Telematics: Tele-Operated System

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Abstract- With the advent of the Internet and more recently the high-speed academic networks, has created a dynamic that has allowed the academic, scientific and research worldwide for greater interaction in order to develop collaborative, relevant research and cooperatively competitive. Thus, Tele-operation stems from the need to keep people away from sources of changing radiation.

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INTRODUCTION

THE term "telematics" was coined in France (Tele-matique). In 1976, a report commissioned by the French president and produced by Simon Nora and Alain Minc Electrik (known as Nora-Minc report and distributed by the title: "Computerization of Society"), which was an incredibly accurate view future technological developments. However, it is no coincidence the difference between the terms: they respond to different contexts, there is indeed to distinguish shades. To clarify this, it is placed in the context of the time: on the one hand France, which placed clear emphasis on telecommunications as an engine of social transformation (1976), while the United Kingdom was undergoing a major revolution in computing. So Compunication points to a model with more relevant computer systems, telematics (Telematique) on the other hand, refers to a greater emphasis on telecommunications. This difference of origin has been lost, and that scientific and technological discipline has completely converged worldwide, to form a single well-established body of knowledge (Josiane & Paul, 2011, 229–49).

In addition, telematic has become an important topic, issue in the field of technology, industry. There are huge numbers of different ideas, definitions about the term of telematic. I mean that discovering most common definition for telematic is not easy. The term of telematic derived for two main words. First word is tele which is Greek word, meaning "far off" or "distance", and second word is matic which is Roman word, meaning "to make happen" or "make something happen at a distance" (L Sena, 2006).

Some writers of new technology claims that the term of telematic is blending two most common information technology tools which are computer and wireless telecommunication to improve most aspect of public, government services and business functions. Another definition is that telematic describe the useful relationship between nods, computers and technology tools via telecommunication to send, receive, store and archive data. For instance the Internet is the big example for telematic technology. The definitions of telematic refer to kind of the information source.

Moreover, Automotive Service Association states that "One of many definitions is the integrated use of telecommunications and informatics, also known as information and communications technology (ICT). More specifically it is the science of sending, receiving and storing information via telecommunication devices", and also Alex Laurie who is Specializes in pricing and reserve review support for P&C insurers claims that "Vehicle telematics is the technology of sending, receiving and storing information via telecommunication devices in vehicles." Moreover, the definition of telematic in term of automotive is that telematic describe about two-direct communication between the center of telematic provider and vehicle, or between different vehicles which are support by different telematic service centers to share critical, sensitive data (L Sena, 2006). There is a simple definition by Foy, who writes that "telematics is the transmission of useful information to and from a vehicle.

Nowadays, telematic technology uses in different aspect of real live such as health sector distance Teaching and learning, safety, security, comfort, and vehicle navigation and tracking. Most common using of telematic is GPS technology which is stand, short of global position system. GPS technology is a useful communication system which can provide huge number of useful services to drivers. For instance, vehicle tracking and position system, vehicle navigation system are two simple GPS technology which use to discover direction, position and speed of vehicles, aircrafts and boats.

Furthermore, telematic devices use every ware around the world to improve different real aspect of the life. Every year, numerous telematic units, tools are expected by markets. Antich claims that the markets sell 5.8 million units by 2009. Moreover, there is a lot of Technology Company support, develop different technology of telematic devices. For instance, ServiceMaster, GEICO, Ryder, KinderCare, Wal-Mart, UPS, and long-haul are some fleets of telematic manufactures. These manufactures are using telematic tools to decrease measure fuel consumption and monitor

Telematic - Cost reduction

In recent years, fuel costs have became a main reason which can make negative effects on economical infrastructure of business sector. Probably, this has become a big problem in front of transformation sector. Nowadays, Vehicle companies can use a vehicle telematic system which can provide effective route planning that assist vehicle centers to discover useful, suitable route for their vehicle driver. Therefore, telematic system services is a wonderful tool which can decrease, cut their fuel costs. Moreover, most of telematic system centers provide different effective services to monitor driving technique. So, telematic provider can see when drivers are driving aggressively. So, this assist vehicle driver to discover these area where fuel is wasted.

Telematic - Increasing security

The second advantage of telematic system services is that telematic increase the security of transformation sector. Telematic provide different services which are very effective to decrease the risk of vehicle driver. Telematic allow vehicle center that where a driver is at all time, and also it provides useful services which can alert vehicle center, driver via e-mail or text, when a vehicle is moved via bad peoples at anytime, anywhere. Telematic systems assist vehicle center to monitor, Track and recover stolen vehicles. Moreover, this system assist vehicle center to discover the position, direction of the vehicle. So, vehicle center can know that where is a vehicle? Where it is going? When a vehicle is moved? Alex Laurie claims that by using telematics system "Carriers have understood the potential benefits of measuring how much, when, where and how vehicles are driven". Therefore, telematic is a wonderful service which can be used to monitor, control vehicle behaviors by vehicle driver, telematic provider center anytime, anywhere.

In addition, Alex Laurie writes that "commercial fleet operators are increasingly harnessing the power of telematics not only for basic and enhanced vehicle tracking, but also for routing, fuel expense reduction, accident response, stolen vehicle recovery, and improved safety through driver education and behavior modification".

Telematics - Increasing safety

Telematics system services have become share point between driver, emergency center and vehicle center. The effective benefit of Telematics systems is that telematics provide some useful tools, services which can increase the safety of the driver by decreasing accident frequency and severity. Moreover, telematics assist vehicle center to decrease accident response time between emergency center, vehicle and driver. In the emergency situation, drivers can use telematics system devices to call near emergency center, vehicle center by using text, e-mail, and also emergency tem can respond the driver as soon.

In addition, the center of telematic provider can identify the position of the accident via using GPRS services very quickly, efficiently. Further benefits about telematics systems are:

- Telematics can decrease driving.
- Telematics is a useful mechanism to reduce environment pollution via reducing driving.
- Telematics is a good tool to reduce traffic congestion by reducing driving.
- Telematics service is a wonderful device to decrease energy consumption.

Approaches for Tele-Operated System

A tele-operated system is one that allows a robot slave rule (control your movement and the force applied) located in a remote area or distance area (Maybe the slave is really far away or you may be in a hostile environment to be protected to the operator) via the management of a master robot located at the point of the operator. Therefore, movement of the slave should be predictable from the movements that the operator have on the master, for example, the operator must understand very intuitively how to move the slave master to lead to a certain path, and also make the work or works required. This concept is shown in figure beneath these lines, in which a operator operates a master robot kinematics chain analogous to the slave that interacts with the environment.

The different tele-operation architectures provides different degrees of existing tele-presence to the operator are easily comparable and measurable (just realize what is the algorithm that allows you to works better). However, in developing tele-operated systems the need arises to objectively assess its performance. A first approach to this assessment is true that the different variations on the basic outlines of the proposed tele-operation bibliography are intended to improve its characteristics of stability and transparency. Therefore, both are important objective.

The concept of stability is quite common and that a feature is a prerequisite for a tele-operated system: it would be unacceptable during system operation via the operator one of the robots began to shake un-controllably. Electrical noise and communication delays are typical causes of instability. Regarding the first, is inherent in any real control system, but delays occur only when the robots are sufficiently far apart (for example when the robot is required to work slave to a certain depth under the sea), which is not occurs in the system on which this project has developed (Flichy, 1995, pp 56-87).

The concept of transparency on the other hand, is much more specific in the world of tele-operation. For the work done by the slave are not precise enough to control the position of the slave, it is also necessary that the operator is able to perceive the forces that appear on the remote robot during tele-operation. In this regard, it is generally speaking tele-operated system with force reflection as it is intended that the forces acting on the slave appear somewhat reflect on the master, so that the operator is able to feel. Therefore, the infinite transparency would be a feature of a tele-operated system that was capable of making the operator feel exactly the same forces that directly manipulate feel if your environment. In other words, in the tele-operated system of transparency infinite impedance (resistance) 1 transmitted (the operator feels) exactly matches the impedance of the remote environment. Therefore, transparency is a measure of how much the impedance of the environment that interacts with the slave is altered to be felt by the operator from the master and through tele-operation algorithm.

Systems Tele-operated

According to their degree of autonomy, robots can be classified into: repetitive operation tele-operated and autonomous or intelligent. Means tele-operation the case where a human operator, remotely located with respect to robot manipulates it. This is incompatible with a tele-operated robotic autonomy, understood as a case in which the control and decision making are performed by the robot thereof.

The limitations of these systems lie in the processing capacity of the signals and thus precision, and human-robot coordination. It is remarkable that the transmission delay plays an important role and should be considered in designing the control system. The design of man-machine interface is usually critical. For which usually lies with the operator tasks in decision making based on sensory information, experience and expertise. Current areas of research and development include:

a. The manipulator and mobile robot control.
b. The architecture of the remote tele-robot.
c. Processing, integration and fusion of the sensory system.
d. Interactive tasks planned and executed.
e. The graphical display of superimposed images.
f. Multi-sensor - balanced control.
g. Micro-mechanisms - control for the deployment of the instruments. (Beniger, 1986, pp 12-34)

The Elements of Tele-Operation System

A tele-operation system include, consists of the following elements:

a. *Operator or telemarketer*: a human being who makes remote control operation. Its action can range from continuous monitoring to intervention intermittently, with which only deals with monitoring and indicating goals and plans time to time

b. *Tele-operated device*: it can be a manipulator, a robot, a vehicle or similar device. Is the machine working in the remote area and is being controlled by the operator.

c. *Interface*: A set of devices that allow operator interaction with the tele-operation system. The master manipulator is considered as part of the interface, and as video monitors, or other device enabling the operator to send information system and receive information from it.

d. *Control and communication channels*: a set of devices that modulate, transmit and adapt the set of signals that are transmitted between remote and local area. Usually have one or several processing units.

e. Sensors: A set of devices that collect information, both in the area local and remote zone, to be used by the interface and control

Operational Work

For industrial operations and complex non-repetitive, nothing beats the reliability and flexibility of manipulation of the robot via humans. For this reason, the delicate operations in a hostile environment could never be fully automated.

Still willing to change the robotic means, AREVA NC instructed the STL to the challenge of innovation. Until then, only the mechanical manipulators were able to reproduce, through a set of cables and pulleys, movements and stresses imposed by the operator on the master arm. The STL team has replaced the mechanical master-slave by a computer controlled motorized system that has adapted to an industrial robot Staubli. Technology transfer has been made to Mecachimie (subsidiary of AREVA NC) which is responsible for carrying the product.

Despite the use of an industrial robot trade, the operator retains the sense of touch thanks to force feedback. A first "When the gripper encounters an obstacle, the stress is transmitted to the master arm, and therefore the operator," said Philippe Desbats, a researcher at STL.

Besides his unique sense of touch, the new tele-operated robot is equipped with support functions by software. "Everything is configurable. The operator can choose to feel such a mass of 1 kilogram for an actual load carried 10 kg. In this way he can move without too much effort on heavy elements, whose weight is offset by the robot's motors. The

operator can freely shift the position of the master arm compared to that of the slave. "This leaves a comfortable working position, although it must intervene in the ceiling of the cell" It can also sequence a task using several control modes (manual, assisted, or automatic). Finally, the operator can work remotely, guided by video screens interposed.

To all these functions are added those being developed by scientists: automatic identification of the weight of objects handled, triggering alarm in case of unwanted shocks, guiding the robot on complex trajectories (Jerzy, 2007, pp 45).

Tele-operation Architectures

The various control architectures differ mainly in tele-operation the information exchanged between the master and slave and the type of sensing is required. Based on the information exchanged between the master and the slave can be classified into the following parts, categories.

i.   *Scheme-Position Position*: the position of the slave is determined from the teacher and vice versa. No need to force sensors.

ii. *Scheme Force-Position*: The position of the slave is determined by monitoring master robot and the forces that appear on the slave are measured and generated the teacher by their engines. It only requires measurement of forces on the slave.

iii. *Scheme Force-Force*: the trajectories of master and slave are determined from the readings of the force of both. There is also a local control position in both robots.

iv. *Four Channels Scheme*: in this case no exchange of information both in positions as in force. The theoretical analysis shows that this solution is capable of provide transparency infinite.

Stability is a common understanding and is a prerequisite for these type systems as it would be unacceptable for the management of the system by the operator one of the robots began to shake. Electrical noise and delays in communication signals cause instability, noise is a common symptom in any real control system, but delays are found only when the robot too far from the control (John, 2009, pp. 280–28).

Technology and Organization of Care Models

Telecommunication technologies have had health utility since its inception, the telephone, radio and television have been used, as they appeared, to bring health care to ships at sea, oil rigs and other isolated settings. This use of telecommunications adopted the term telemedicine.

From the 90's, health systems are seeking new ways of organizing and alternatives to traditional ways of providing health services, information technology and communications have emerged as facilitators and change

tools, making viable organizational models, as continuity of care or the approach of the patient care environment (Angaran, 2009).

More recently, the evolution of these new technologies, and tools of the new information society, have allowed applying the concepts of comprehensiveness and interoperability to healthcare organizations, giving rise to new organizational and working environments in which, Telemedicine that first concept associated exclusively to overcome geographical barriers, has become obsolete.

Access control

Controls access to information prevents unauthorized access entitled to information systems, preventing access of users authorized; Protects network services; prevents unauthorized access to computers; prevents unauthorized access to information contained in the Systems, detects unauthorized activity, and ensures the safety of the information when using mobile computing devices and telecommuting. Is measured by: requirements, user access management, user responsibility; control access to the network access control to the operating system, control access to applications, monitoring and computer access and use mobile and telecommuting.

Telematics deploys Network Infrastructure for the Park Hyatt

Telematics will deploy the network infrastructure based on the SYSTIMAX GigaSPEED XL solution which will provide the robust foundation for today's communication needs. The system exceeds the CAT6 specification standards.

Alongside the hotel network, Telematics is also upgrading the fiber backbone infrastructure between the existing properties in the resort to enhanced Singlemode Teraspeed which is capable of supporting 100Gbps applications thereby future-proofing the network completely. Telematics has only recently completed the much acclaimed Madinat Jumeirah project.

Conclusion

It is a fact that Improvements in telecommunication technology are also having a major impact on tele-operation. Tele-robotics tends to use bandwidth asymmetrically because the "uplink," relaying commands from the human operator to the robot, requires a much lower data rate (less than 10KB per second) than the returning sensor information

As communications in general continue to advance, the definition and scope of a telecommunications network will also continue to change and broaden. However, the core

concept will likely remain the same. As long as the form of communication allows for the real-time electronic exchange of audio, visual, and data transmissions, there is a good chance that method of communicating can be classified as a telecommunications network.

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