SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AI Techniques in Electrical Engineering

UNIT II: NEURAL NETWORK

TOPIC: **NEURAL NETWORK MODELS**

TOPIC OUTLINE

- Introduction of Neural Network
- Types of Neural Network
- Application of Neural Network
- Conclusion

Introduction of Neural Network

Fundamental concept

•NN are constructed and implemented to model the human brain.

•Performs various tasks such as pattern-matching, classification, optimization function, approximation, vector quantization and data clustering.

•These tasks are difficult for traditional computers

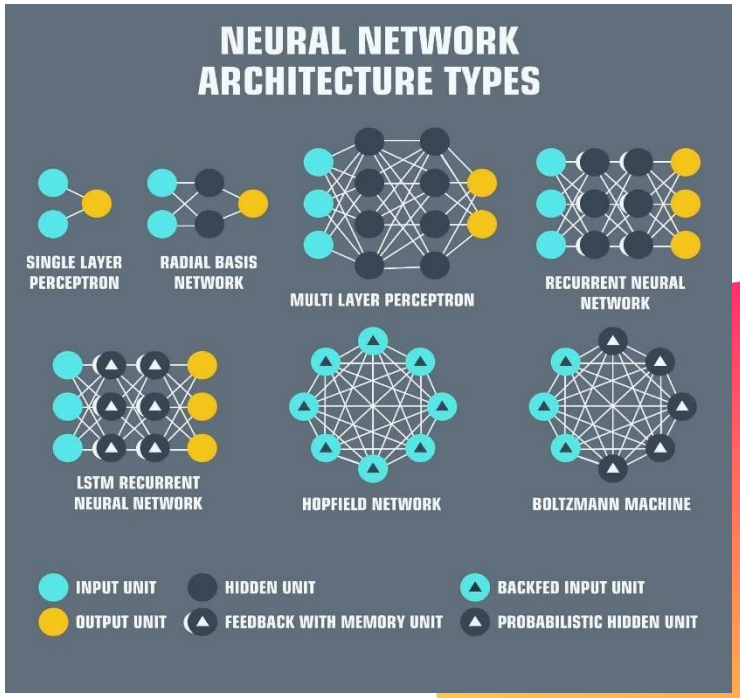
Types of Neural Network

Neural Network types can be classified based on following attributes

1. Connection Type
   - Static (feedforward)
   - Dynamic (feedback)

2. Topology
   - Single layer
   - Multilayer
   - Recurrent

3. Learning Methods
   - Supervised
   - Unsupervised



ANN

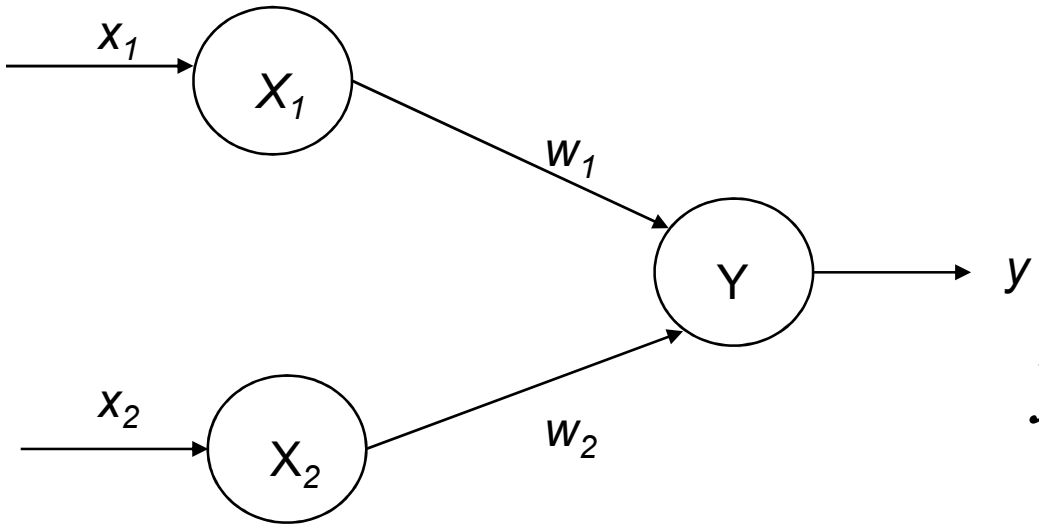
•ANN posess a large number of processing elements called nodes/neurons which operate in parallel.

•Neurons are connected with others by connection link.

•Each link is associated with weights which contain information about the input signal.

•Each neuron has an internal state of its own which is a function of the inputs that neuron receives- Activation level

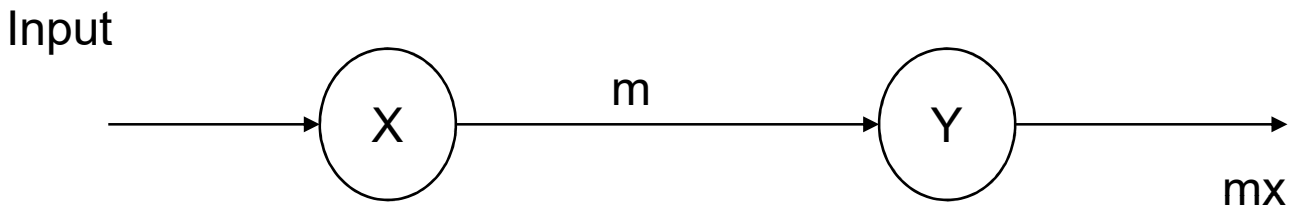
Artificial Neural Networks



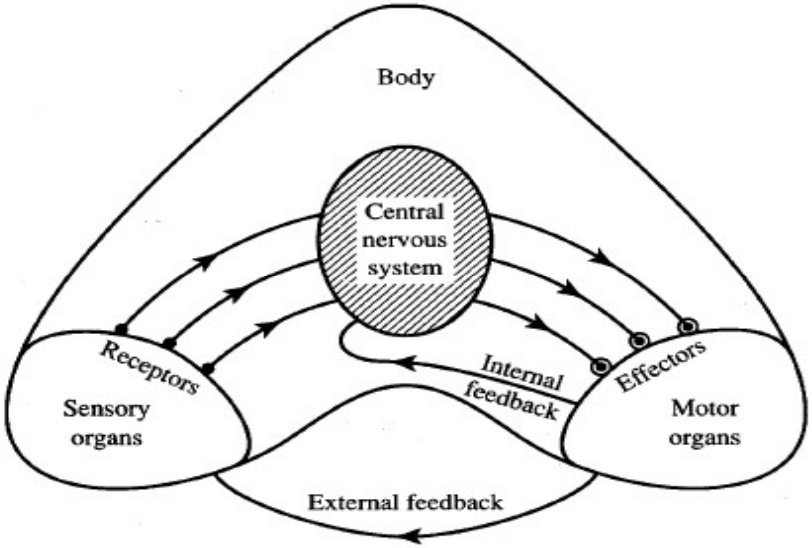
$$y = f(y_{in})$$

$$y_{in} = x_1 w_1 + x_2 w_2$$

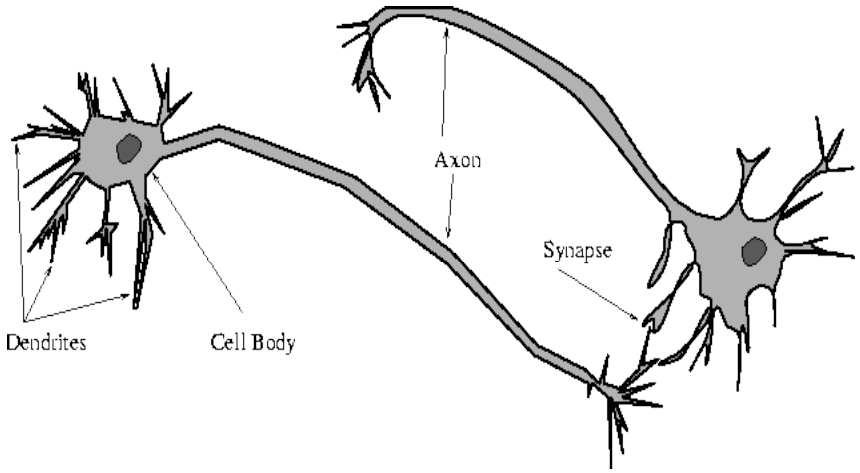
Neural net of pure linear eqn



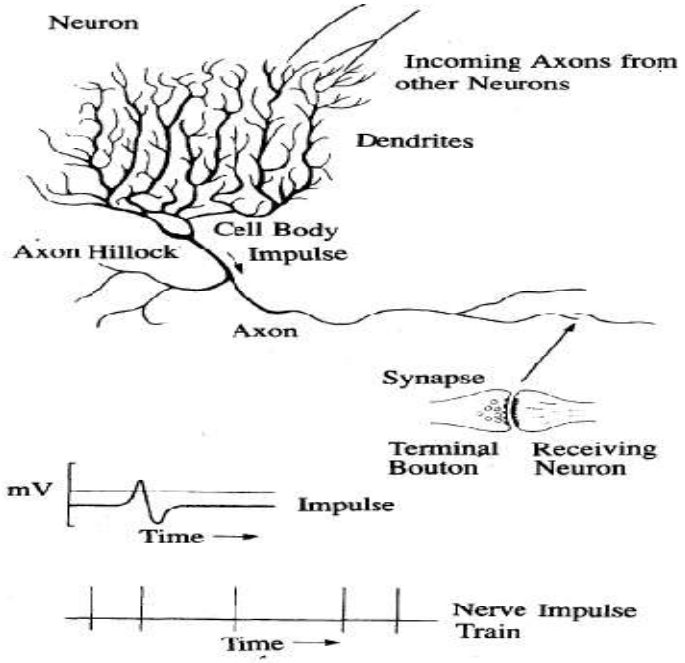
Information flow in nervous system



Biological Neural Network



Neuron and a sample of pulse train



Biological Neuron

- Has 3 parts
  - Soma or cell body:- cell nucleus is located
  - Dendrites:- nerve connected to cell body
  - Axon: carries impulses of the neuron
- End of axon splits into fine strands
- Each strand terminates into a bulb-like organ called synapse
- Electric impulses are passed between the synapse and dendrites
- Synapses are of two types
  - Inhibitory:- impulses hinder the firing of the receiving cell
  - Excitatory:- impulses cause the firing of the receiving cell
- Neuron fires when the total of the weights to receive impulses exceeds the threshold value during the latent summation period
- After carrying a pulse an axon fiber is in a state of complete nonexcitability for a certain time called the refractory period.

…THANK YOU