Tensorflow

AI/ML Workshop

Discover, Design and Develop

Google Developer Student Clubs
Maharishi Markandeshwar(Deemed to be University)

Presented By:
Tanuj Saini

Google Developer Student Clubs
Maharishi Markandeshwar(Deemed to be University)

Overview

1. Introduction
2. AI vs ML vs DL
3. Framework for AI/ML
4. Different types of ML
5. Neural Networks
6. Activation Function
7. Backpropagation

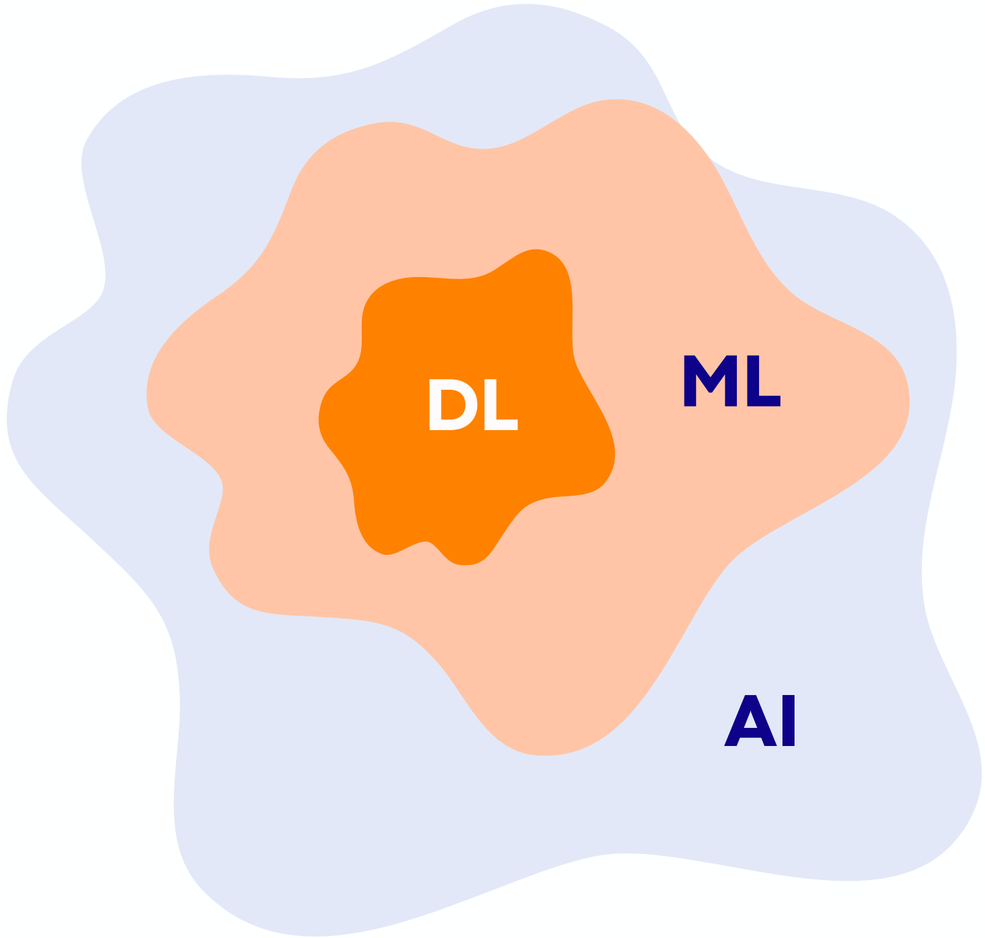
Google Developer Student Clubs
Maharishi Markandeshwar(Deemed to be University)

AI vs ML vs DL

AI is the creation of computer systems capable of imitating human intelligence, performing tasks like learning, problem-solving.

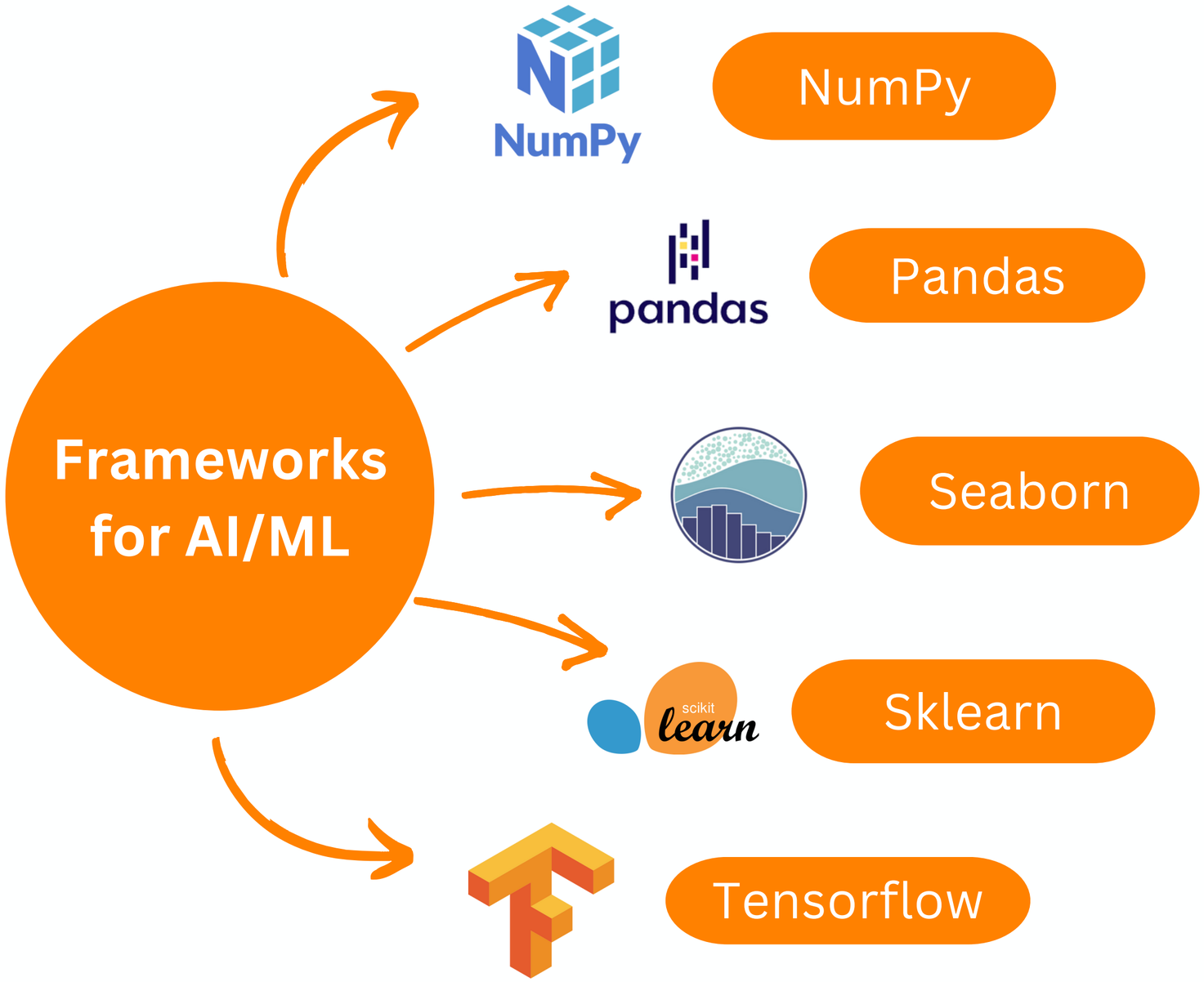
ML is a subset of AI that involves use of algorithms and models to learn from data.

DL is a subset of ML that uses neural networks with many layers to learn hierarchical representations of data.



Framework

A framework is a structured and reusable foundation, providing common tools, libraries, and design patterns for efficiency.



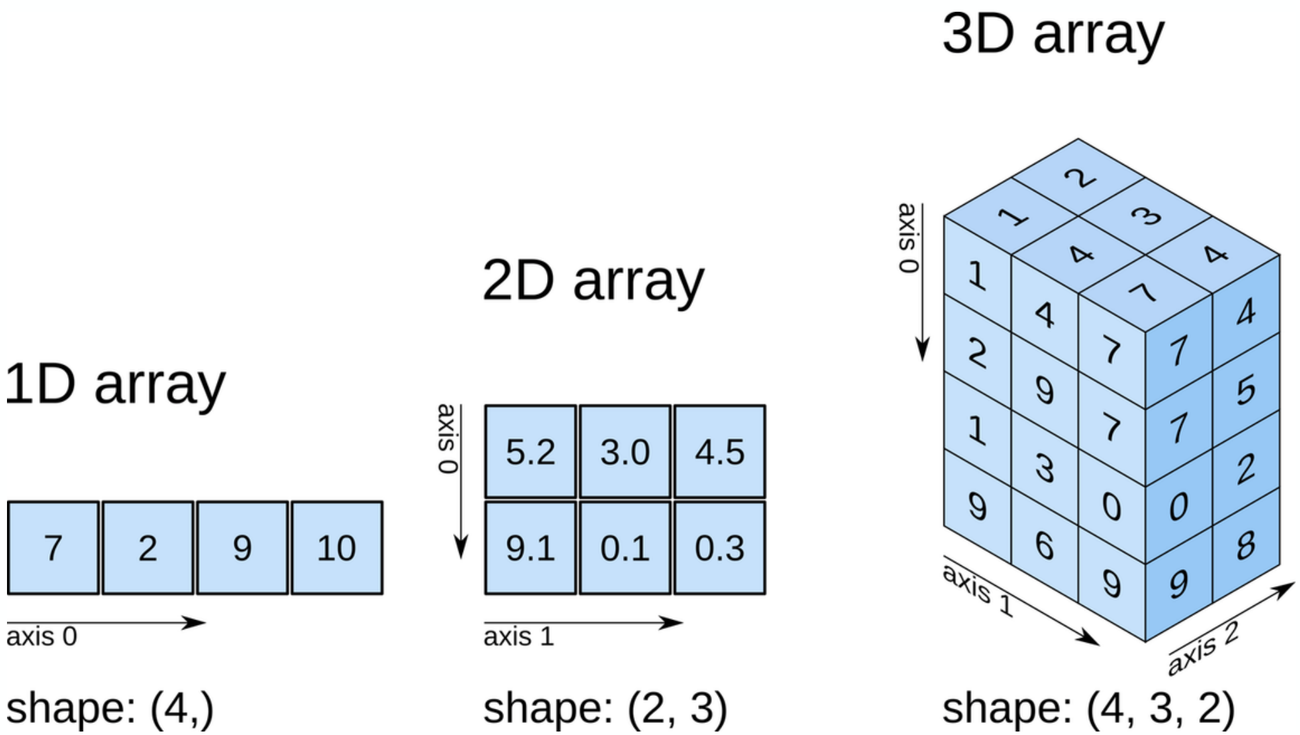
What is Numpy?

NumPy is a Python library created in 2005 that performs numerical calculations. It is generally used for working with arrays.

NumPy also includes a wide range of mathematical functions, such as linear algebra, Fourier transforms, and random number generation, which can be applied to arrays.

NumPy is an important library generally used for:

- Machine Learning
- Data Science
- Image and Signal Processing
- Scientific Computing
- Quantum Computing



Numpy Functions

Creating Arrays

```
>>> np.array([1,2,3])
>>> np.zeros((3,4))
>>> np.ones((2,3,4),dtype=np.int 16))
```

Inspecting Your Array

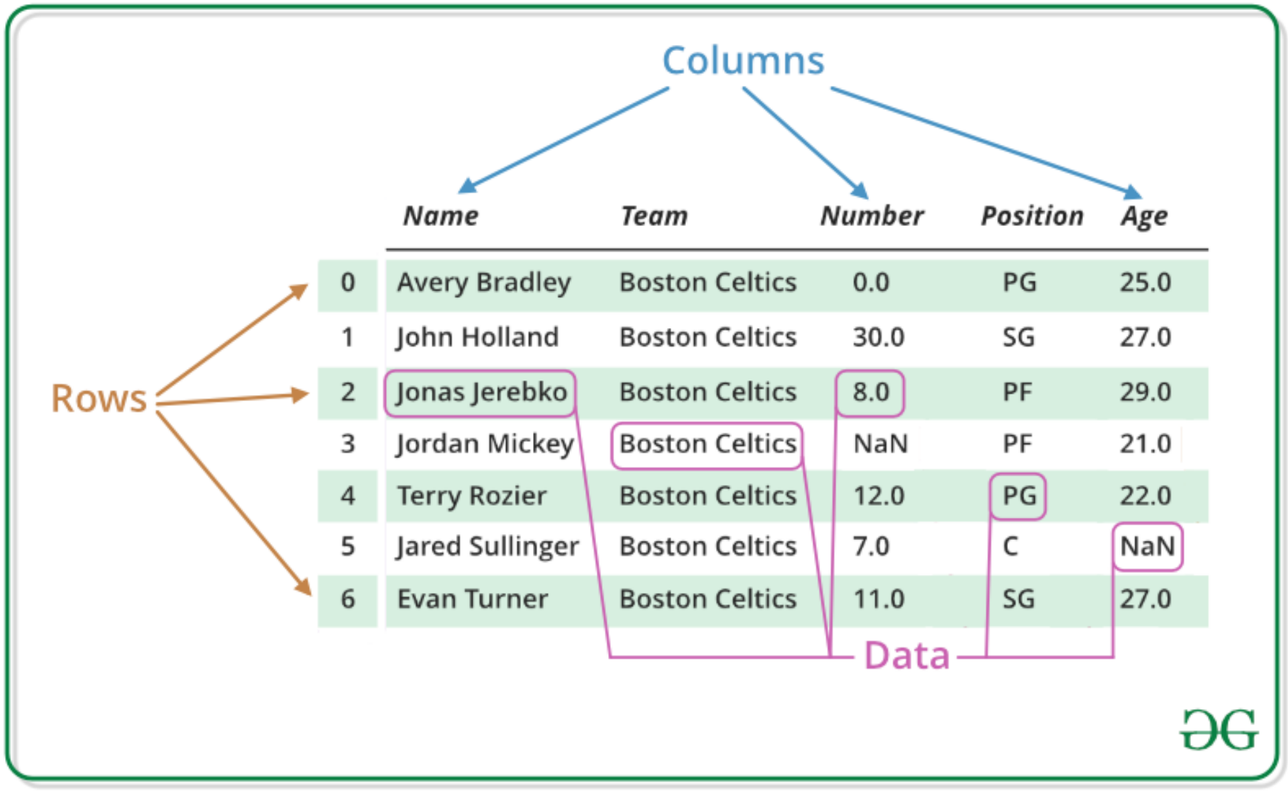
```
>>> a.shape #Array dimensions
>>> len(a)    #Length of array
>>> b.ndim  # Number of array dimensions
>>> b.dtype #Data type of array elements
```

What is Pandas?

Pandas is an open source Python package that is most widely used for data science/data analysis and machine learning tasks. It is built on top of another package named Numpy

Use of Pandas:

- Data cleansing
- Data fill
- Data normalization
- Merges and joins
- Data visualization
- Statistical analysis
- Data inspection
- Loading and saving data
- And much more



Pandas

Series

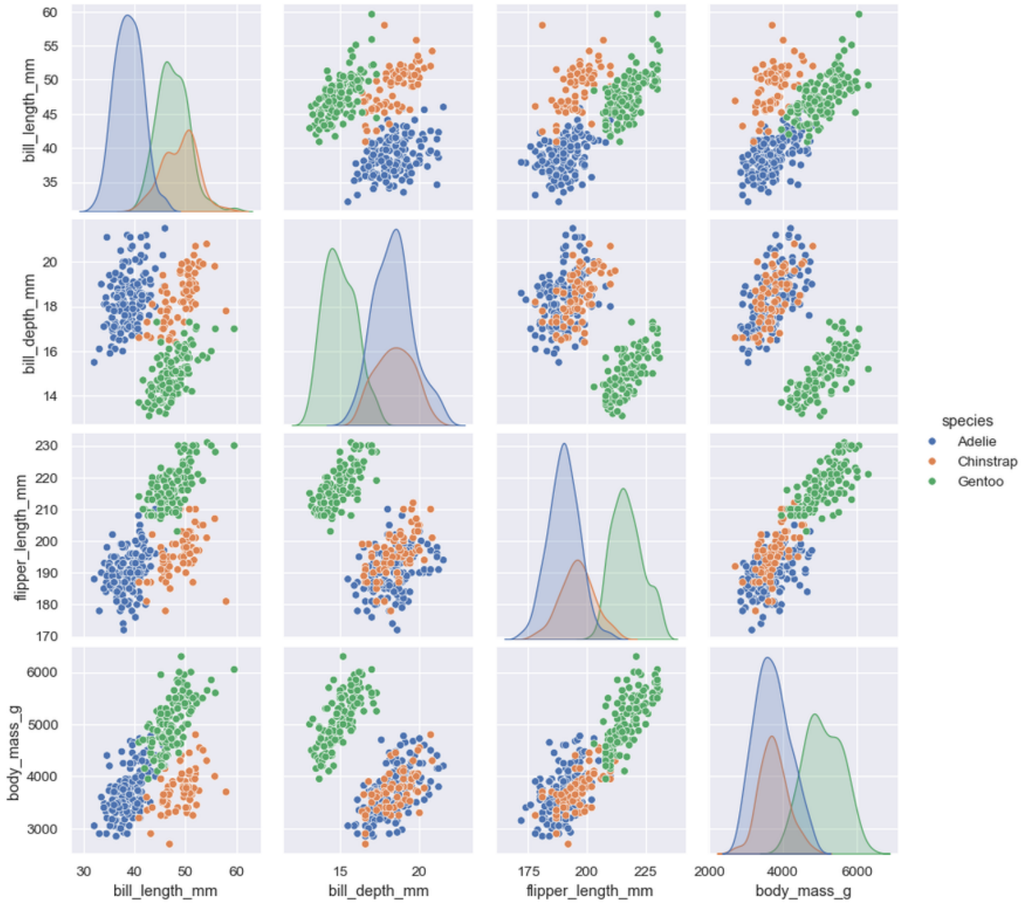
```
>>> s = pd.Series([3, -5, 7, 4], index=[ 'a' ,'b' ,'c', 'd'  ])
```

Dataframe

```
>>> data = { ‘Country’: [’Belgium’ ,’Indai’ ,’Brazil’ ],
                ‘Capital’: [’Brussels’ ,’Delhi’ ,’Brazilla’ ],
                ‘Population’: [11190846, 1303171035, 207847528]}
>>> df = pd.DataFrame(data,columns=[ ‘Country’,’Capital’ ,’ Population’])
```

What is Seaborn?

Seaborn is a library for making statistical graphics in Python. It builds on top of matplotlib and integrates closely with pandas data structures. Seaborn helps you explore and understand your data.



Seaborn

```
>>> import seaborn as sns
>>> tips = sns.load_dataset('tips' )
>>> iris = sns.load_dataset( 'iris')
>>> sns.barplot(x= 'sex',y= 'survived', hue=False,data=titanic)
>>> sns.jointplot( 'sepal_length','sepal_width',data=iris, kind= 'kde')
```

Types of Machine Learning

Machine Learning can be broadly categorized into three types:

Supervised

Involves training a model on a labeled dataset, where the algorithm learns to map input data to corresponding output by using pairs of input-output examples.

Performs tasks like classification and regression.

UnSupervised

Works with unlabeled data, aiming to discover patterns, relationships, or structures within the data without explicit guidance on the desired output.

Performs tasks like clustering.

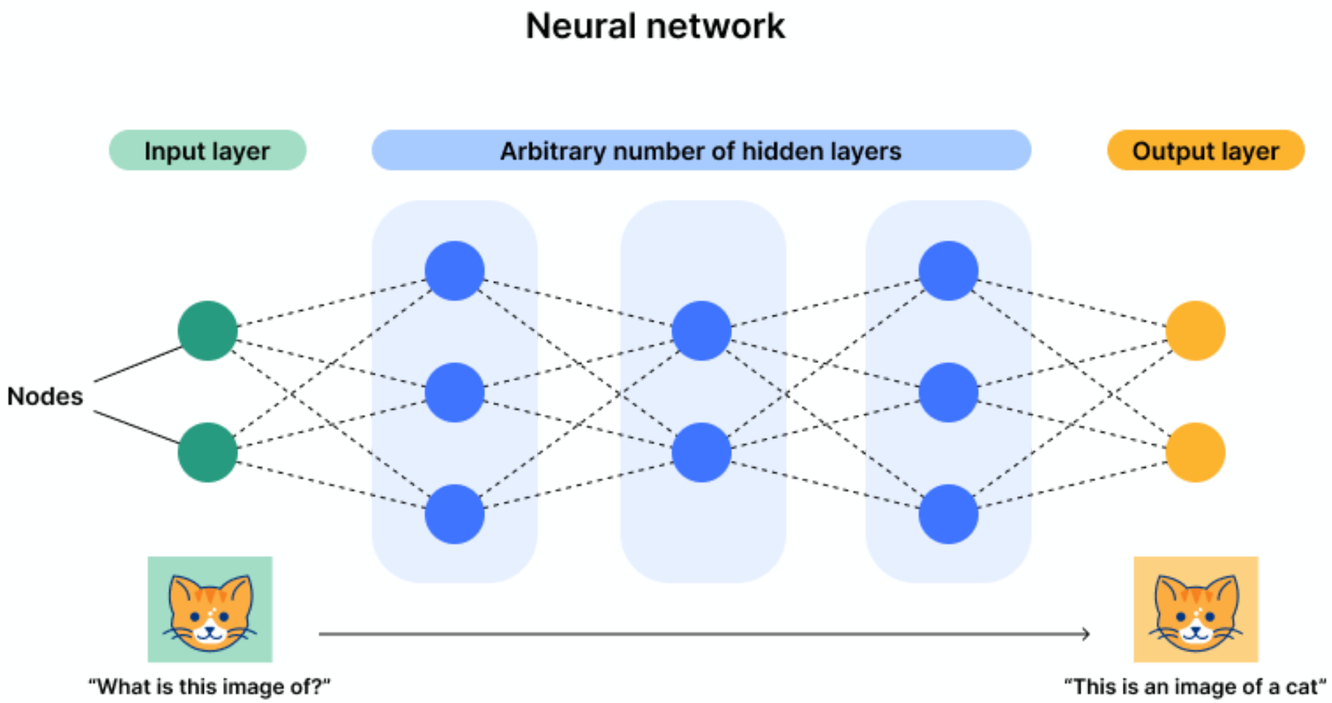
Reinforcement

Involves an agent learning to make decisions by interacting with an environment. The agent receives feedback in the form of rewards or penalties, guiding its learning process.

Teach a computer program (agent) to play chess.

Neural Networks

A neural network is a method in artificial intelligence that teaches computers to process data in a way that is inspired by the human brain. It is a type of machine learning process, called deep learning, that uses interconnected nodes or neurons in a layered structure that resembles the human brain.

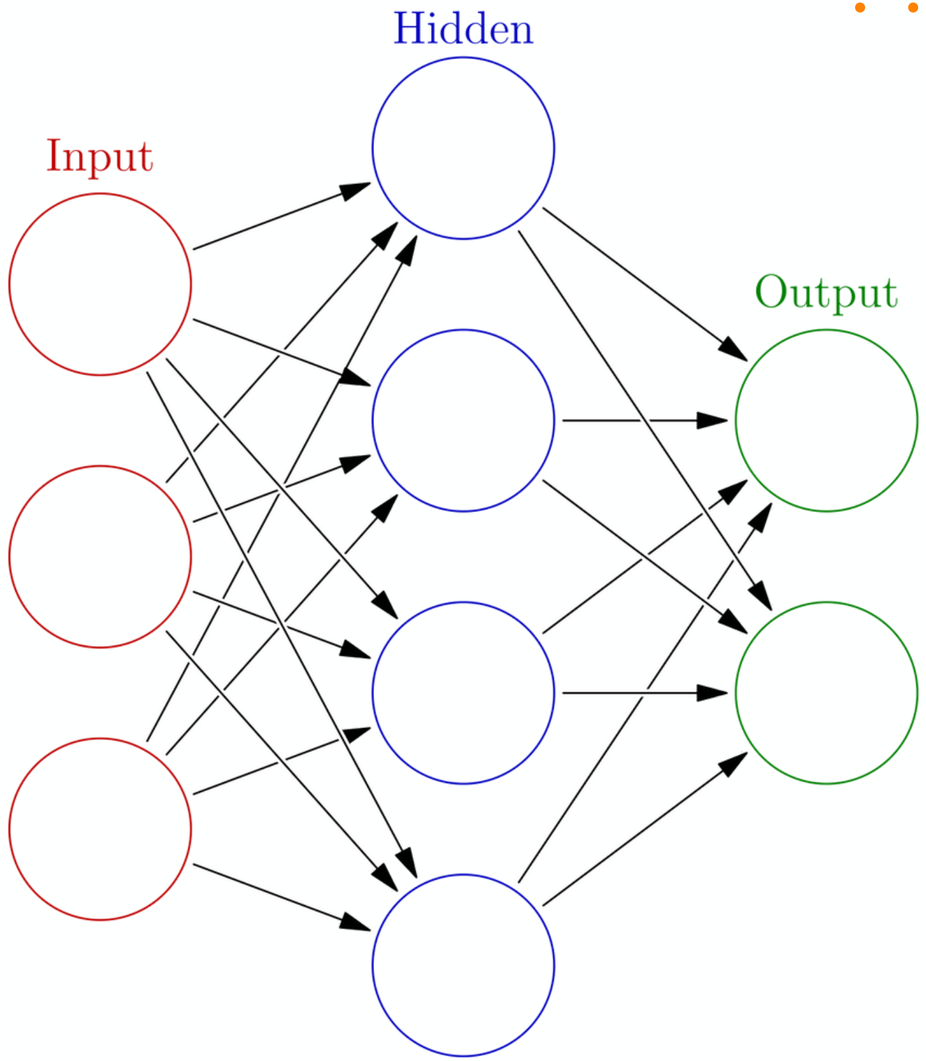


Neural Network

Input Layer: Information/features passed in this layer.

Hidden Layer: A neural network can have any number of hidden layers.

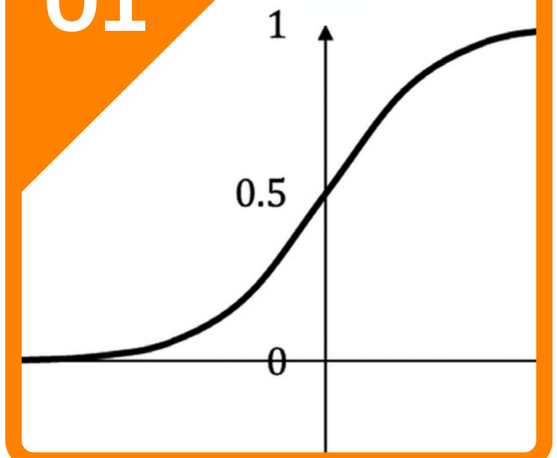
Output Layer: Can have 'n' number of nodes. It provides the output.



Activation Function

An activation function is a mathematical operation applied to the output of a neuron in a neural network.

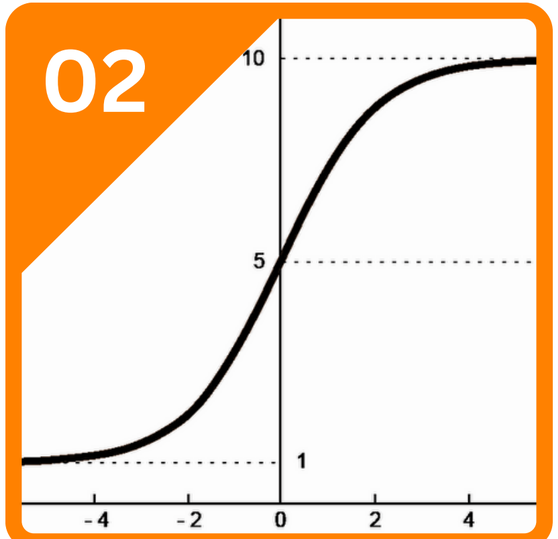
01



Sigmoid Activation Fxn

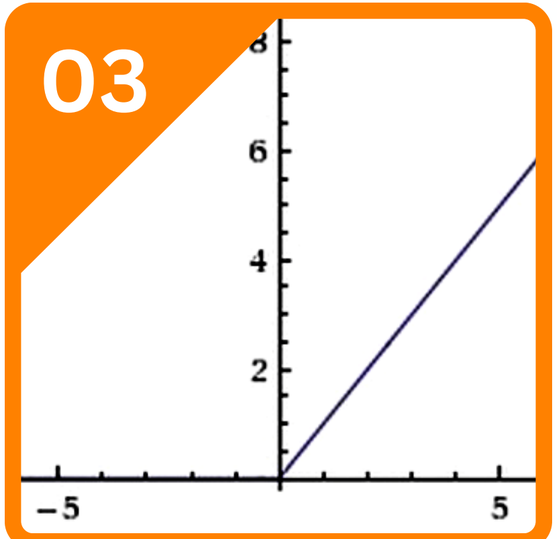
Range: (0, 1)

02



Softmax Activation Fxn

03



Relu Activation Fxn

Range: [0, +∞)

Back Propagation

In Easy language perform the above whole process in reverse direction.

Back Propagation is performed to increase the accuracy in the output which we have received.

We use 'OPTIMIZERS' for back propagation

Type of 'OPTIMIZERS' : Adam, SGD, etc.

ANY QUERIES?