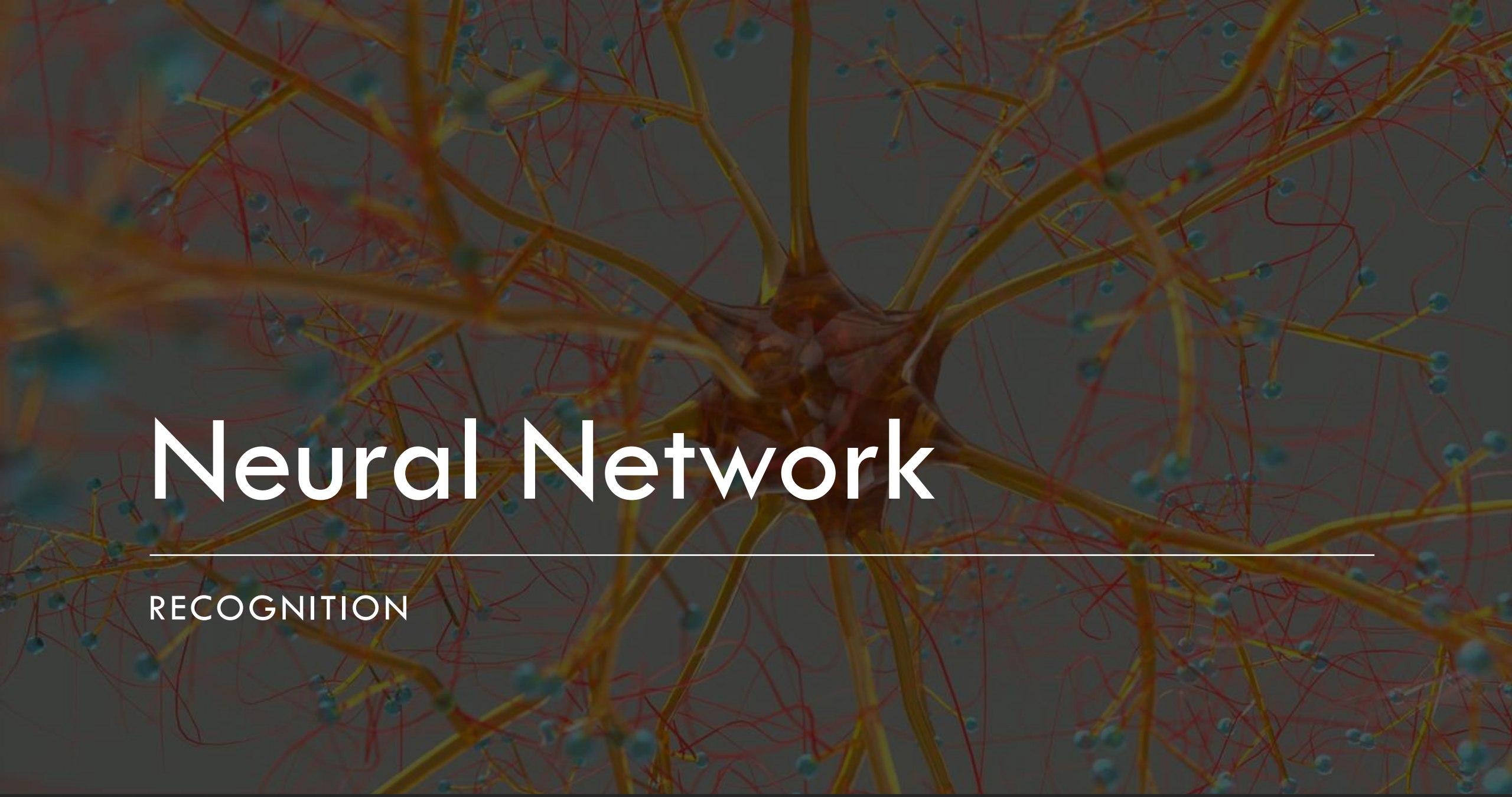
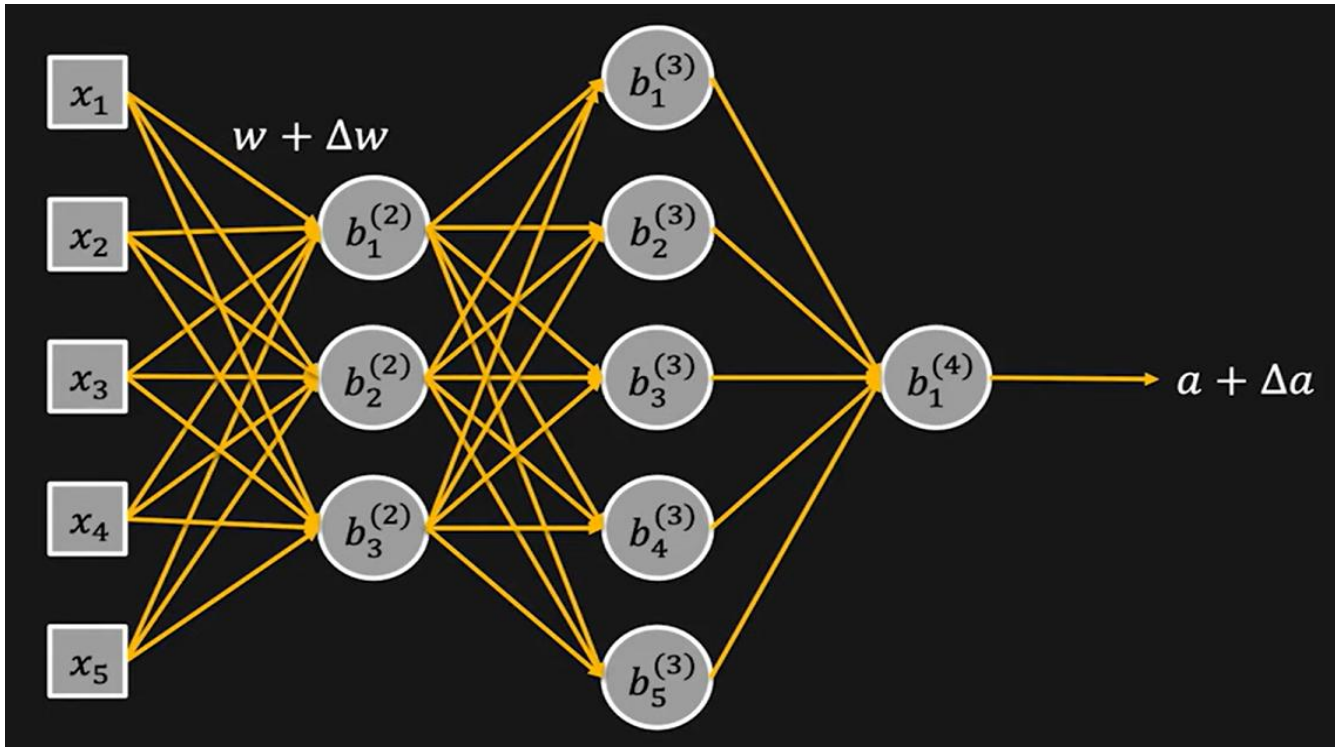


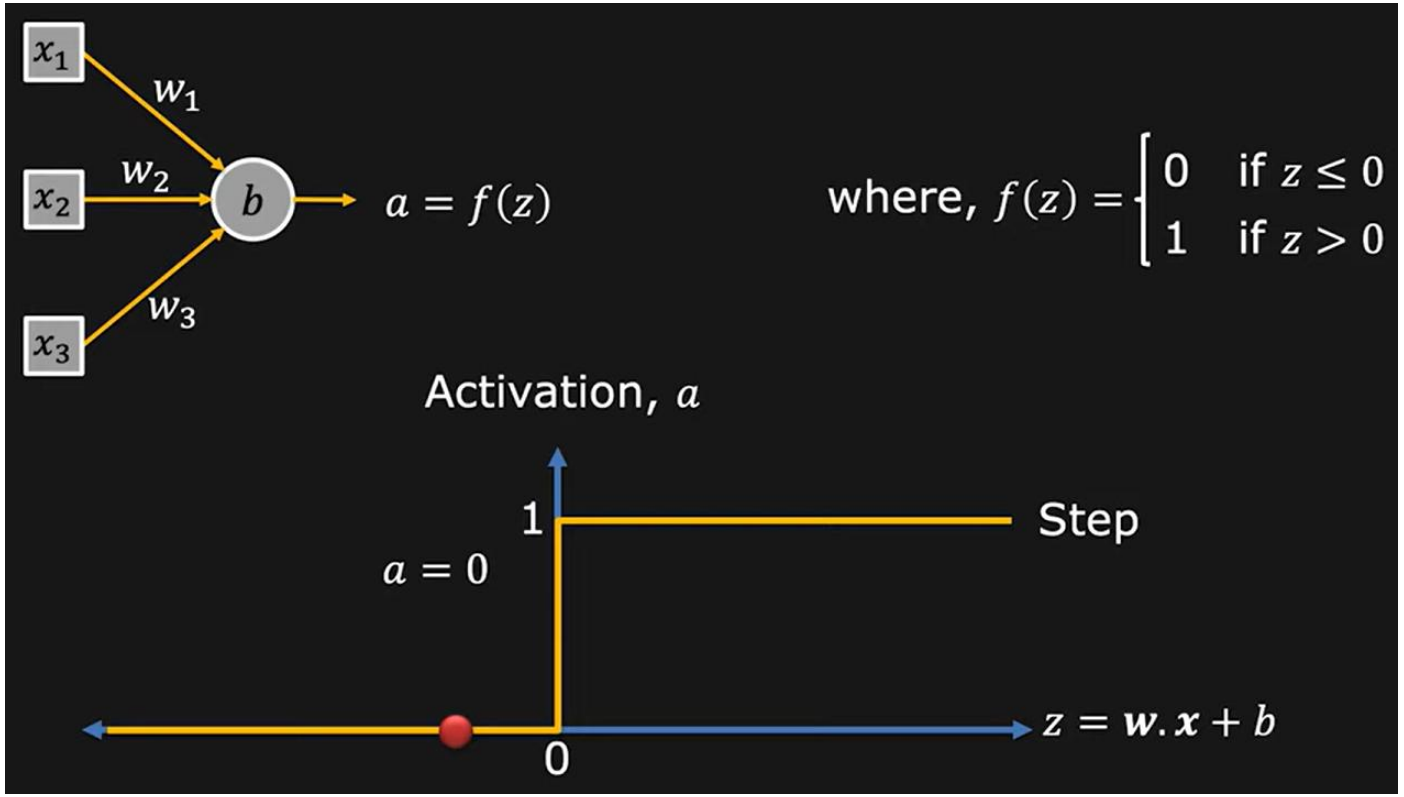
Neural Network

RECOGNITION

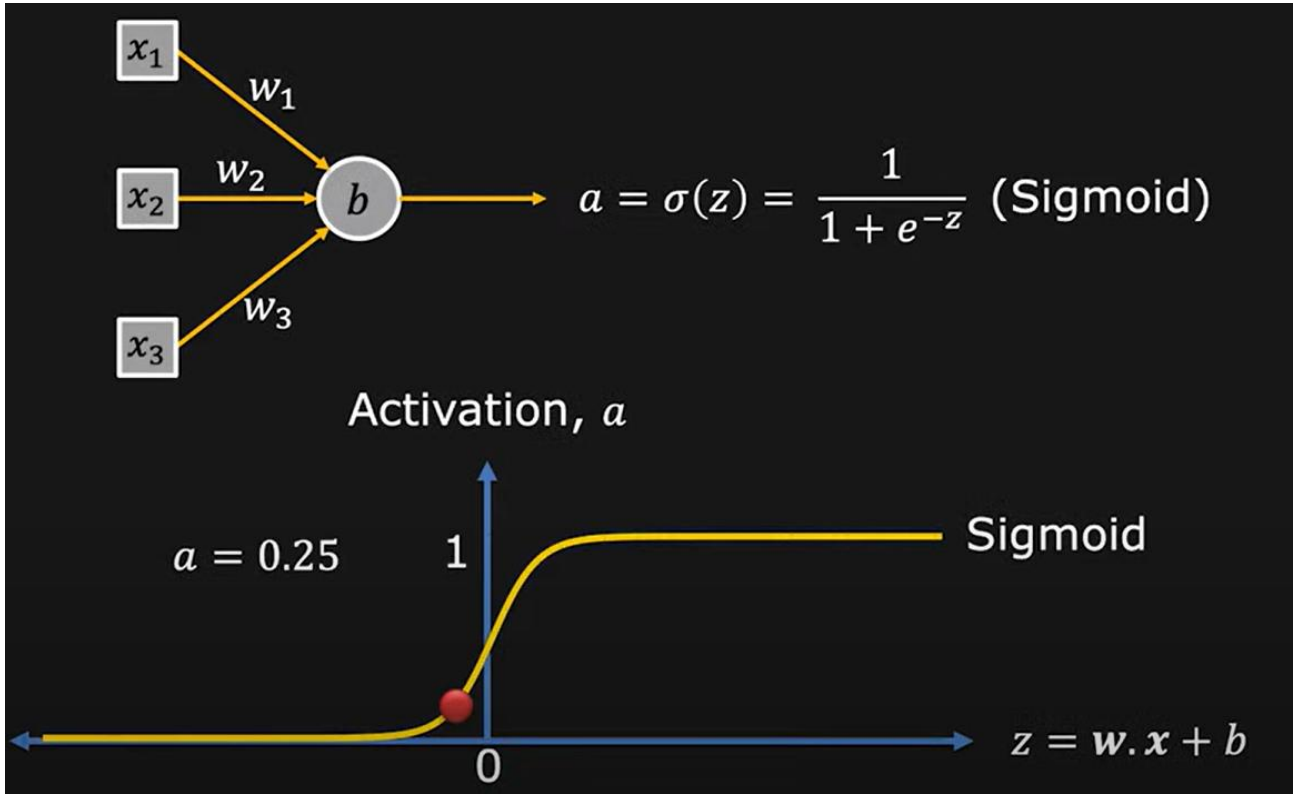
Varying the weights & biases



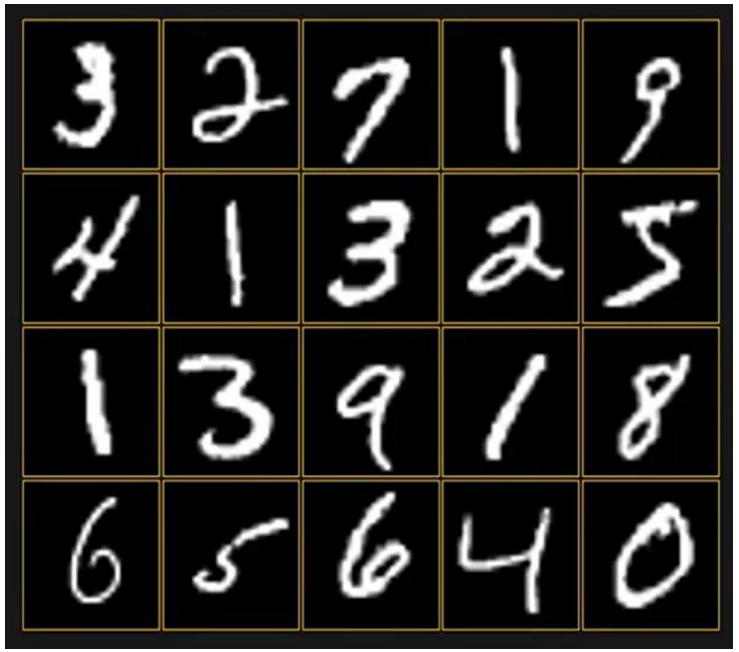
Varying the weights & biases



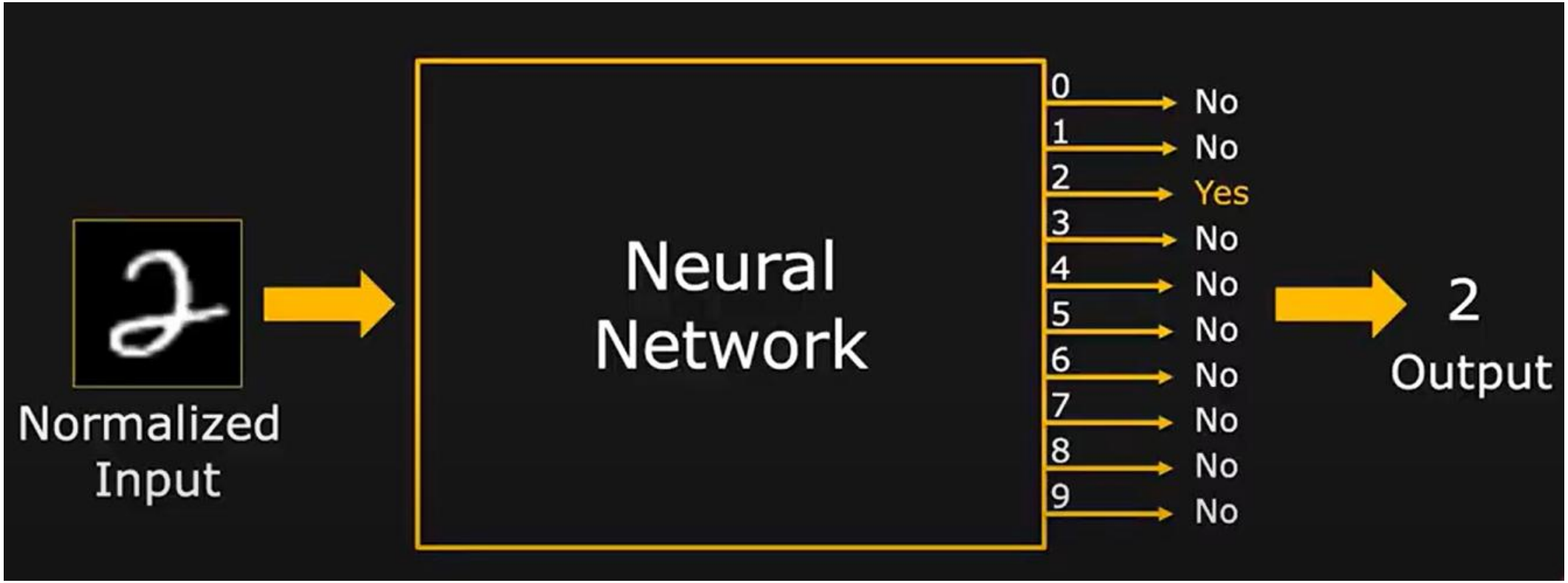
Sigmoid Neuron



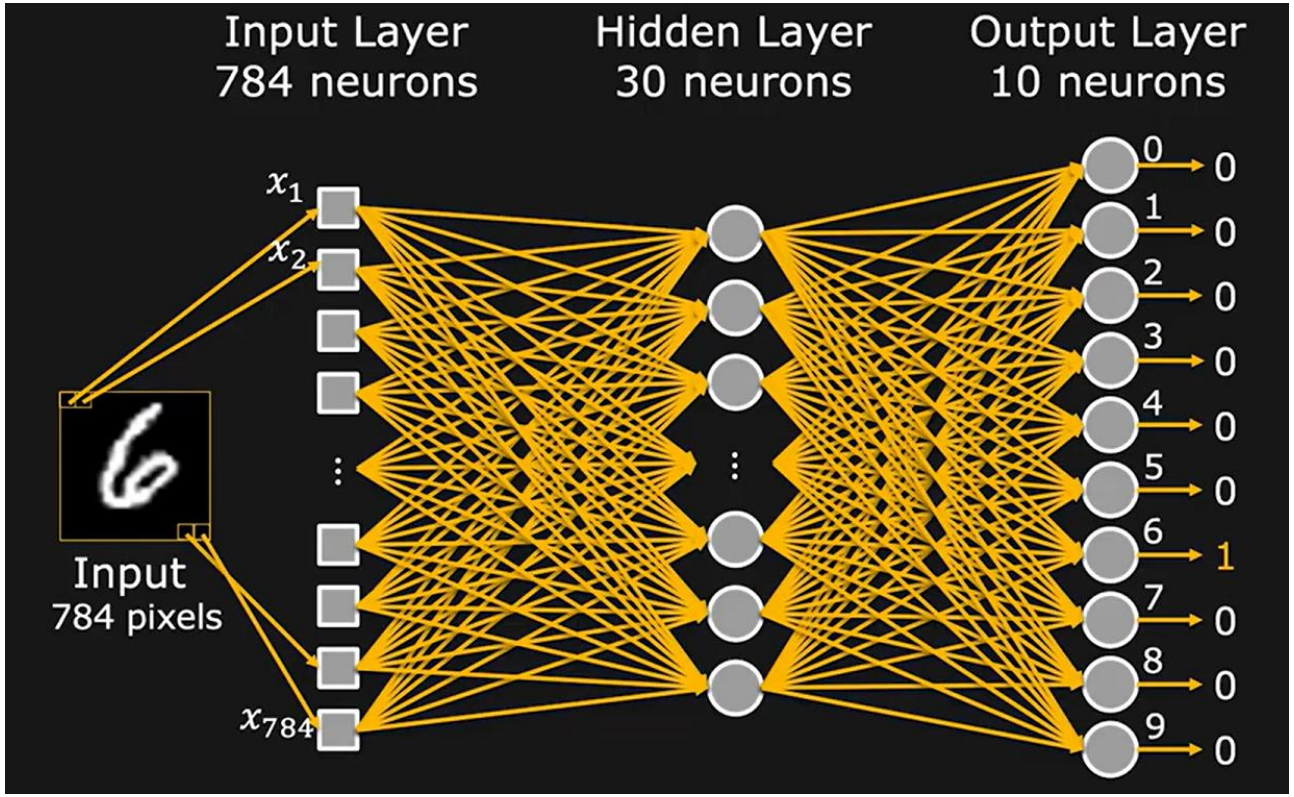
Recognizing Characters



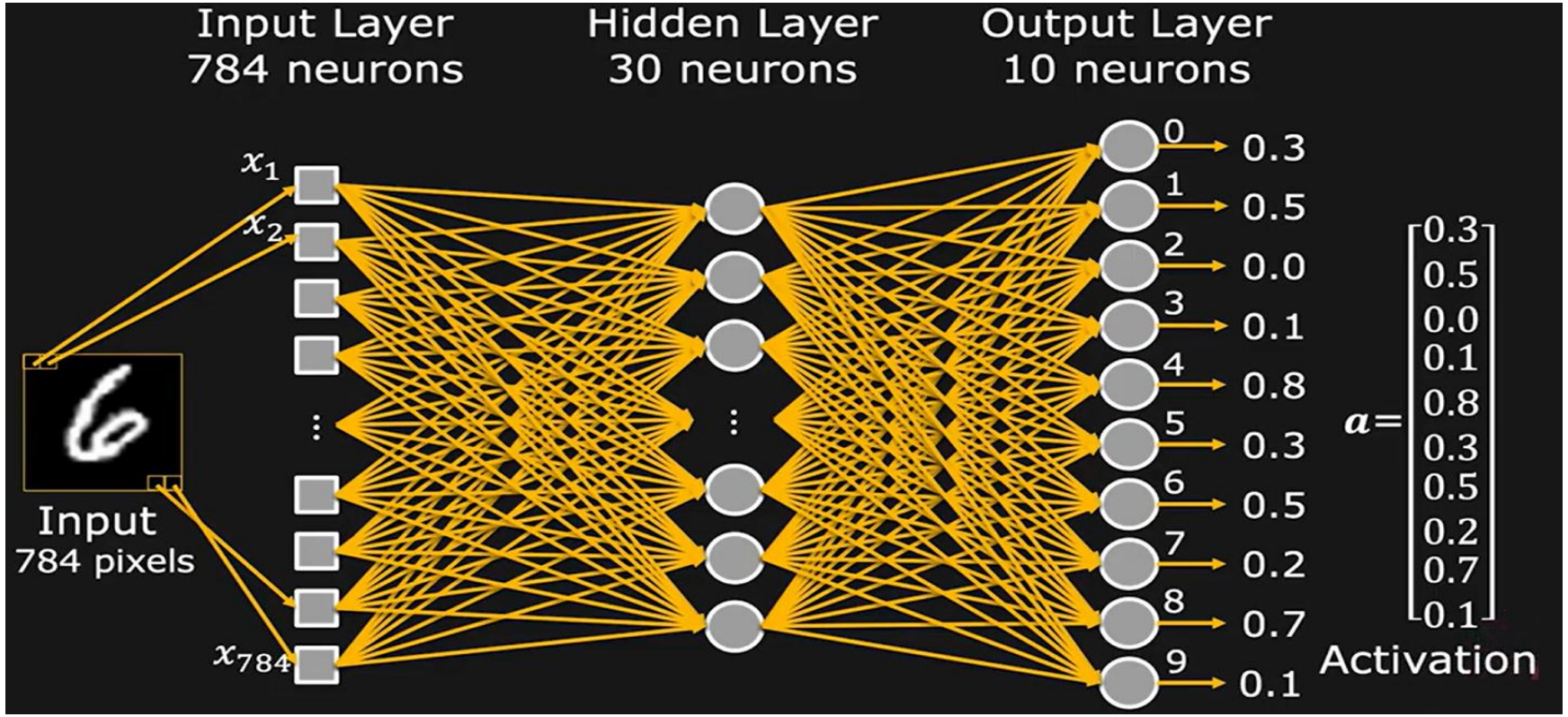
Recognizing Characters



Character Recognition Network

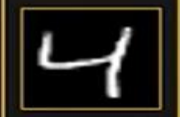


Network with Random Weights & Biases

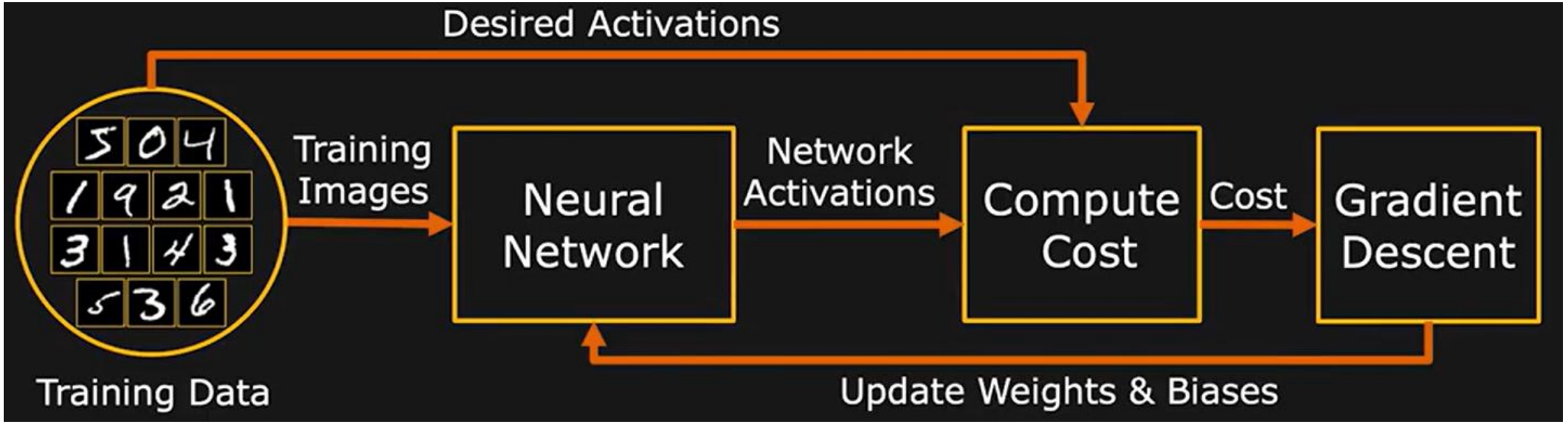


Training data

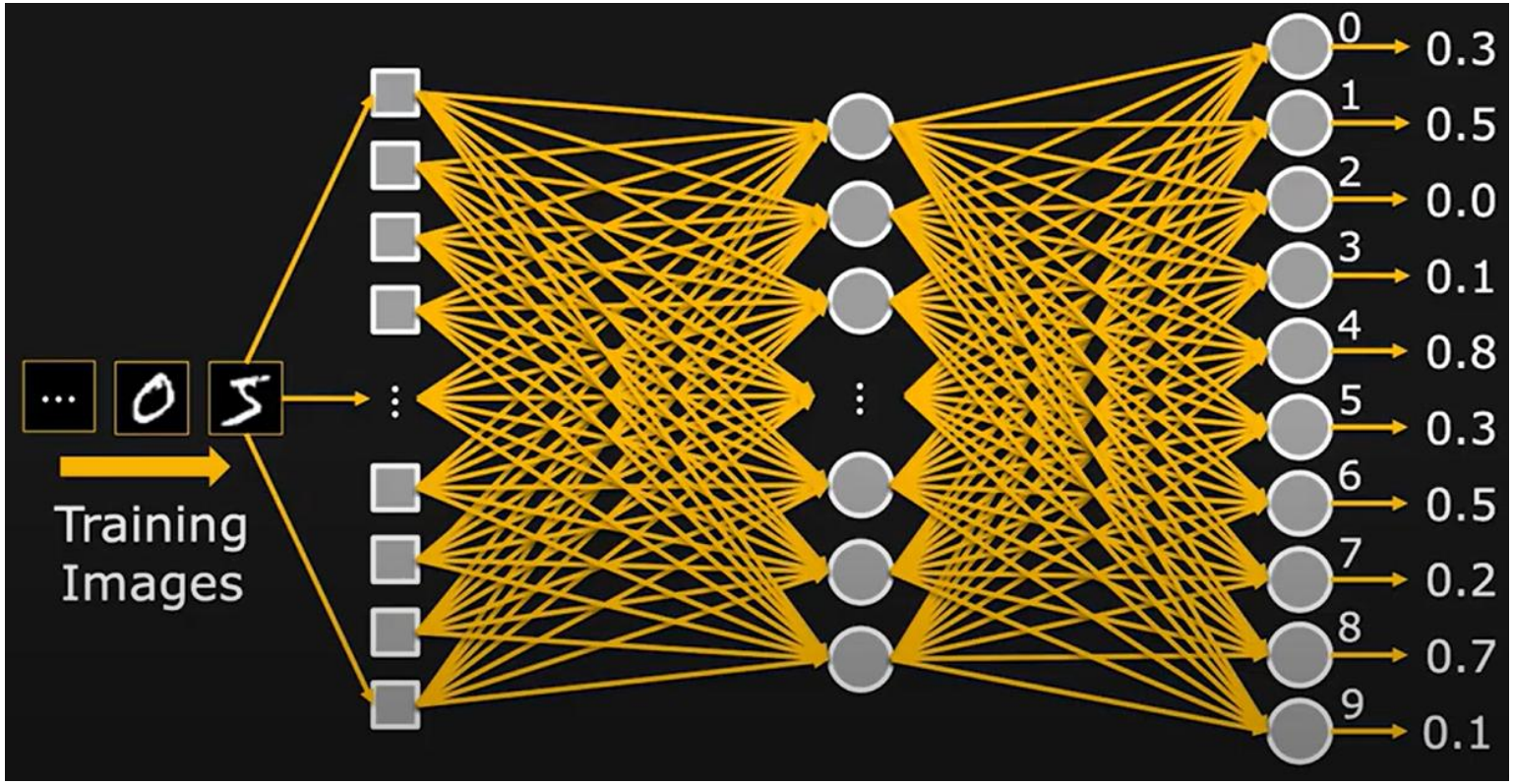
Sample Training Data - MNIST Dataset (60,000 images)

Training Image x										
Label	5	0	4	1	9	2	1	3	1	4
Desired Activation $\hat{a}(x)$	$\begin{bmatrix}0\\0\\0\\0\\0\\1\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}1\\0\\0\\0\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\0\\0\\0\\1\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\1\\0\\0\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\0\\0\\0\\0\\0\\0\\0\\0\\1\end{bmatrix}$	$\begin{bmatrix}0\\0\\1\\0\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\1\\0\\0\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\0\\0\\1\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\1\\0\\0\\0\\0\\0\\0\\0\\0\end{bmatrix}$	$\begin{bmatrix}0\\0\\0\\0\\1\\0\\0\\0\\0\\0\end{bmatrix}$

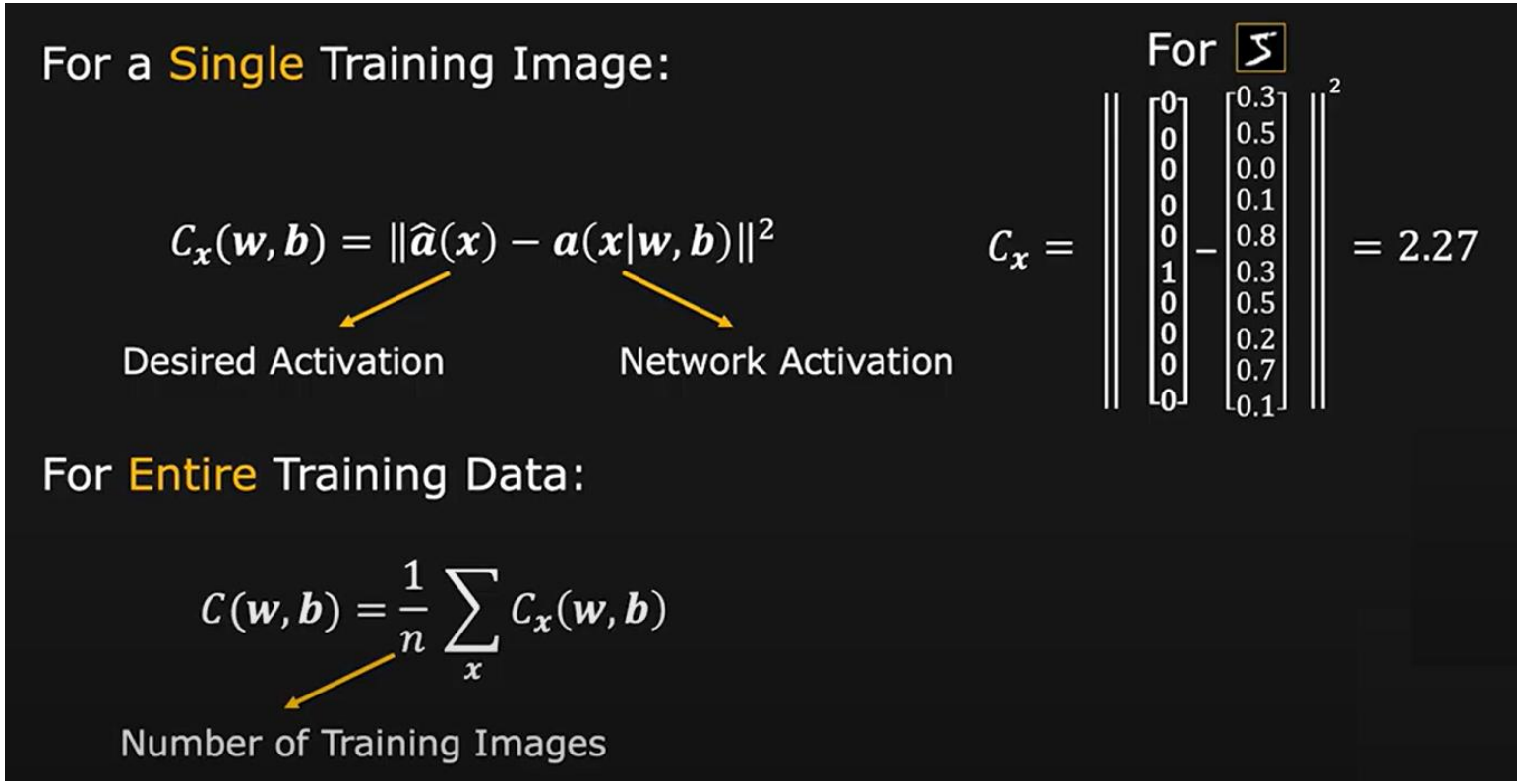
Training Process



Compute Activation



Computing Cost



Training Process

1. Initialize Network with random weights and biases values.
2. Compute Network activation for each training image.
3. Compute cost for entire training data.
4. Update Wights and Biases using Gradient Descent.