Study of Neural Networksin Artificial Intelligence

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Introduction of Artificial Intelligence:

Al is intelligence displayed by machines in contrast with the natural intelligence displayed by the humans and another animals. If we consider the history of AI the early model of an artificial neuron In 1943 Warren S. McCulloch, a neuroscientist,and Walter Pitts, a logician, published "A logicalcalculus of the ideas immanent in nervousactivity" in the Bulletin of MathematicalBiophysics 5:115-133. In this paper McCullochand Pitts tried to understand how the brain couldproduce highly complex patterns by using manybasic cells that are connected together. Thesebasic brain cells are called neurons, andMcCulloch and Pitts gave a highly simplifiedmodel of a neuron in their paper.

In 1950 Alean Turing published a /land mark paper in which he speculated about the possibility of creating machines with true intelligence. He noted that "intelligence" s difficult to define and devised his famous Turing test .if a machine could carry on a conversation (over a tally type that was) indistinguishable from conversation with a human being then the machine could be called intelligent . This simplified version of the problem allowed Turing to argue that a thinking machine was at least plausible and the paper answered all the most common objections to the proposition. The Turing Test was serious proposal in the philosophy of artificial intelligence.

In 1956 John McCarthy regarded as the father of AI organized a conference to draw the talent and expertise of others interested in machine intelligence for a month of brainstorming. He invited them to Vermont for "The Dart mouth summer research summer research project on artificial intelligence." From that point on because of McCarthy the field would be known as Artificial intelligence. Although not a huge success the Dartmouth conference did bring together the founders in AI and served to lay the ground work for the future of AI research.

SUBAREAS OF ARTIFICIAL INTELLIGENCE

- Neural Networks
- Game Theory
- Programming languages
- Expert systems
- Genetic algorithmic
- Speech or Hand writing recognition
- Vision
- Robotics
- Search algorithms
- Learning systems
- Natural language processing
- Common knowledge databases
- Logic
- Agents
- Planning and prediction
- Automation software

COMPONENTS OF AI:-

- Perception and Learning
- Reasoning and Problem solving
- Language understanding

Some areas of specialization of AI are Game playing,Expert systems,Natural language processing,Neural networks Robotics.Some example of AI Expert system, Natural Language Processing, Speech recognition,Computer vision,Robotics ,Automatic programming. Programming languages used in AI are Lisp,Python,Prolog,Java,C++.

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ADVANTEGES OF AI:-

- ✓ Can take on stressful and complex work that humans ay struggle/can not do.
- ✓ Can complete task faster than a human can most likely.
- ✓ To discover unexplored things.
- ✓ Less errors and defects and More versatile than humans.

ARTIFICIAL NEURAL NETWORKS (ANN):-
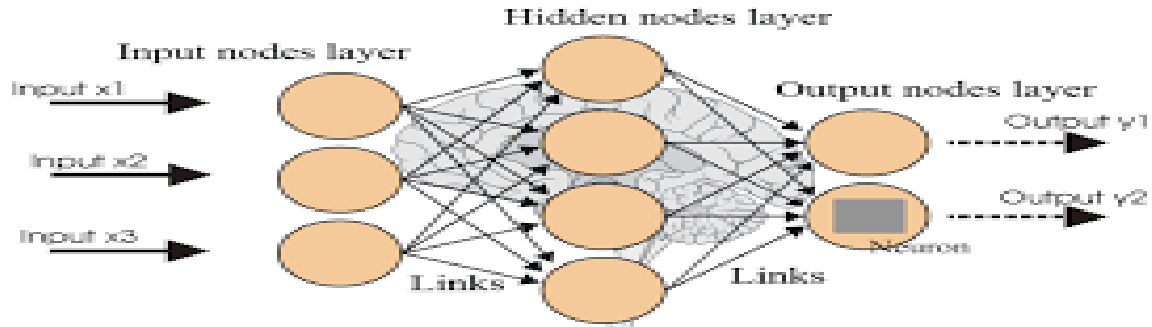
ANN is a machine learning approach that models human brain and consists of artificial neurons. Neuron in ANN tends to have fewer connection than biological neurons. each neuron in ANN receives a number of inputs. an activation function is applied to these inputs which results in activation level of neuron.Knowledge about the learning is given in the form of examples called training examples. If we consider difference between human brain and an computer then Human brain contains 10billion neurons and 60 billion synapses. Computer is faster than neurons (10^{-9}sec).human brain contains distributed and nonlinear processing .computer contains central and sequential processing.
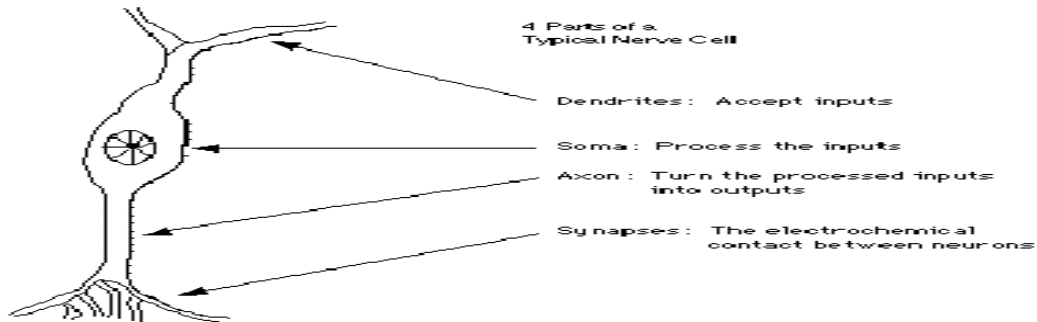
Properties of Artificial Neural Networks:-

NEURON MODEL:bbIt is divided in to 4 parts

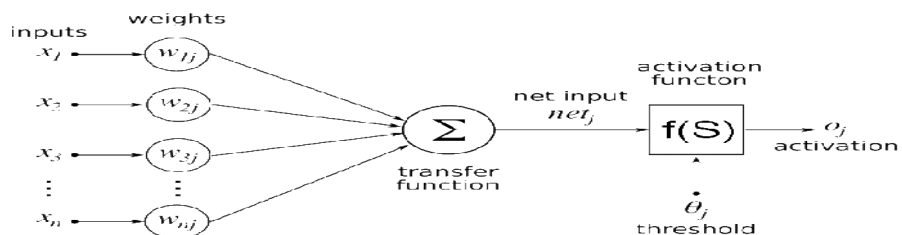**Dendrites:** Accepts the inputs.   **Soma:** Processing the inputs.
Axon: Turns the processed inputs into outputs.   **Synapses**: The electrochemical contact

Artificial Neuron model:-

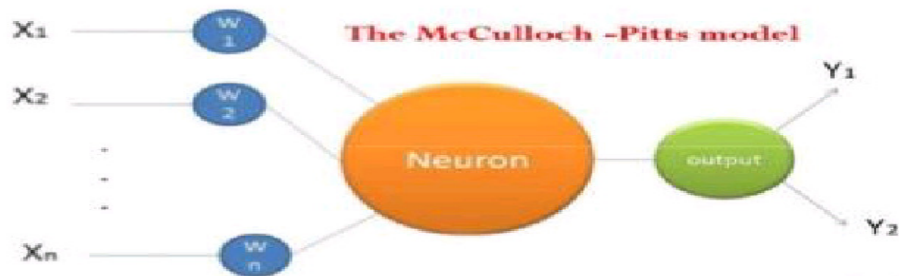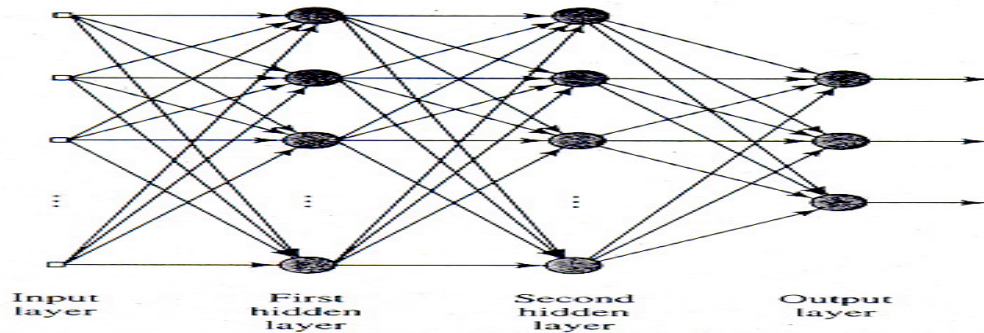Input to the network are represented by the x1 mathematical symbol Xn.
Each of these inputs are multiplied by a connection weight Wn
Sum=W1X1+……+WnXn
These products are simply summed fed through the transfer function() to generate a result and then output.
A network of artificial neurons

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Inputs(synapses):input signal.
Weights (Dendrites): Determines the importantance of incoming values.
Output(Axon):output other neuron or of ANN.
Characteristics-
Nonlinear I/O mapping
Adaptively
Generalization ability
Fault-tolerance (graceful degradation)
Features of Artificial Neural Networks:-
The output values can be represented as a discrete value, a real value, or a vector of values. Tolerant to noise in input data. Timefactor. It takes long time for training. Once trained, an ANN produces output values (predictions) fast. It is hard for human to interpret the process of prediction by ANN.Example of Applications:-
NETtalk [Sejnowski]
Inputs: English text, Output: Spoken phonemes, Phoneme recognition [Waibel]
Inputs: wave form features, Outputs: b, c, d,…,Robot control [Pomerleau]
Inputs: perceived features, Outputs: steering control,
Intelligence system in our Everyday life:-
Post office:- Automatic address recognition and sorting of mail.
Banks:- Automatic check readers signature verification systems automated loan application classification,
Customer services:- Automatic voice recognition.
Digital cameras:-Automated face detection and focusing.

Advantages :-

It involves human like thinking. They handle noisy or missing data. They can work with large number of variables or parameters. They provide general solution with good predictive accuracy. System has got properties of continued learning.

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