Study on Future of Artificial Intelligence in Neural
Network System

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ABSTRACT

In the modern world there is need for a system that can learn new concepts and give decisions on its own. Hence the Artificial Neural Network is needed in the present scenario. Such a system can recognize speech, face scanning and detecting voice, capable of scanning and detecting of fingerprints etc. This would result in enhancing the system's privacy and security. This research paper is a subject written after thorough study of the subject Artificial Intelligence in Neural Network.

Keywords:

Artificial Neural Network System (ANNS), Framework Programming, Activation Function, Hidden Layers, Input-Out Nodes/neurons

1. INTRODUCTION

With ever growing field of artificial intelligence, there are numerous intelligent systems providing algorithms to solve any particular problem which require human intelligence. These artificial intelligent systems led to development of a more creative, knowledgeable and exceptional system that helps computers learn. These systems are most commonly known as **Artificial Neural Systems**. Basically the Artificial Neural Network is the interconnecting network of artificial neurons which uses the some algorithms and the mathematical formulas for the processing of the data or information on the computational purposes. Neural network is non-linear, statistical data model- -ling, decision making tool. Thus it is being combined with the artificial network together to form the Artificial Neural Network. It uses modern technique of "Learning with examples" which the corresponding response seems to come from a kind of natural intelligence rather than using Artificial Intelligence. Fields those are included in Artificial Neural Network are:

1. Function approximation

2. Data Processing

1.1. General Terms

i. Concept of Artificial Neural Network System.
ii. The relevancy of artificial neural network models lies within the fact that they can be used to assume a function from observations and also to use it and hence giving a corresponding natural response.
iii. The type of system that are also responsible for predicting result of some source data to happen or how the result of the source data is likely to come out. Artificial Neural System creates a learning technique in computer to enable it to respond correspondingly to the request whether in the form of the audio, video and many more. Artificial neural networks are models of human neural networks that are designed to help computers learn. It is a system that scientists are trying to achieve using techniques like mimicking human neural systems. The traditional based artificial system didn't have much strength to compete with the enormous data but use of the Artificial Neural System has acquired the much robust and strong approach in dealing with and processing the data.

1.2. Techniques to present output through ANNS:
The Artificial neural system consists of a large group of artificial neurons that process information and produce a corresponding output. This output is produced by processing the information with the help of layers of interconnected artificial neurons.
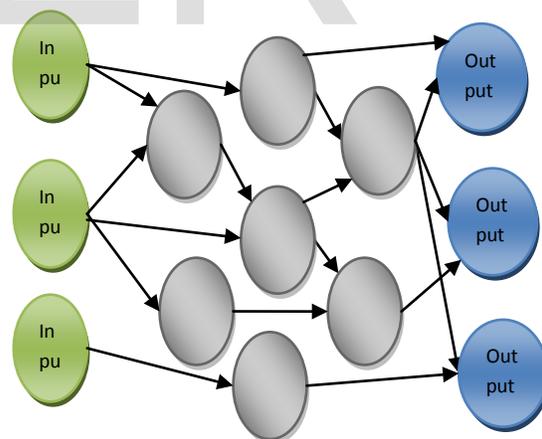

Connecting Leads Neurons   **Inter-connecting**

1.3. Ba

Figure 1 Artificial Neural Network

A simplified example is the pain from getting burned. When this happens for the first time, a connection is made in the brain that identifies the sensory information known as fire (flames, smell of smoke, heat) and relates it with pain. This is how

one learns, at a very young age, how to avoid getting burned. These leaps are not always correct, but they can be corrected through experience, thus allowing adaptive learning. Artificial neural networks try to recreate this learning system on computers by constructing a simple framework program to respond to a problem and receive feedback on how it does. A computer can optimize its response by doing same problem thousands of times and adjusting its response according to the feedback it receives. The computer can then be given a different problem, which it can approach in the same way as it learned from the previous one.
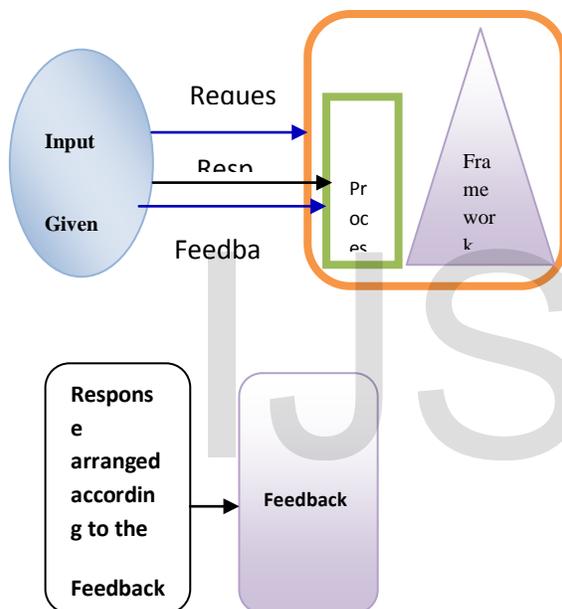
1.4. Interconnected Network

The term neural network was coined to refer to net--work or circuit related to the interconnections of the biological neurons. The current usage of the term often refers to artificial neural networks (ANN'S), which are composed of artificial neurons or nodes. In the artificial intelligence field, artificial neural networks (ANN'S) have been implemented successfully to speech recognition, image analysis and adaptive control, in order to construct software agents (like in computer and video games) enable in the enhancement of the technologies. Neural networks (NN'S), as used in

artificial intelligence, have traditionally been viewed as simplified models of neural processing in the brain. A subject of current research in computational neuro science is the question surrounding degree of complexity and the properties that individual neural elements should have in order to reproduce something resembling animal cognition.

A *neural network* (NN), in the case of artificial neurons called *artificial neural network* (ANN) or *simulated neural network* (SNN), is an interconnected group of natural or artificial neurons that use a mathematical formula for information processing that is based on an approach for computation purposes. In most cases an ANN is an adaptive system that changes its structure based on external or internal information that flows through the network. However, the paradigm of neural networks - i.e., *implicit*, not *explicit* , they use the modern technique of "learning with examples" seems more correspond to some kind of natural intelligence than to the traditional symbol-based Artificial Intelligence, which would stress, rule-based learning.
The applicability of artificial neural network models (ANN) lies within the fact that they can be used to assume a function from observations and also to use it. Learning in neural networks is particularly useful in applications where the complexity of the data or the task makes the design of such functions by hand impractical.

The fields where the artificial neural networks are:

1. Function Approximation including time series prediction and modeling.
2. Data processing, including filtering, clustering and compression.

Application areas of ANNs also includes system identification and control (vehicle control, process control), game-playing and decision making (backgammon, chess, racing), pattern recognition (radar systems, face identification, object recognition), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications, data mining (or knowledge discovery in databases, "KDD"), visualization and e-mail spam filtering. Artificial Neural Networks are composed of interconnecting

artificial neurons for solving artificial intelligence problems. The goal of artificial neural networks is good, or human-like, predictive ability.

2. Flexibility in the Artificial Neural Network System
ANNS are very powerful tool in the field of modeling; they acquire the robust approach to deal with data unlike tradition model based. ANNS have the feature of relating and learning the similar related figures between both the data inputs and the corresponding required outputs. They have an extremely beneficial feature of flexibility where they use a methodology of "learning with practical knowledge "and replaces programming in problem solving.

3. Predicting the Result
They provide benefits where people have little or incomplete knowledge of the problems but where the data is available easily. They can be used to predict result of the source data. Neural Networks have been widely used in different aspects of life where demographical methods are active.ANNS have the capabilities of aligning the source data with its corresponding target output.ANNS understand by examples, they can be skilled with known examples of any problem.
They also have the capability to be metaphysical by predicting new targets outputs from the past input figures. They are brawny systems. They can fetch the complete information from disturbed, incomplete figures.

4. ANNS-Information Processing System

They process information coextensively at very speed in an apportioned manned.ANNS can be called as information processing which consists of large connected elements where the structure is exhilarated from architecture of cerebral cortex of the brain.
There are two types of ANNS:
4.1. Feed Forward Networks: In this the data flows along the connected lane from the source data through the hidden areas to the target output. There are no bends as the output of one does not affect the current or the past zone.
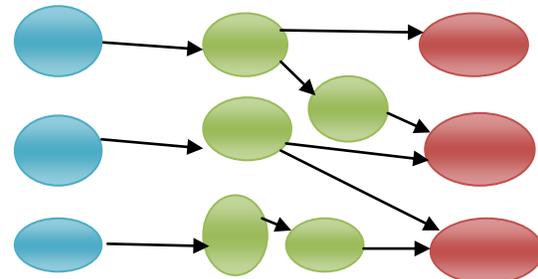
Input   Hidden Layers   Output

Figure 2 Feed Forward Network with Hidden

1)   Recurrent Networks:
In this there can be one feedback bend and also there could be neurons with their own feedback connections. The output can be targeted back to itself as the source data or information.
Learning methods/Build up methods:
They can further classified under the 3 heads:
i. Supervised
ii.Unsupervised
iii.Reinforced

i. **Supervised:** In this method every data figure that is used to build the network and is related with the output figure that is the desired output figure.
ii. **Unsupervised**: is indeed the reverse operation of supervised where the system has to adapt its own methods and to structural features in the source figures.
iii. .**Reinforced**: In this method it just indicates the computed to check whether the target output is correct or not. It is not implemented much in the field of learning .In this correct computed result is awarded and the amends for the incorrect one.
The most popular class of neural networks   for solving real world problems is:

I. Multilayer Perception

II. Radial Basis Functional Networks.

III. Kohonen Self Organizing Feature Maps

I. Multilayer Perception:

i.   This is the most popular form of neural structure
ii.   It has many inputs
iii.   Uses linear combination of methods in the input layers.
iv.   Have connections between hidden layer, input layer, first input layer and between the last layer

and output layer.

v. With building the time, given adequate data, enough data units and MLP with just one hidden layer with it can increase the function virtually with any degree of accuracy. It is also known as Global Approximates which can be used with partial knowledge of the relationship between the source and destination results.

vi. Using extra layers improves generalizations.

II. Radial basis Functional Network:

They resemble the functionality of feed forward but have only one hidden layer:

I.It can have any number of inputs

Ii.It has just one hidden layer

Iii.Connections between input and hidden layer as well as hidden layer and output layer

III. Kohonen Neural Network:

It is also named as Self Organizing Feature Map the are designed specifically for unsupervised learning. Kohonen network attempts to learn the architecture of the data. It is also used in exploratory data analysis as well as in novelty detection. It has just 2 layers present in the architecture one is input and output layer of radial units.Neural Networks have proven to be very active tool in various fields of problem solving and also by professionals from agriculture to zoology.
There are various phases in constructing neural networks and they are:

I.Variable Selection

ii. Formatting of training, testing and validation sets

iii. Neural Network architecture

i. **Variable Selection**: The source variables essential for modeling variables under the study are selected by suitable variable selection procedures.

ii. **Formatting of training, testing and validation sets**: The data file is divided into three unique sets called training, testing and validation. Amongst these three training are the largest set and is used

by neural networks to learn patterns present in the data. The testing set is used to evaluate generalization ability of a trained network and to check the performance of a trained network is done using validation set.

iii. **Neural Network architecture**: It defines its structure using hidden layers, hidden nodes and output nodes.

A. Number of Hidden layers: It provides the network with its capability to discern.

B. Number of Hidden Nodes: There is no such rule which can be implemented for selecting the appropriate number of hidden neurons.

C. Number of Output Nodes: Neural networks with concurrent outputs if are widely spaced produce inappropriate results in comparison with the result generated through a single output.

D. Activation Function: It uses mathematical formulas to determine the output of a processing node. Each unit takes its net input and implements an active method on it.

5. SOFTWARES

There are lots of software have been developed related to neural network. Some of them are listed below:

i. Commercial software: Statistica Neural Network, TNS2Server, DATA ENGINE, and partek, MATLAB: Neural network toolbar.
II. FreeWare Software: Net II, Neural Shell, NeuDC,PlaNet,Brain Neural Network simulator. NSL-Neural Simulation LANGUAGE Version, spider nets neural network Library.

6. CONCLUSSION:

Since every technique has certain pros and cons associated with it similarly the same thing implements for ANNS as well .The developing advancements in computer worlds need neural networks. Their ability to adapt the methodology of "memorizing with examples" is its strength and makes it powerful and worthy. A large number of assumptions have been made regarding the

modeling abilities of Neural Networks some amplified and some acquit.

For efficient utilization of ARTIFICIAL NEURAL NETWORKS for problem solving, it is important to understand the dormant as well as the deficiencies of neural networks. In future the artificial intelligence would be the essential part of normal life for human being such as transportation, education and aeronautics. Also, neural networks have a great potential and will also benefit different fields of techniques and get the best out of them when merged with artificial intelligence with fuzzy logic and related subjects. A common assessment of neural networks, in the field of robotics, is that they require a huge assortment of training for real-world operations.

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