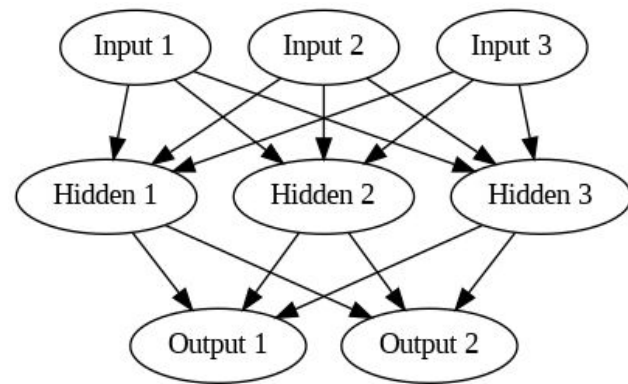


Deep Learning introduction

- What is deep learning?

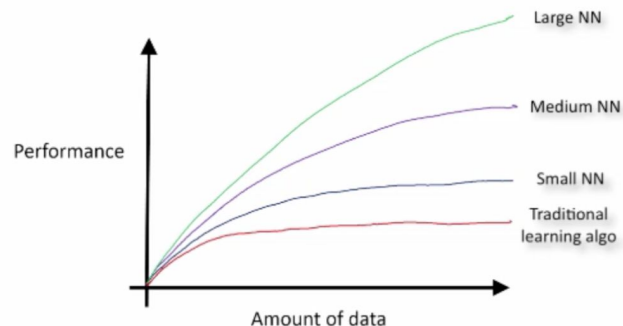
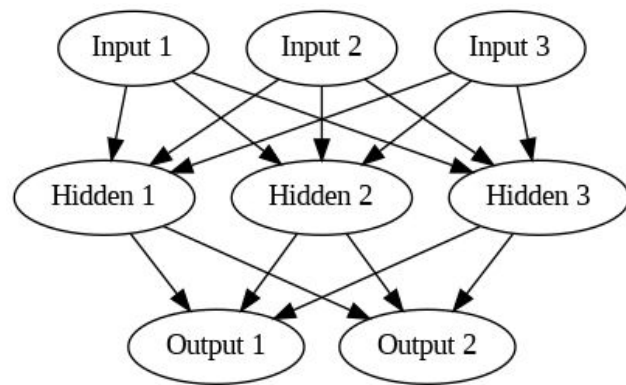
Deep Learning introduction

- What is deep learning?
 - Class of algorithms inspired by the way our brain works
 - Use of multiple layers of neurons
 - What are layers?
 - What are neurons?



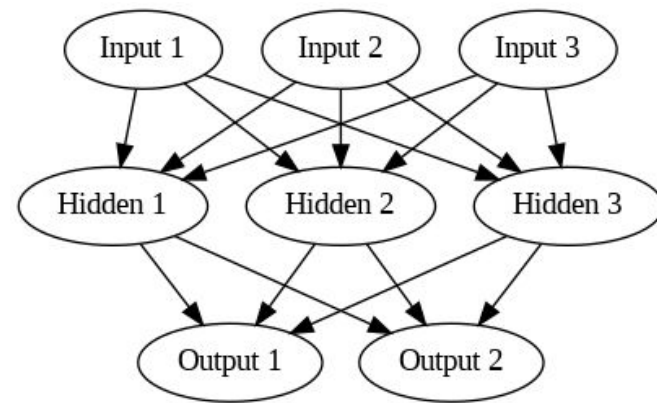
Deep Learning introduction

- What is deep learning?
 - Class of algorithms inspired by the way our brain works
 - Use of multiple layers of neurons
 - What are layers?
 - What are neurons?
- Why deep learning?
 - Feature Engineering (especially with unstructured data)
 - Solving complex problems,
 - Computational power,
 - Handling large datasets



Deep Learning introduction

- What is deep learning?
 - Class of algorithms inspired by the way our brain works
 - Use of multiple layers of neurons
 - What are layers?
 - What are neurons?
- What are layers?
 - Consists of neurons
 - Transformations are applied



Input layer?

Takes in the input data

Output layer?

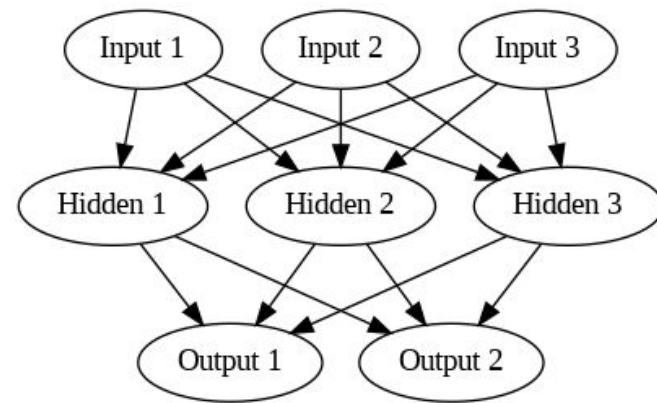
Produces the final output

Hidden layer?

Extraction of complex features

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Input layer?

Takes in the input data

Output layer?

Produces the final output

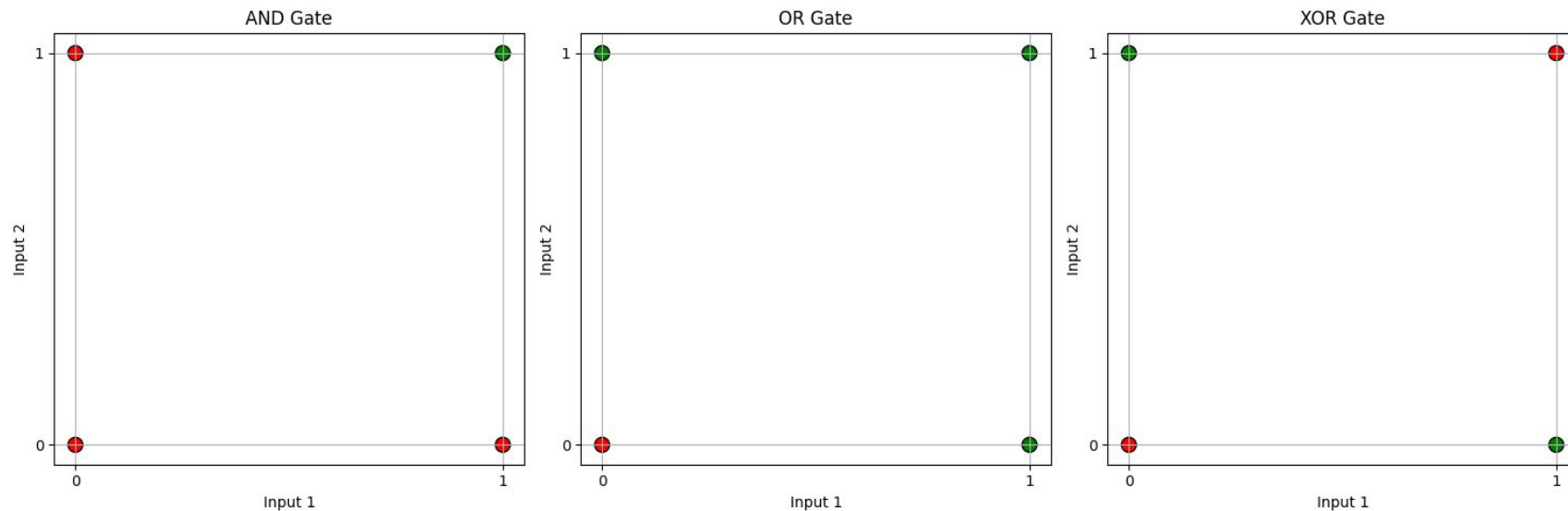
Hidden layer?

Extraction of complex features

Deep Learning introduction

Perceptron

- Simplified model of a neuron for binary classification
- Linear combination of inputs and weights
- Activation functions - step function



Deep Learning introduction

Hidden layers:

- Transforms the non-linear XOR problem into a separable one

Why do deeper?

- Adding layers to a neural network allow
 - To learn complex non-linear relationships
 - Each hidden layer transforms input into a new representation

Activation functions

- Introducing non-linearity allow the model to learn complex relationships

Deep Learning introduction

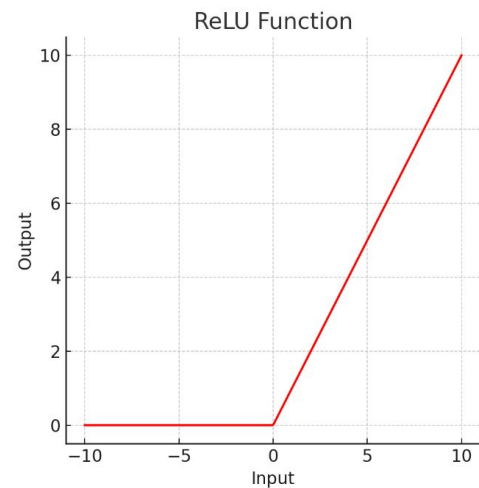
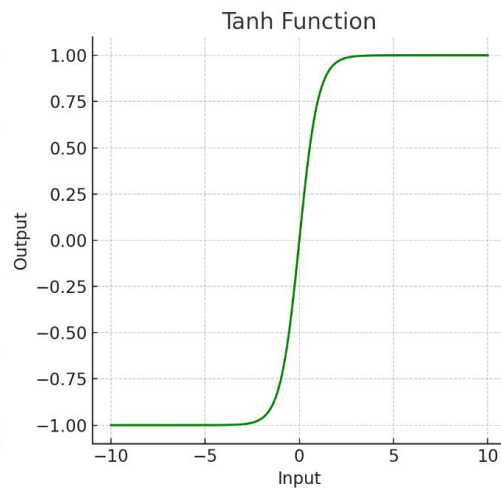
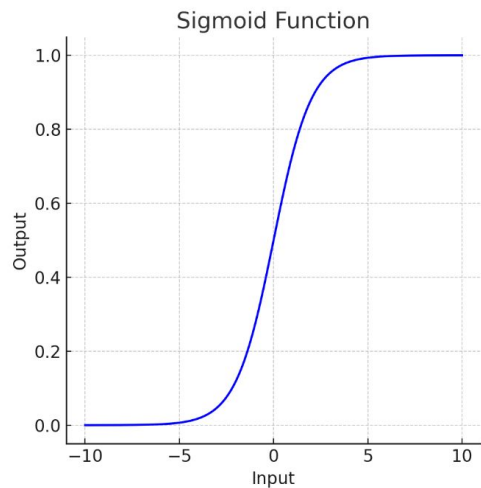
Common activation functions

Sigmoid

Tanh

Relu

LeakyRelu etc.,



Deep Learning introduction

Deep learning frameworks: Tensorflow, PyTorch, FastAI, etc.

How do we define layers in tensorflow? - Google colab notebook examples

Single layer

List of layers

Deep Learning introduction

How do we know what the model predicted is correct or not?

Loss functions	Backpropagation	Optimization
<ul style="list-style-type: none">• How different are predictions of models from actual values?	<ul style="list-style-type: none">• A method that tell how much the model's parameters should change.	<ul style="list-style-type: none">• An algorithm that updates the model's parameters such that the loss function is optimized.
<ul style="list-style-type: none">• Classification - BCE, CE, etc.• Regression - MSE, MAE, etc.		<ul style="list-style-type: none">• Gradient descent• Stochastic gradient descent• Adam, Nadam, etc.

Deep Learning introduction

How do we evaluate model performance?

- Metrics
 - Classification
 - Regression
- Train test splitting

Deep Learning introduction

Tensorflow example