SPACE

"Third space" in Soja's eponymous work (1996), defined as 'a purposefully tentative and flexible term that attempts to capture what is actually a constantly shifting and changing milieu of ideas, events, appearances, and meanings'. Soja sees first space as having been explored chiefly through its 'readable texts and contexts', and second space through 'its prevailing representational discourses'. Third space is to be explored spatially, 'to improve the world in some significant way'. The concept of third space can be broadly used to highlight the 'othering' of geographical space and social spatiality. In addition, Oldenburg (1999) identifies some of the specific characteristics of third places:

- They are on neutral ground;
- They are a leveler;
- Conversation is the main activity;
- They are accessible;
- As a home away from home, they have 'regulars'; and
- The mood is playful

The lack of third places and the fragmentation of local communities have implications for democratic political involvement, the safety and security of communities and the overall quality of life of citizens. Unfortunately, the vast suburban infrastructure, demanding work roles and consumer lifestyles of the post-industrial culture dramatically impede the development of third places. Without centralized 'town squares' or downtowns and with traditional neighborhoods abandoned for more private subdivision developments, third places are difficult to build and sustain. So some scholars point out virtual third space as a practical way for communication.

In order to enhance the virtual third-place experience, the CMC participant should feel present or 'immersed' in the environment or virtual space. Ideally, the environment promotes 'the perceptual illusion of non mediation' via immersion (Riva, 1999). 'Virtual third place' offers a distinctive concept that better accounts for the unique characteristics of computer-mediated social interaction.

More specifically, Douglas Schuler (1996) scrutinizes the similarities between third places and virtual communities. In his research, CMC contexts share key characteristics with Oldenburg's third places. Generally, CMC contexts such as third places emphasize conversation, humor and play, are on neutral ground, provide a home away from home and involve regular members. Primarily, computer mediated environments often emphasize playful conversation via informal talk (Schuler, 1996). In fact, Oldenburg's (1999) description of third places echoes the interaction typical of many chartrooms and online discussion forums: 'Conversation's improved quality in the third place is also suggested by its temper. It is more spirited than elsewhere, less inhibited and more eagerly pursued'. As in online discourse, in discussions in third places 'consciousness of conditions and time often slip away amid its lively flow', Based upon the detailed analysis of discourse online (Baym, 1995).

Danet (2001) argues that the contemporary conditions of CMC such as interactivity and identity concealment promote a playful form of interaction. By masking their identity or using alternative personae, people feel less inhibited and online conversations are often highly spirited and lively. Thus, third places and CMC environments often share a comparable jocular, energetic and spirited conversational tone or mood. At contrast, for Turkle (1996), traditional third places differ from computer-mediated contexts in one important respect: the 'realness' of the interaction or dependence upon simulation. In particular, three key characteristics differ dramatically between traditional third places and social interaction online:

(1) Third places emphasize localized community;
(2) Third places are social levelers; and
(3) Third places are accessible.

Oldenburg (1999) prominently and strongly advocates a return to geographically localized communities. He explicitly states 'the first and most important function of third places is that of uniting the neighborhood'. As Doheny-Farina (1996) illustrates: 'a third place cannot exist separate from a locality because it exists only in comparison to its neighborhoods, to local work, play and family life, to the institutions and formal rituals that encompass daily life.

Also, Oldenburg found MUDs, Usenet conferences, mailing lists where conversation is the only activity and where characteristics such as non-hierarchy and playfulness are quite analogue to third places. These virtual places also have a high accessibility – always 'open', always crowded because of its global participants.

Postmodern theorists celebrate fragmentation because it allows the recognition of diversity in political desires acknowledges difference between individuals and debunks the myth of homogenous political units leading ultimately to liberation. They focus attention on the multiple, fragile, complex, fluid, and fragmented processes that compose individual identities (Laclau & Mouffe, 1987; Rosenau, 1992). There is, according to this view, no true self, and people do not exhibit personal characteristics. Rather, as Goffman (1959) pointed out some years ago, the self is constituted differently through a variety of "performances" in different times and places.

## 6 PROBLEMS

In spite of the optimism that are around the above assessments that focus largely on exploring potential use of the CSN as a free global space for social dialogue and international activism there are of course effective counter arguments that can be arranged in three main categories: (1) government limitations of use; (2) structural forces of capital organized either nationally or globally; and (3) the problems of fragmentation.

Through communication processes are integral to their success (Atton, 2003; Downing, 2001), research shows that cyber activisms experience several difficulties communicating through the these networks. These networks often

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systematically distort, negatively cast or ignore social movement viewpoints. They may deny social movements access or representation at critical moments in their development (Raboy, 1981), employ message frames that undermine or weaken public perceptions of a movement's legitimacy (Gitlin, 1980; McLeod and Detenber, 1999; Shoemaker, 1982), or tacitly encourage cyber activisms who seek coverage to cater to the questionable values of mainstream reportage on social activism, including a heightened interest in violence, emotionality and slogans (Kielbowicz & Scherer, 1986; Gamson, 1990; DeLuca and Peebles, 2002;).

Some Pessimistic observers acknowledge the power and potential of the internet but caution against overestimating what it can do (Clark and Themudo, 2003). Pessimistic observers look to a broader social context, arguing that the patterns of internet control suggest that the dominance by a handful of companies over much of the world's communication system is merely replicated on the internet, while suggesting that the internet in no way guarantees grass roots participation or more widespread democracy (McChesney, 1998). In terms of power, reliance on the internet may well privilege certain groups, languages, genders or countries to the exclusion of others (Clark and Themudo, 2003; Kole, 1998; Kramer and Kramarae, 1999). Surveillance is an increasing concern as some corporations are monitoring movement internet usage, and law enforcement, intelligence and other agencies are logging on to monitor social movements, actors and others that challenge the status quo (Coombs, 1998; Kahn and Kellner, 2004). For example the Chinese Government is reported to employ around 30,000 internet police to control the web so that it can be used by businesses and not by its political opponents (The Guardian, 2005). In addition, face-to-face connections remain important, and failing to focus on human contacts in favor of technology may mean diverting precious resources from other areas (Carlsson, 1995; Danitz & Strobel, 1999).

For Castells (1996), the globalization of the capitalist system does not open up the possibility of a labor-led emancipatory project. Taking Castells' view, the fragmented nature of new media does limit the capacity of NSMs to create coherent strategies due to the increasing individualization of labour. Problems of quantity and chaos of information challenge the way analysis and action are integrated in decision-making processes as well as existing configurations of power and collective identity in social movement organizations.Furthermore, the internet may contribute to the fragmentation of civil society, as well as political mobilization and participation.

Greater pluralism is regarded by Habermas as a risk for deliberative democracy rather than its savior. This concern is echoed by Sunstein(2001), Hill and Hughes (1998), who argues that the internet has spawned large numbers of radical websites and discussion groups allowing the public to bypass more moderate and balanced expressions of opinion in the mass media. Moreover, these sites tend to link only to sites that have similar views. Sunstein argues that a consequence of this is that we witness group polarization and this is likely to become more extreme with time. Sunstein contends that two preconditions for a well-functioning, deliberative democracy are threatened by the growth of the internet and the advent of multi-channel broadcasting. First, people should be exposed to materials that they have not chosen in advance. This results in a reconsideration of the issues and often recognition of the partial validity of opposing points of view. Second, people should have a range of common experiences, in order that they may come to an understanding with respect to particular issues (Downey & Fenton, 2003). Sunstein(2001) also recognizes that 'group polarization helped fuel many movements of great value – including, for example, the civil rights movement, the antislavery movement, and the movement for sex equality'.

In a same way as Atton (2004) notes: "To consider the internet as an unproblematic force for social change is to ignore the political and economic determinants that shape the technology; …; and it is to ignore the obstacles to empowerment that legislation, inequalities of access, limits on media literacy and the real world situation of disempowerment necessarily place on groups and individuals.

The danger in constructing global solidarity online, as Tarrow (1998) points out, is that the speed at which social movement actors can respond encourages a focus on short term and rapidly shifting issues rather than fully fledged ideologies. This easy-come-easy-go politics does not lend itself to long-standing commitments or deeply held loyalties, but rather to a following that is also fleeting and momentary and often lacking in political memory.

Overall, in spite of all these problems, the CSNs have a great potential for establishing social movements seeking for their goals.

## 7 Effects of CSNs on Socio-Political Movements

It is obvious that CSNs would play a pivotal role, fundamental to the social movement's success. Protest activity and alliances of social movements on the ground can impact upon the way in which the internet is used and structured on the various and multiple websites. In other words interactivity is both between groups and between online and offline forms of organizing.

Scholarship in this area has demonstrated that new technologies can reduce a state's capacity for repression and open up access to elite allies. For example, the Mexican Zapatistas used the high-speed global communication capacities afforded by the internet to coordinate with elite allies internationally and to exploit differences between their own government and that of the United States (Schulz, 1998). Scholars also suggest that the Internet can be used to avoid surveillance and to circumvent state regulation (Denning, 2001; Kidd, 2003; Scott & Street, 2000). Changes such as these alter activists' political opportunities, enhancing their ability to organize, mobilize, and influence elites (McAdam, 1996). Such as, the People's Global Action (PGA) organization, formed in 1998 by activists protesting in Geneva against the second Ministerial Conference of the WTO which is an attempt to create a worldwide alliance against neo-liberal globalization on an anti-capitalist platform. It is defined as 'an in-

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strument for communication and coordination for all those fighting against the destruction of humanity and the planet by capitalism, and for building alternatives' (www.agp.org, 2006).

Furthermore, Ayres's (1999) depicts the internet as a mechanism facilitating the rapid circulation of unverifiable claims. Based on this characterization, he suggests that new technology may "indeed herald a return to old-fashioned collective behavior—the riots, panics and sporadic protests of old".

One much quoted example is the anti-globalization movement that gained public recognition at what is now commonly referred to as 'The Battle of Seattle'. On 30 November 1999 an alliance of labor and environmental activists congregated in Seattle in an attempt to make it impossible for delegates to the World Trade Organization (WTO) conference to meet. They were joined by consumer advocates, anti capitalists and a variety of other grassroots movements. At the same time, it is claimed that nearly 1200 NGOs in 87 countries called for the wholesale reform of the WTO, many staging their own protests in their own countries (The Guardian Online, 1999). Groups integrated the internet into their strategies. The International Civil Society website provided hourly updates about the major demonstrations in Seattle to a network of almost 700 NGOs in some 80 countries (Norris, 2002). The demonstration was heralded as a success for transnational internet activism. Wall (2002) concludes that Seattle was not an anomaly, but rather the prototype for a global anti-corporate domination social movement that will increasingly rely on the Internet – for its benefit while also at its peril. While other media and even face-to-face organizing will remain vital, this new communication technology has and will continue to affect the face of social change in ways that we have yet to fully comprehend.

Antiwar movement in London is another example. On 15 February 2003, about one million people took to the streets of London to protest against the imminent war with Iraq. It was followed on the third anniversary of the war, 18 March 2006; thousands once more lined the streets demanding an end to the occupation. These protests, and the multiple actions that have taken place in between, represent an upsurge in peace campaigning in Britain and worldwide.

On the whole, we can conclude that CSNs, as were mentioned, have undeniable effects on social movements. Nowadays, social movements will increasingly rely on the Internet and virtual communities and moves toward cyber social movements.

In the next section, we will study Tehran as a case study, and show why people have recently inclined to CSNs and how it helps them establish a powerful social movement.

## 8 TEHRAN

For clarifying the role of virtual space in Tehran, we made an interview with a group of people (includes 200 people, 100 males and 100 females, and 144 persons younger than 35 years old) about how much time they spend on urban space and virtual public space for social interaction. At first, we can see in bar chat (1 and 2), most of the women spend less than 6 hours per week for social interaction in urban spaces while this number for virtual spaces upsurge more than 8 hour a week. Women in Islamic society confront with some limitation for participating in social activities and it seems that they use the virtual space to break these limitations and play an effective role in the society. Overall, all the people with different ages and sexes prefer virtual spaces rather than urban spaces. They indicated several reasons such as lack of appropriate public places in Tehran, government monitoring and limitations which were imposed by traditional society, especially for women. The bar chart2 shows that young people more than old ones and females more than males are interested in using cyber social networks.

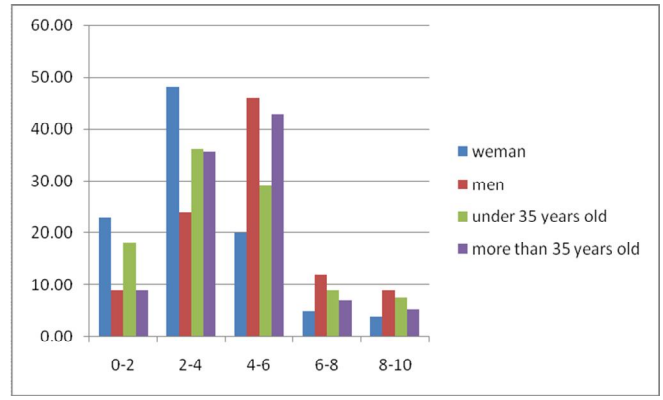


Figure 1. How much hour do people spend on urban spaces for interaction with others?

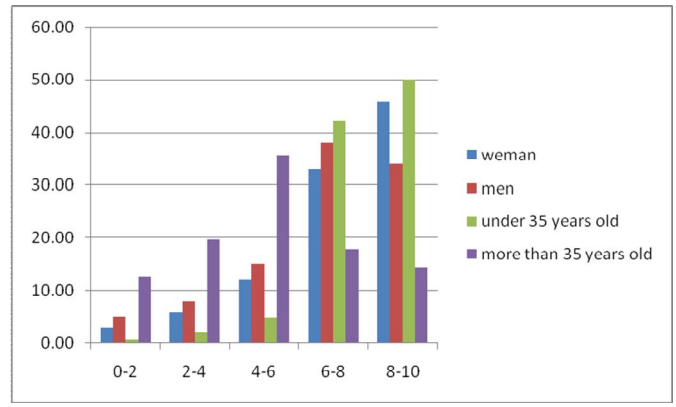


Figure 2. How much hour do people spend on cyber social networks for interaction with others?

When we asked the interviewees to determine by which way they often get their information and share them with others, they indicate social networks such as Facebook and Twitter in the first stage and email in the second one (bar chart 3). As it can be seen, women are more interested in cyber networks, while men prefer email and its accessories.

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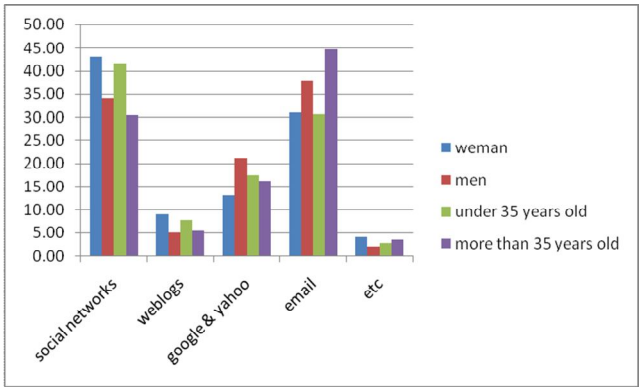


Figure 3. Which ways do interviewees prefer for interaction through cyberspace?

The problems which internet users have to deal with are respectively, narrow internet band, inaccessibility for all and user's limit knowledge (bar chart 4). All users from different age and sex group have the similar idea and the numbers only fluctuate slightly except for old people that have problem with complicated sites because of the lack of knowledge.

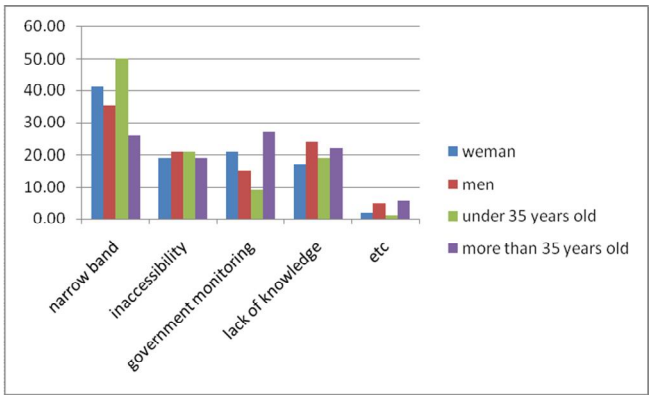


Figure 4. Which problems do make more difficulties for internet users?

In conclusion, we can summarize that in the absence of appropriate urban spaces in Tehran, people like using virtual spaces more and more, and people who were put into marginal areas in their society, are more keen on using cyber social networks.

## 9 Communication Through Cyber Social Networks

Where real public places don't exist (Tehran), there is still social communication. Thanks to new technologies creating cyber social networks, absolute preventing human interactions has been impossible and social movements have bred their social interaction possibilities in an impressive virtual public place. Poster (1995) states, "When users have decentralized, distributed, direct control over when, what, why, and with whom they exchange information…it seems to breed critical thinking, activism, democracy and equality…This electronically mediated communication can challenge systems of domination" through offering an effective environment for presenting interests and messages of resistance identities. "Cyberspace is a new domain for social interaction and entertainment" (Wertheim, 1999).

Cyber social Networks such as Face Book, Twitter, You Tube, enable Tehran's users to construct their cyber identity and communicate with others in desired ways. "These networks are very flexible and the main bond between the various individuals and coalitions is that they maintain similar values and visions" (Smith, 2002). Such networks which were once used to make friendships as delightful spaces for Tehran's users gradually have changed into proper places for socio-political interactions and attracted various socio-political groups of human rights activists, journalists, reformists and so on who have been forbidden to activate throughout the city. These groups applied these networks to state their policies and thereby found a lot of advocates being communicated via the internet. "These online communities also launch e-mail campaigns and strategize to organize marches and teach-ins" (Nieves, 2003). One Million Signatures campaign for women's equality in Iran is a noticeable example of this networking. In such campaigns all members can activate and present their beliefs and ideas. They "have changed substantially what counts as activism, what counts as community, collective identity, democratic space, and political strategy. And online activists challenge us to think about how cyberspace is meant to be used" (McCaughey & Ayers, 2003)

All protesting online organizations, cyber networks and E-campaigning were jointed and formed broad coalition in the cyberspace to seek their common political goals, a political cyber activism. "Cyberactivism crosses disciplines, mixes theories with practical activist approaches ,and represents a broad range of online activist strategies, from online awareness campaigns to internet transmitted laser projected massaging"( McCaughey & Ayers, 2003). The combination of various activist approaches founded a great cause that Features by which these cyber public places assisted are:

• Be entertained to attract different people

Connect with strangers in meaningful ways, as "'weak-tie instrument' par excellence as such it is able to attract easily and rapidly a large number of people to join an action or event" (Kavada, 2006). It helps Iranian people from different race and religious, establish new interaction realm between strangers which were not possible in the past.

• Sharing experiences and interests

People share their interest and experience in Facebook and by which show to others what they believe and desire. In recent years, Facebook has become a place for transforming information and acts as a multilayer media which make a lot of people interact with each other and talk about what that is not possible to be discussed in governmental media.

• Informing people about their various rights

Through interacting in CSNs, Iranian people, especially women had been more familiar with their rights by comparing themselves to the overdeveloped countries.

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• Presenting experiences in visual formats and audio

It helps them to inform other citizens about their experience in the society throughout different from what government has stated.

• Offering a place for poll about movement's problems and activities

In the Facebook and Twitter, people were able to criticize their movements and its policy.

• Enrolling in an indefinite rate

Here, there are vast ranges of selections and everyone is able to identify himself or herself, based on his/her notion.

• Flexibility and no formal or complicated membership

For registering in a group, there is no need to use your real identity and so everyone can be a member without receiving any threat or danger from the state.

Therefore, these virtual spaces are the extension for physical public places in which people can express beliefs forbidden to state in the city. Virtual spaces, alternative media and citizens' media were necessary tools in establishing a public sphere for dissenting views of protesters. According to Rodriguez (2001), "alternative media spin transformative processes that alter people's senses of self, their subjective positioning, and therefore their access to power".

Considering about explanations, we can conclude protesting demands and beliefs which cannot be physically expressed in real forms, such as 'talk', 'face-to-face' due to the lack of public places, "are symbolically replaced in cyberspace by 'chat', 'chatting', 'e-mail' and 'posting'" (Hamman, 1999), eventually will materialize in urban spaces in form of protesting rallies. "Social movement organizations wanting to mobilize for a mass street demonstration make extensive use of the Internet to enhance coordination and mobilization efforts" (Van Laer, 2007).

## 10 Conclusion

New media can become the location for counter reflexive political deliberation and activity – but only if they embody democratic practice. The use of new communication technology to spread radical social critique and alternative culture is the realm of New Social Movements marked by fragmentation. Fragmentation has been variously interpreted as multiplicity and polycentrality when focusing on the potential for social agency and disaggregation and division when focusing on the potential for increased social control.

Computer networks can provide the means to create new 'virtual' places that offer functionally similar forms of localized informal interaction. These virtual third places should not be designed merely to reconstruct a hyper real image of a nostalgic small town embedded in our mediated collective memory. Further, these virtual third places should not be designed as 'futuristic' virtual realities created to realize fantastic visions from science fiction films and novels requiring elaborate equipment and sophisticated technical knowledge. Rather, virtual third places should be designed to fit into the participants' 'mundane' and 'ordinary' lived experiences. The virtual third place should feel like a place for the here and now, a place that is integrated seamlessly into the existing textures and details of our lived communal experiences. By emphasizing the unique demands of our unique communities, these virtual great good places can expand the participants' social world and further redefine how communication technology is integrated into everyday life.

In order to strengthen social movement, cyber social networks and virtual third space should provide people with an environment in which they can collect and provide information, publicize them, have dialogue and make lateral linkages, Coordinate action and also are able to lobby decision-makers.

Furthermore, they need a place to have a daily practice about socio-political events and also they need a network leadership to help them have an effect on their movement decision. This place should be able to make a good connection between online and offline users and also connect its user and share the online experience with whom are not able to use internet.

There are several examples in which people established social movement by using net. In Tehran and other cities that there are no powerful urban places for interaction, cyber social networks can play a more effective role in social movement. In Tehran, people have used the CSNs increasingly and have organized their own NGOs and campaigns independent from the government. These CSNs act as a place for enrolling and informing them about their right and their abilities.

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