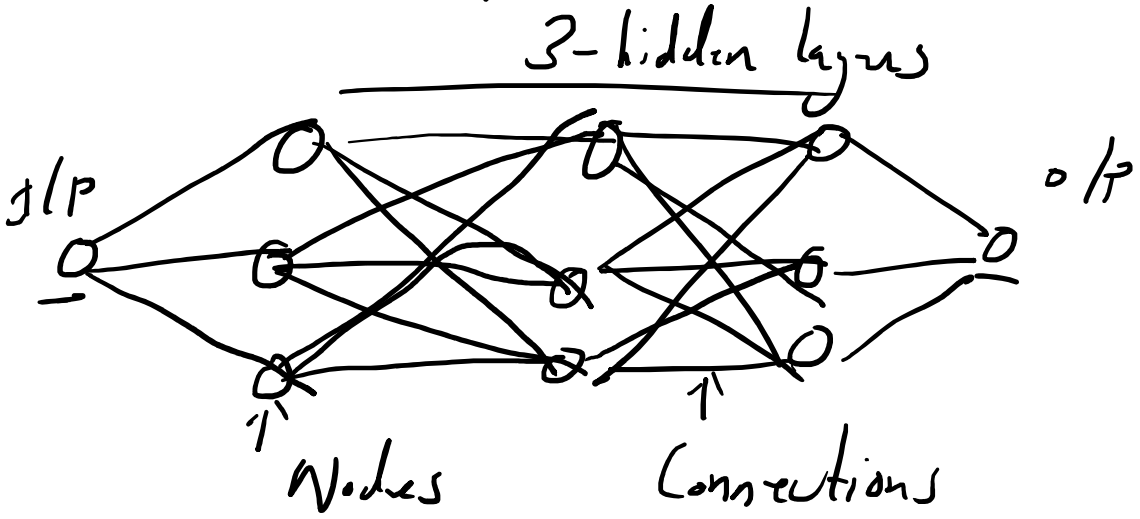
2025-06-24

24 June 2025 11:33

=> System of Deep Learning :

=> Parametric / Non-Parametric

=> ANN - Artificial Neural Network



$$\hat{y} = \beta_0 + \beta_1 x_i$$

$$\hat{y} = w + b \cdot x$$

$\hat{y}$ — Dependent Variable

w — Weights

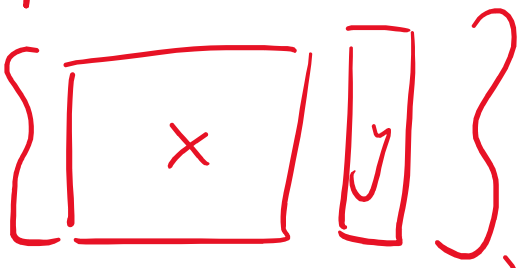
b — Bias

x — Independent Variable

=> Linear Reg (Basic)

=> Compute the parameters with fixed

=> Compute the parameters with fixed data.

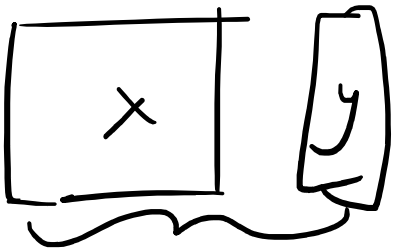


$$\beta_1 = \frac{\sum (x_i - \bar{x}) \cdot (y_i - \hat{y})}{\sum (x_i - \bar{x})^2} \qquad \beta_0 = \bar{y} - (\beta_1 \cdot \bar{x}$$

=> Linear Reg (Non-Parametric) (DL)

W: [0.714] [0.681]

b: [0.217] [0.318]



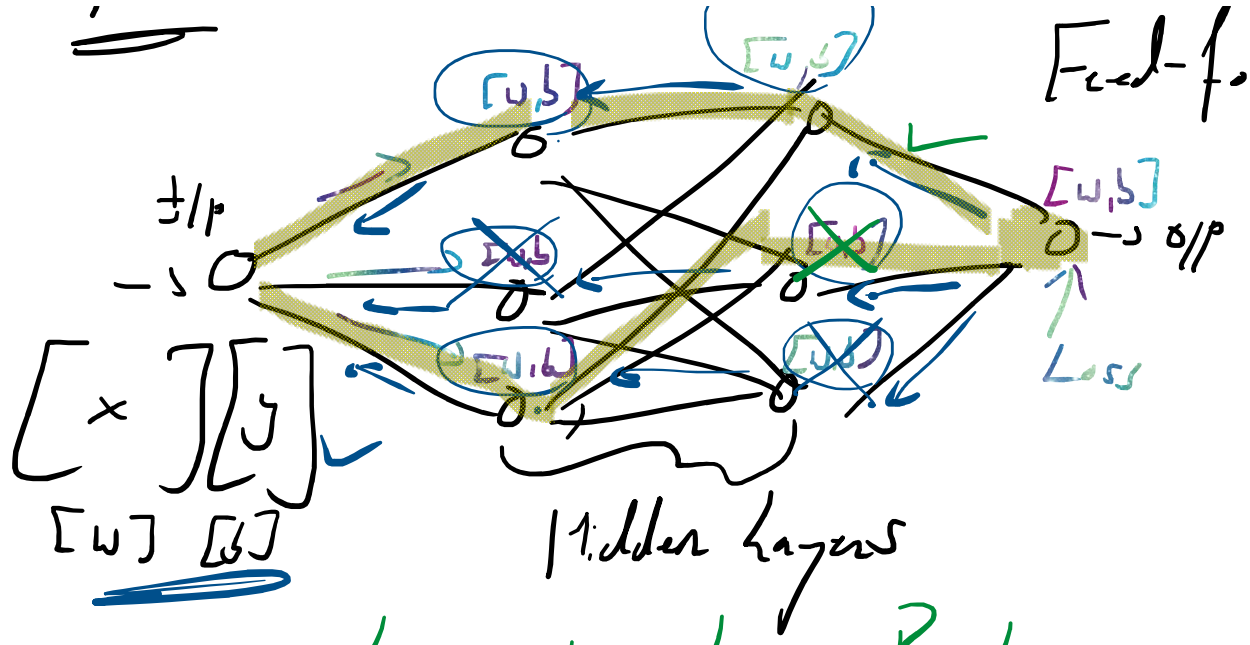
=> Takes input & gives to the next layer.

=> It computes loss.

=> then it optimizes the loss.

=> Flow:

Feed-forward.



Loss optimization - Back propagation

⇒ Classification Neural Nets:

MNIST - Dataset of handwritten digits

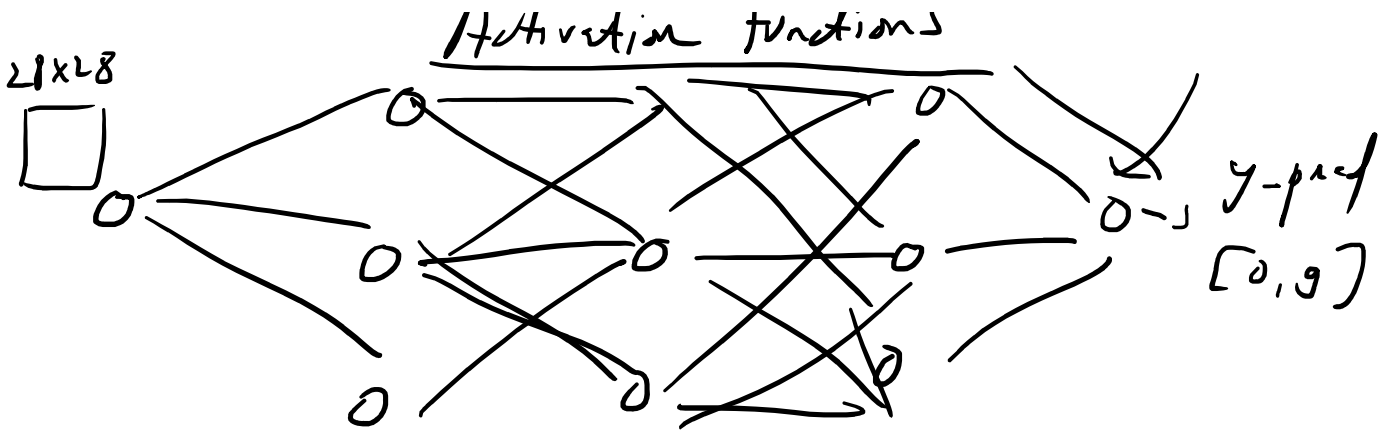
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]

⇒ Images of 28x28 pixels.

70k [x] [y]

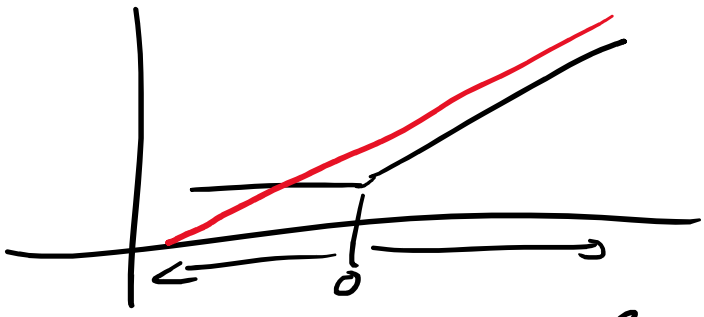
28x28

Activation Functions



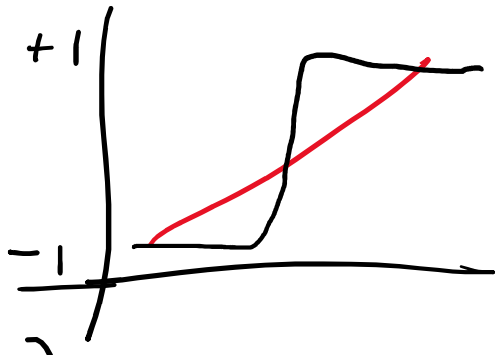
Activation Fns : Convert linearity into non-linearity.

=> ReLU : Rectified Linear Unit



=> Tanh : Hyperbolic Tangent

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



=> Sigmoid (Logistic / Logit)

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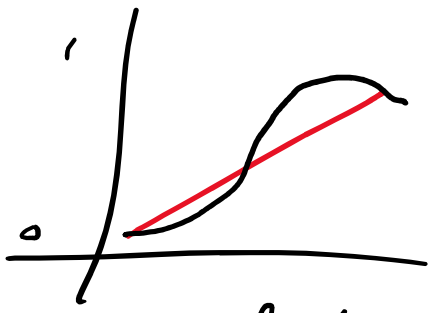
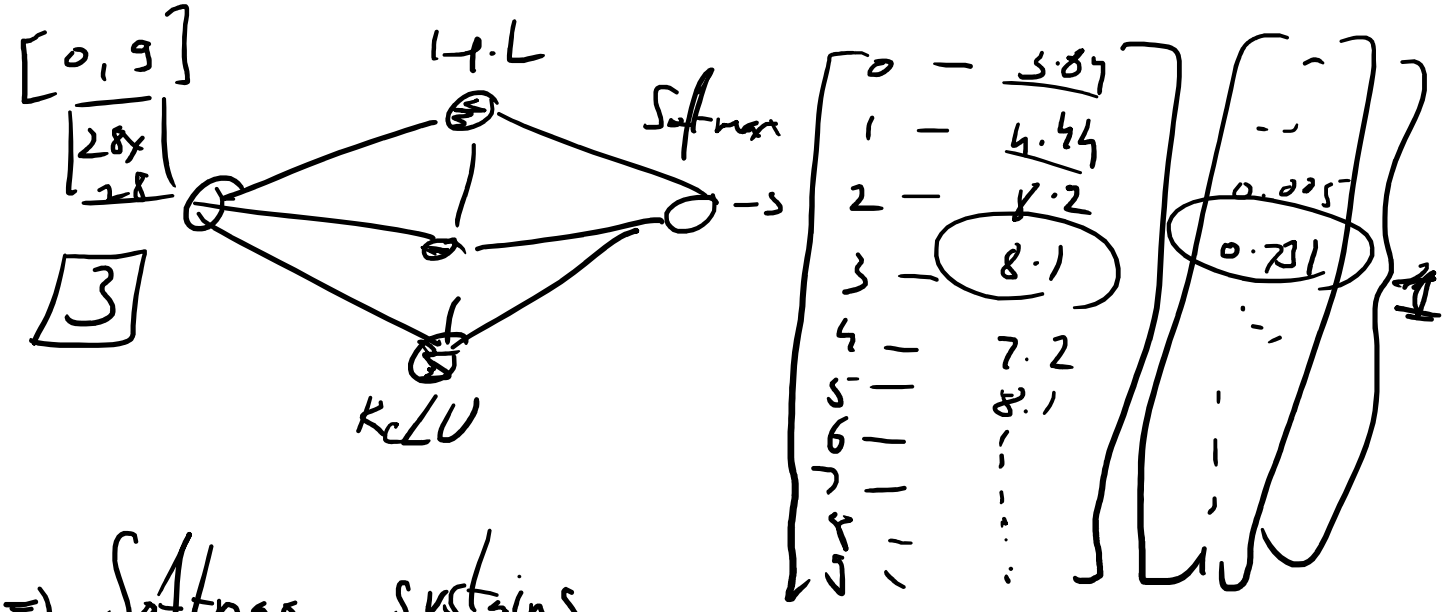
$$\sigma(z) = \frac{1}{1+e^{-z}}$$



=> Softmax Activation - Multilevel Classification

$$SM = \frac{e^{x}}{\sum e^{x}}$$



=> Softmax sustains multiple label values in 0-1 range.

=> Pick highest probability value using maximum argument function. (Argmax)