Deep learning Techniques

RA2311047010038
B.Tech - AI - 'A' section
3rd year

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NAME: TAMILSELVAN M STD: _____ SEC: _____ ROLL NO.: _____ SUB _____

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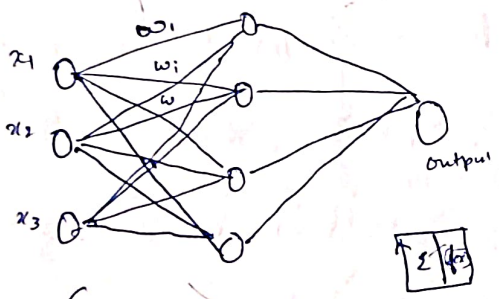
6	09/09/25	Implement Gradient Descent & Backpropagation in DNN.		

Why we need

→ filter each inside neuron

→ Non - linearity



Neuron Computes

$$z = w_1x_1 + w_2x_2 + b$$

w_i → weights

x_i → input

b → bias

Weights → the parameters that scale the input features.

→ They determined how much influence

Bias → It acts like an offset or intercept for

Ex.No 5
22/8/25

Study Of Activation Functions And Its Role

AIM:

To study different activation function and understand their role.

OBJECTIVE

→ To implement and visualize common activation functions such as sigmoid, Tanh, ReLU, Softmax.

→ To understand the importance of activation function in transforming input Symbols.

→ To observe how activation function affect the training & Performs of models.

PSEUDOCODE :

1. Import libraries
2. Define activation function
   i) Sigmoid (x)
   ii) tanh(x)
   iii) ReLU
   iv) Softmax
3. Generate input value in a rang.

Sigmoid (Not Zero-Centered)

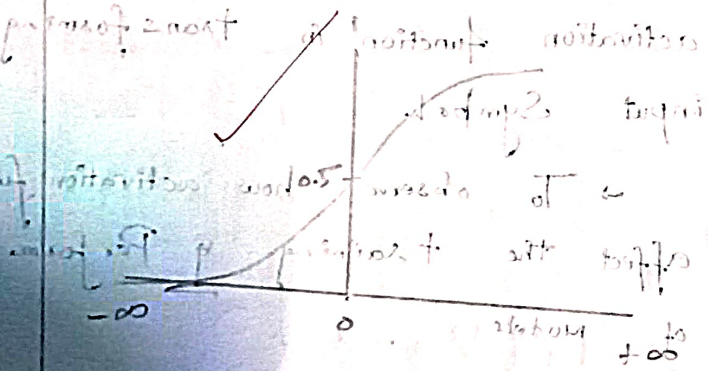
- Graph has a characteristic S-shaped or sigmoid curve.
- Vanishing Gradient Problem

Formula

$$S(x) = \frac{1}{1+e^{-x}} \quad [0 \text{ to } 1]$$

$S(x)$ → Sigmoid function

e → Euler's Number



TAN H

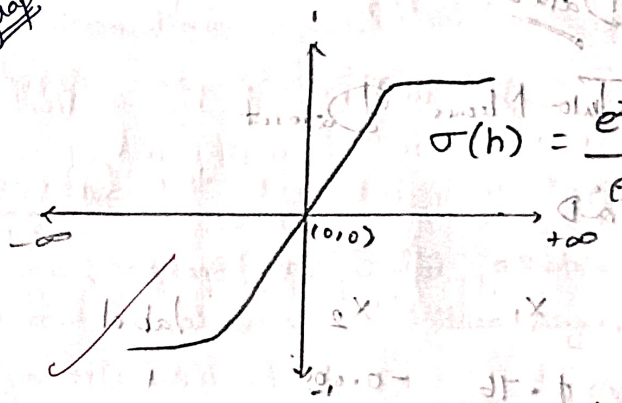
- Hyperbolic tangent
- It in the hidden layer of nn including rnn recurrent neural net
- Zero-Centred Output

Formula

$$\tanh(x) = \frac{\sinh(x)}{\cosh(x)}$$

$$\tanh(x) = \frac{e^{x} - e^{-x}}{e^{x} + e^{z}}$$

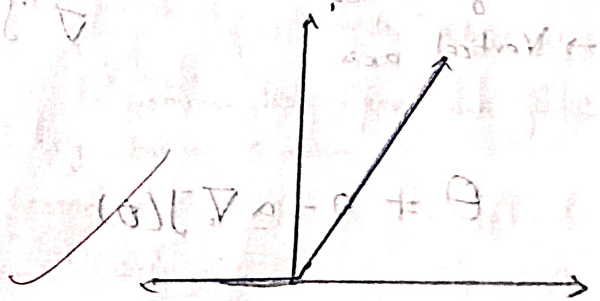
Graph (−1 to 1)



$$\sigma(h) = \frac{e^{z} - e^{z}}{e^{z} + e^{-z}}$$

~~Softmax~~ ReLU (Rectified Linear Unit)

- $f(x) = \max(0, x)$



Result

learned Activation function and its differen roles. [tanh, Sigmoid, ReLU].