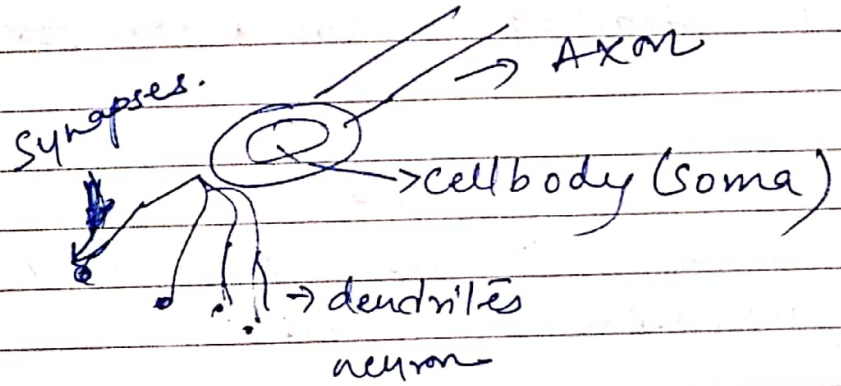
BNN

1. A neural N/w is made up of no. of processing elements called (neurons), whose interconnecting are cld (Synapses).

In our body wkr have 10^{10} neurons. & each neuron is connected through 10^4 neurons.



2. Each neuron accept i/p from External world or from other neuron.

3. Suppose two info :- One is you are writing from one hand & from other hand you are holding tea. Two info. is parallel

3. Synapses have a processing value or output.

Eg. How much pain in hand, this info. had passed through dendrites, passed through soma & then passed through Axon.

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→ A neuron is composed of nucleus a cell body K/as (Soma).

→ Attached to Soma are long filament like (Dendrites).

→ All input from other neurons are passed through (dendrites).

→ Other link attached to Soma are (Axons).

	ANN	BNN
1.	Neural N/w are faster in processing information	are slow in processing Info.
2.	They operate on sequential mode i.e. one instruction after other in conventional computer.	2. can perform massively parallel operations.
3.	ANN are not fault tolerant, since, corrupted Info cannot be retrived from memory.	3. They exibit fault tolerant since the info is distributed in connection through the N/w
4.	There is control unit which monitors are the activities of	4. There is no specific control mechanism.

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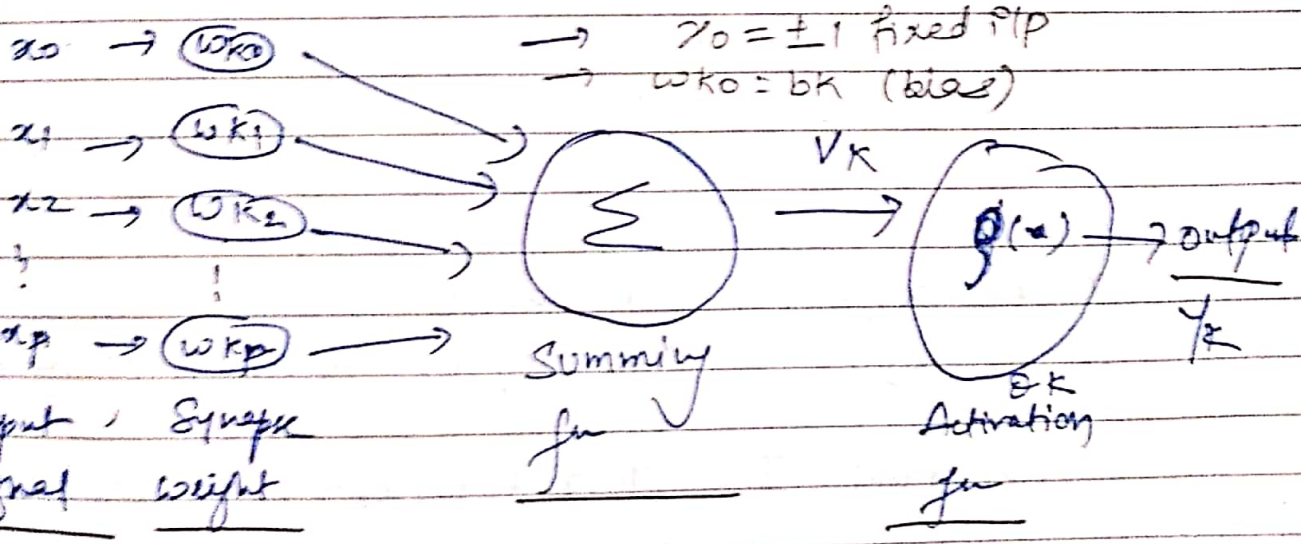
Model

1. Synapses → A set of synapses or connected link, each of which is characterized by a weight.

A signal (x_j) at the input of synapses (j) connected to neuron (k) is multiplexed by synapse weight (w_{kj}) $(w_{kj} \times x_j)$.

w_{kj} → neuron, input end of synapse



(2) Adder → Summing the input signals weighted by the respective synapse of neurons.

(3) Activation fn → for limiting the amplitude of the neurons.

Range :- $[0, 1)$ or $[-1, 1]$

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$$V_k = b_k + U_k$$

(4) · Summation fn.

$$U_k = \sum_{j=1}^{p} w_{kj} \cdot x_j$$

$$V_k = \sum_{j=0}^{p} w_{kj} \cdot x_p = \underbrace{w_{k0} \cdot x_0}_{\text{bias } (b_k)} + \sum_{j=1}^{p} w_{kj} \cdot x_j$$

↓ linear combiner O/P due to I/P.

(4) Bias b_k is externally applied bias, has the effect of increasing or lowering the net input of the activation fn. whether it is +ve or −ve.

Activation fn

x_1, x_2, x_3 ---- are I/ps to artificial neuron
w_1, w_2, w_3 ---- are weights attached to input link

Total Input $I = w_1 x_1 + w_2 x_2 + \cdots + w_n x_n$.

$$I = \sum_{i=1}^{n} w_i x_i \cdot \Rightarrow \text{Adder fn value}$$

→ To generate final O/p y Sum is passed on to a non-linear filter f, called Activation fn. (or Squashing fn)

$$y = f(I).$$

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Common Activation fn is cld as thresholding fn.

The sum is compared with thresholding fn value θ. If O/P = I is greater than θ, the O/P is 1, otherwise 0.

$$y = f(I - \theta)$$

→ for neurons in the same layer same activation fn is used.

Eg. Suppose $I = 0.9$ $\quad \theta = 0$

$0.9 > 0$ → then O/P. 1

$-0.1 < 0$ → Otherwise 0

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