

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light green. They are positioned diagonally, with the blue one partially covering the green one.

# Multi layered Neural Networks

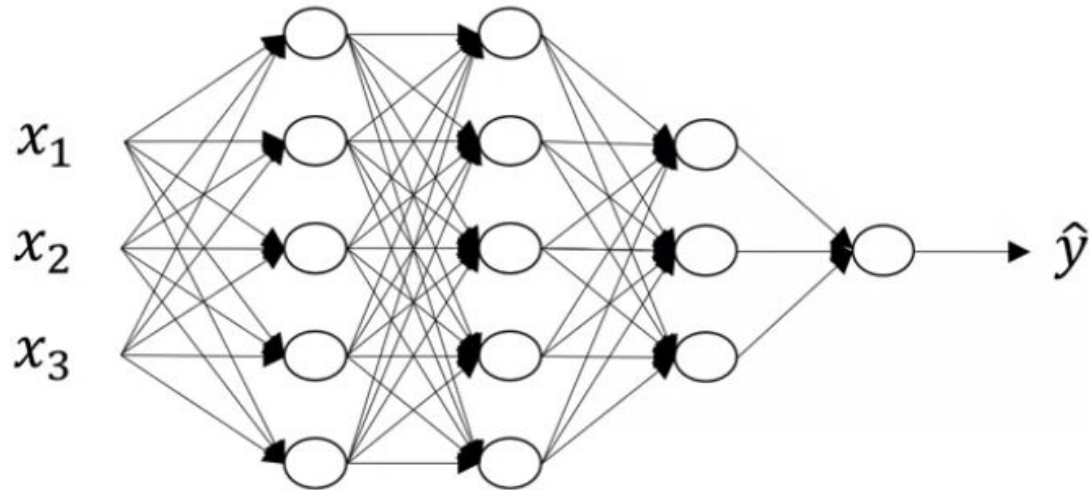
Spring 1400  
Presenter : Daniel Ali Azimi



# Neural Networks

- Common neural networks
  - Feed Forward Neural Networks
  - Convolutional Neural Networks
  - Recurrent Neural Networks

# Multilayered Neural Networks

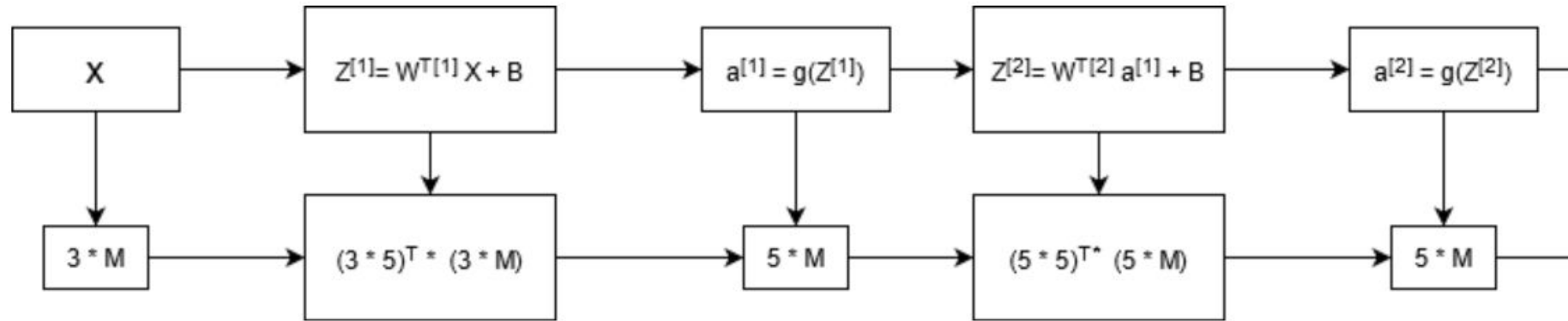




## Notation used

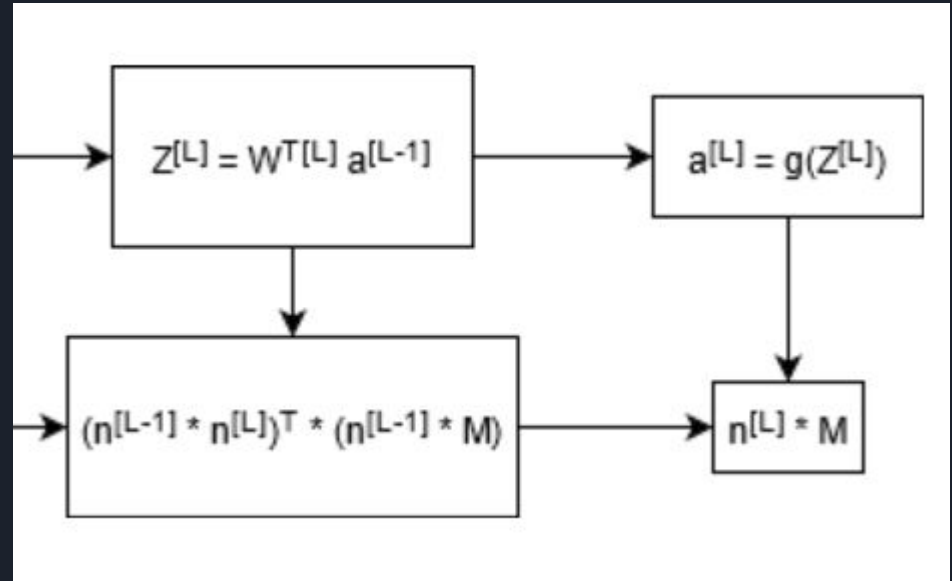
- $L$  : number of layers (not counting input)
- $n^{[L]}$  : number of units in layer  $L$  (nodes of layer)
- $a^{[L]}$  : activation of layer  $L$
- $w^{[L]}$  : weights of layer  $L$
- $b^{[L]}$  : bias for layer  $L$
- $M$  : number of Training Samples
- $n_x$  : number of input features

# MLP forward propagation

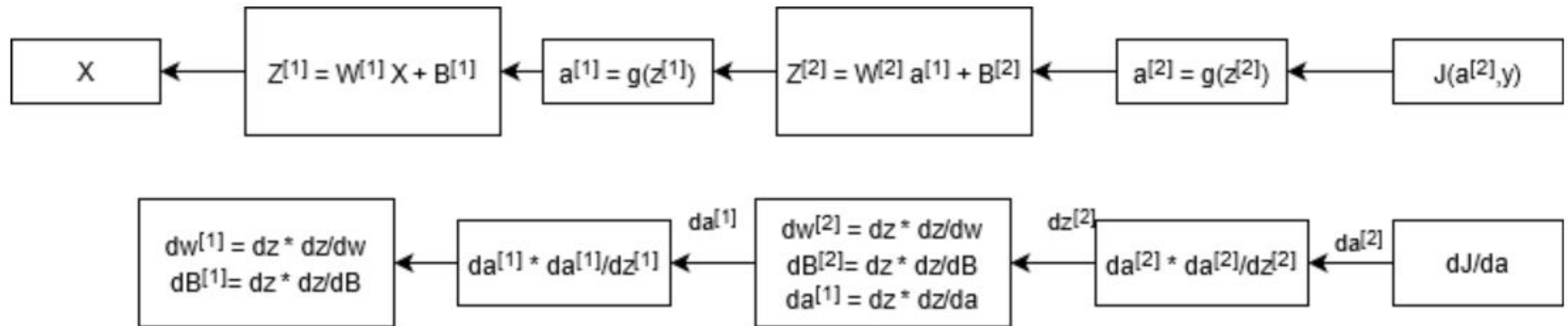


# MLP forward propagation : General form

- Base Case :  $n^{[0]} = n_x$
- Sample Size :  $M$

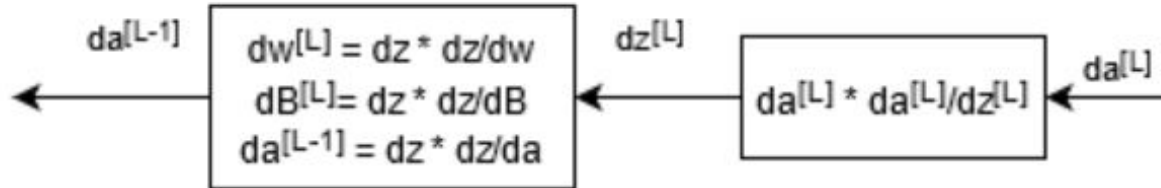


# MLP backward propagation



# MLP backward propagation : General form

- Base case :  $da^{[L]} = dJ/da$



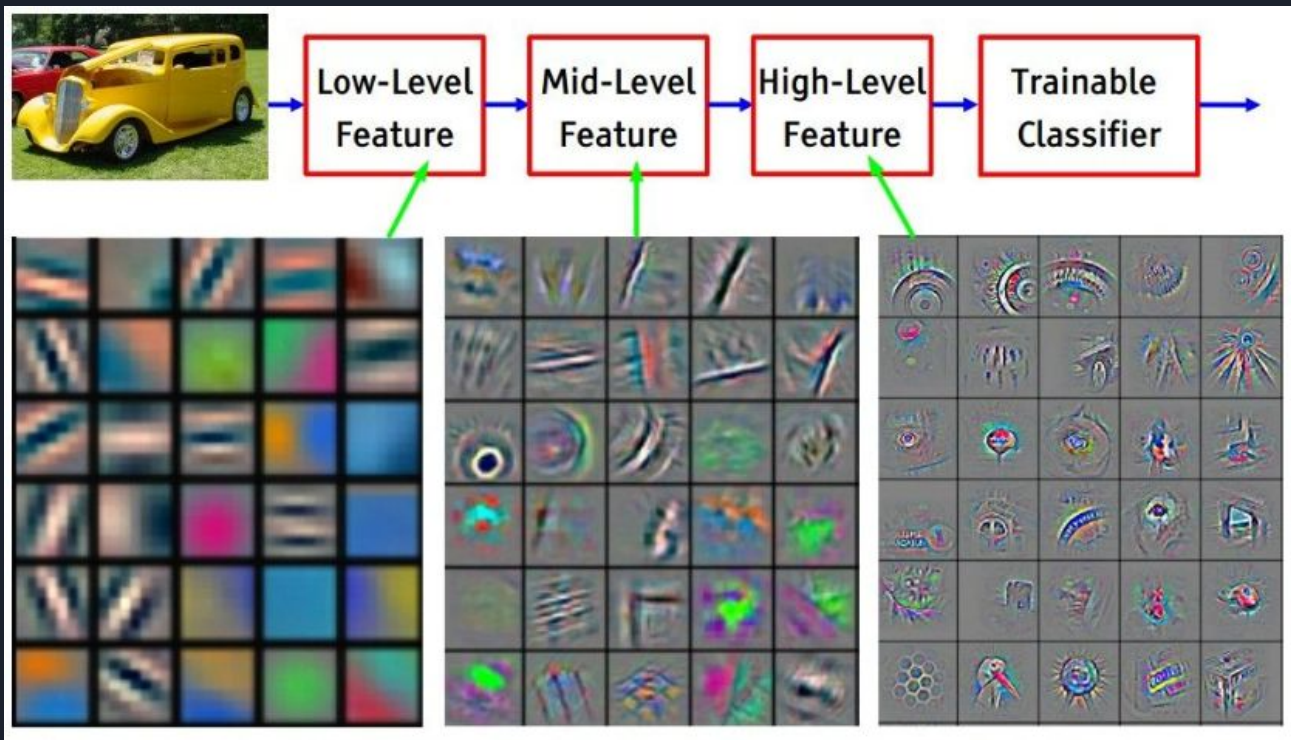




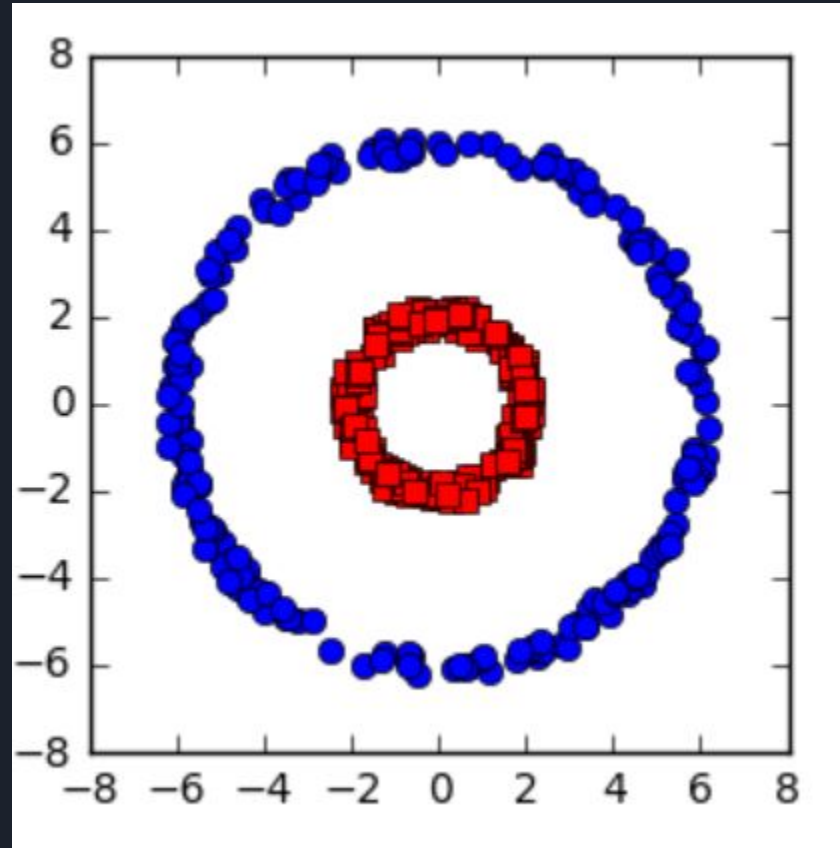
# Hyperparameters

- HyperParameters :
  - Learning Rate
  - Number of layers
  - Number of nodes
  - Number of training Iterations
  - Etc ...
- Parameters :
  - Weights
  - Bias
  - Etc ...

# Feature extraction using Deep Architecture



## Intuition on neural networks : non linear data



# Intuition on neural networks : dividing space

