ABES INSTITUTE OF TECHNOLOGY

APPLICATION OF SOFT COMPUTING

UNIT-1 : NEURAL NETWORKS

LECTURE-1

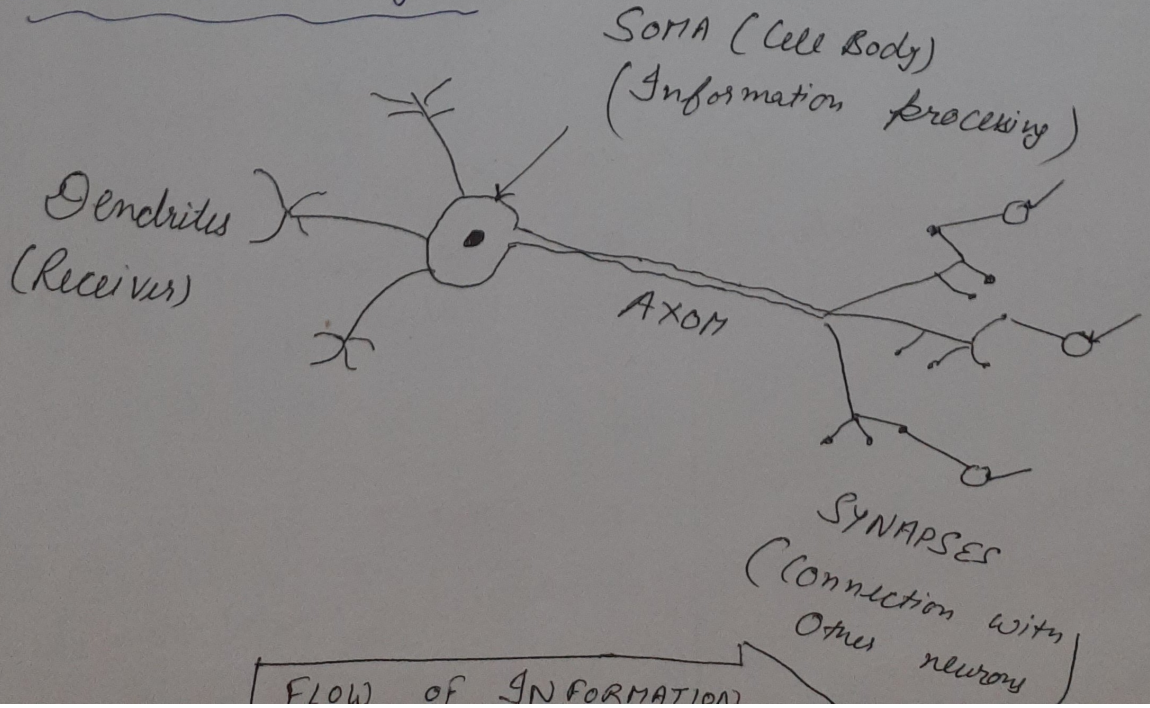
CONTENT: WHAT IS NEURON, ANN VS BNN, MODEL of ANN

LECTURE OUTCOMES: Students are able to Expain what is Soft Computing. Know About Neuron, ANN & BNN. Introduction to ANN.

NEURON: A nerve cell also called neuron is a special Biological cell that process Information.

* There are Large No of neuron in Brain approximately 10^{11} with numerous Inter-Connections approximately 10^{15}.

Schematic Diagram!



Neuron Consist of four parts

1 Dendrites - They are tree like Branches, responsible for receiving the Information from other neurons it is connected to. We can say that they are like the neuron

2 Soma: It is the cell body of the neuron and is responsible for processing of Information, They have received from dendrites

3 Axom: It is just like a cable through which neurons send Info.

4. SYNAPSES: It is the Connection Between the axom & other neuron dendrites

→ LET'S Take a Look AT The similarities BASED ON THE TERMINOLOGY.

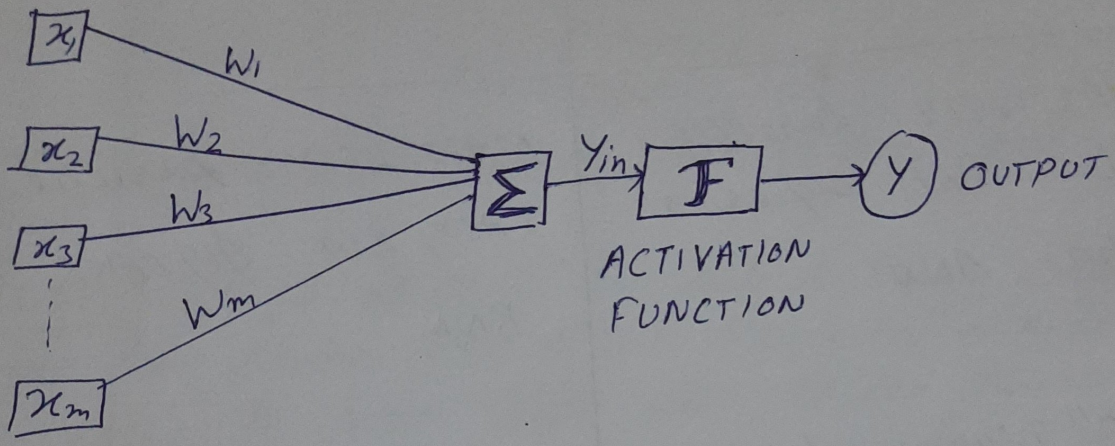
BIOLOGICAL NEURAL N/W (BNN)	ARTIFICIAL NEURAL N/W (ANN)
1 SOMA	1 NODE
2 Dendrites	2 Input
3 SYNAPSE	3 Weight or Intel Connection
4 AXOM	4. OUTPUT

LET's DISCUSS THE COMPARISON BETWEEN ANN and BNN BASED ON SOME CRITERIA

CRITERIA	BNN	ANN
1 PROCESSING	MASSIVELY parallel, slow But superior than ANN	MASSIVELY parallel, FAST, BUT INFERIOR THAN BNN
2 SIZE	10^{11} neurons & 10^{15} Inter Connection	10^2 to 10^4 nodes
3 LEARNING	They Can tolerate ambiguity	Very precise, structured and formatted data is required to tolerate Ambiguity
4. FAULT TOLERANCE	PERFORMANCE degrades with even partial damage	It is capable of Robust performance, Hence has the potential to be fault tolerant
5 STORAGE CAPACITY	Stores the Information in the synapse	Store the Information in Continous memory Location

MODEL OF ARTIFICIAL NEURAL NETWORKS:

The following diagram represent the general Model of ANN FOLLOWED BY IT's PROCESSING.



FOR THE Above general model of artificial neural Network, The net I/p Can be Calculated as follow.

$$y_{in} = x_1 \cdot w_1 + x_2 \cdot w_2 + x_3 \cdot w_3 ----- x_m \cdot w_m$$

$$y_{in} = \sum_{i=1}^{m} x_i w_i$$

The output Can be Calculated BY APPLYING The ACTIVATION FUNCTION OVER the NET INPUT

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

(OUTPUT) FUNCTION (netinput calculated)