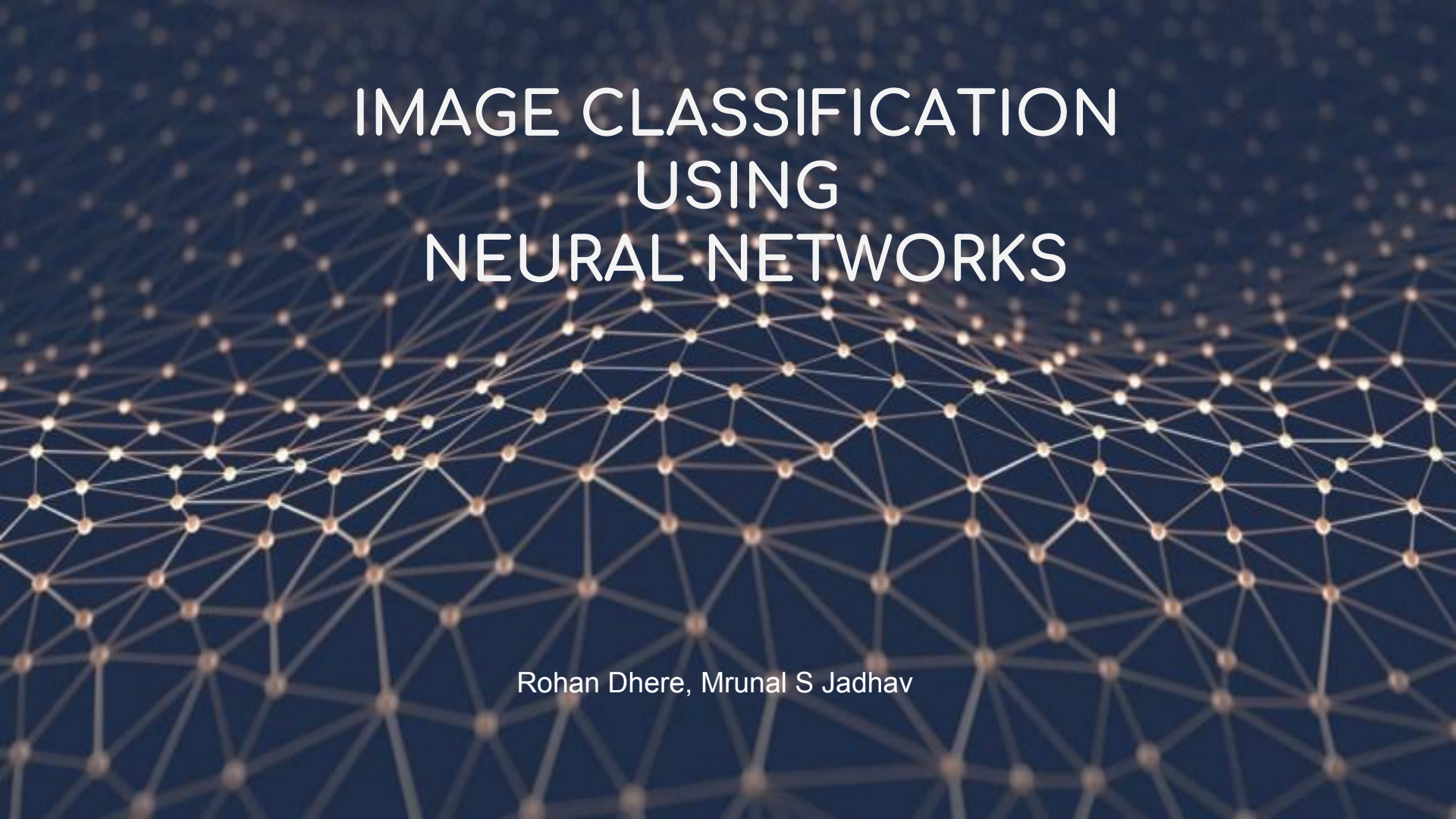
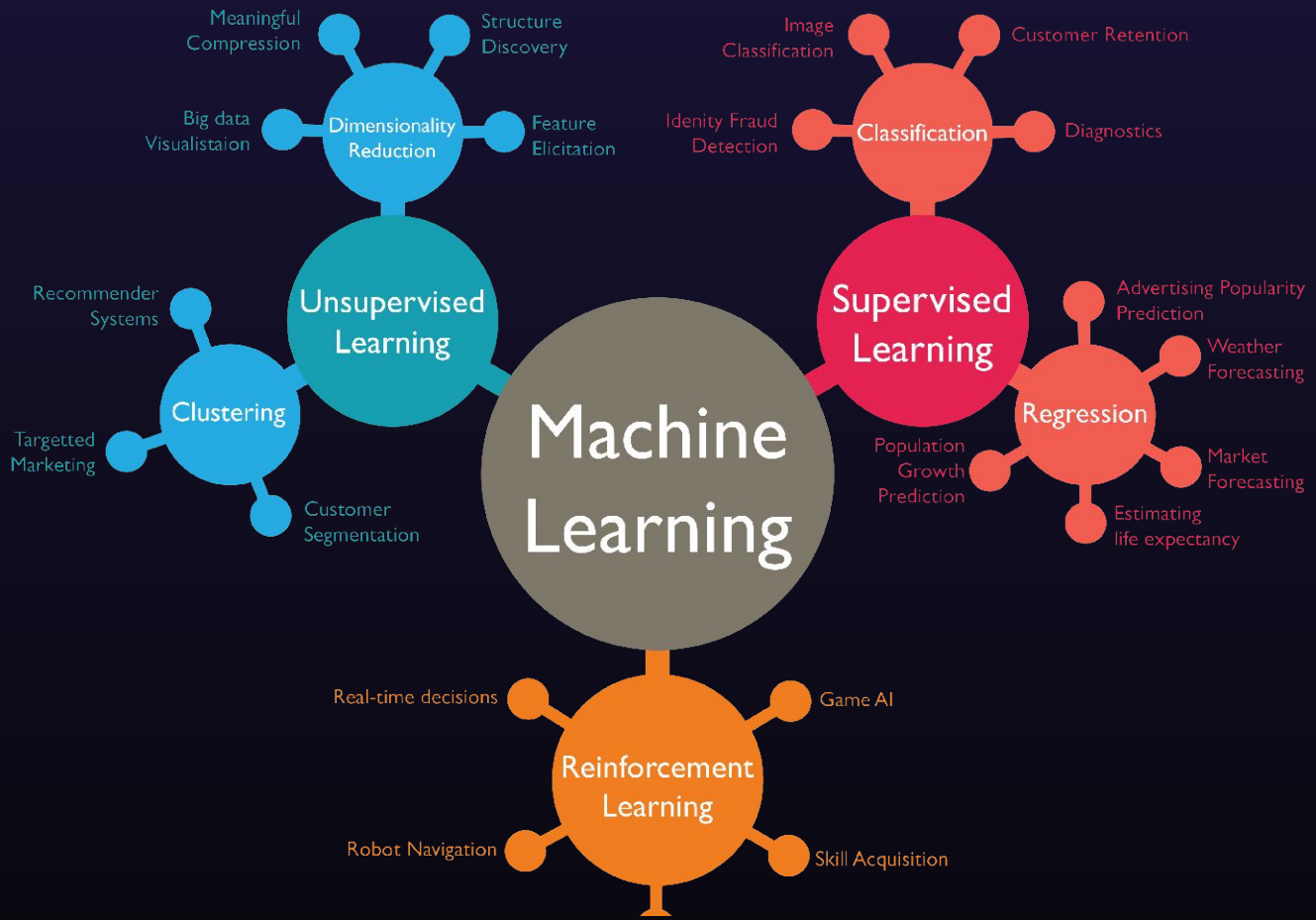


Rohan Dhere, Mrunal S Jadhav

DOMAIN


Machine Learning
Unsupervised Learning
Dimensionality Reduction
Meaningful Compression
Structure Discovery
Big data Visualistaion
Feature Elicitation
Clustering
Recommender Systems
Targetted Marketing
Customer Segmentation
Supervised Learning
Classification
Image Classification
Customer Retention
Idenity Fraud Detection
Diagnostics
Regression
Advertising Popularity Prediction
Weather Forecasting
Population Growth Prediction
Market Forecasting
Estimating life expectancy
Reinforcement Learning
Real-time decisions
Game AI
Robot Navigation
Skill Acquisition

KEYWORDS

Classifier: An algorithm that maps the input data to a specific category.

Classification model: A type of machine learning model for distinguishing among two or more discrete classes

Convolutional layer: layer of a deep neural network in which a convolution filter passes along an input matrix. feature An input variable used in making predictions.

Feature: A feature is an individual measurable property of a phenomenon being observed

Neural Networks: mimics the behaviour of a human brain when processing data

Hidden layer: A synthetic layer in a neural network between the input layer (that is, the features) and the output layer (the prediction).

Outliers: Values distant from most other values.

Pooling: Reducing a matrix (or matrices) created by an earlier convolutional layer to a smaller matrix.

Introduction

Teaching computers to understand what they see is the subject that keeps all the computer vision engineers awake.

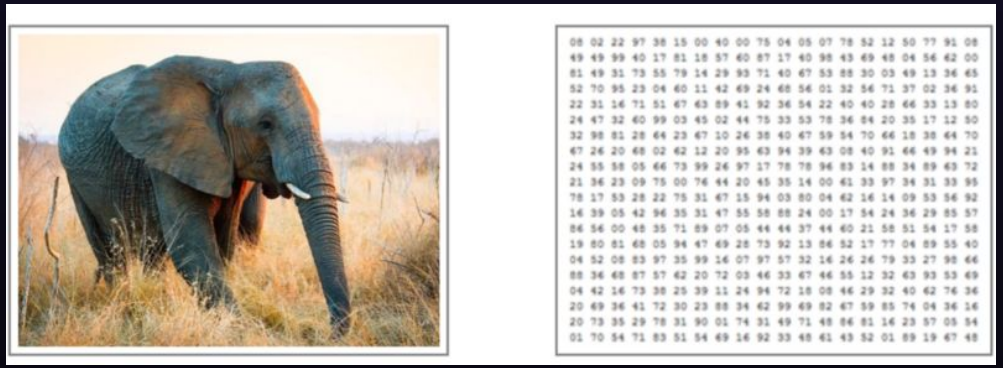
Image Recognition is the process of identifying what an image depicts. For humans interpreting the visual world comes easy.

When humans see something, there is an inherent understanding of what it is. In most cases, there is no need for a conscious study of the object in order to make sense of it.

Instead of the image, the computer sees an array of pixels. For example, if image size is 300 x 300. In this case, the size of the array will be 300x300x3. Where 300 is width, next 300 is height and 3 is RGB channel values. The computer is assigned a value from 0 to 255 to each of these numbers. This value describes the intensity of the pixel at each point.

The classification model is used to identify which category the target image belongs to.

Classification is the process of predicting the class of given data points. Classes are sometimes called as targets/ labels or categories. Classification predictive modeling is the task of approximating a mapping function (f) from input variables (X) to discrete output variables (y).



What humans see

What computers see

Methods of classification

- **Logistic Regression**

  Probabilities describing the possible outcomes of a single trial are modelled using a logistic function.

- **Naïve Bayes**

  Assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature

- **K-Nearest Neighbours**

  An object is classified by a majority vote of its neighbors

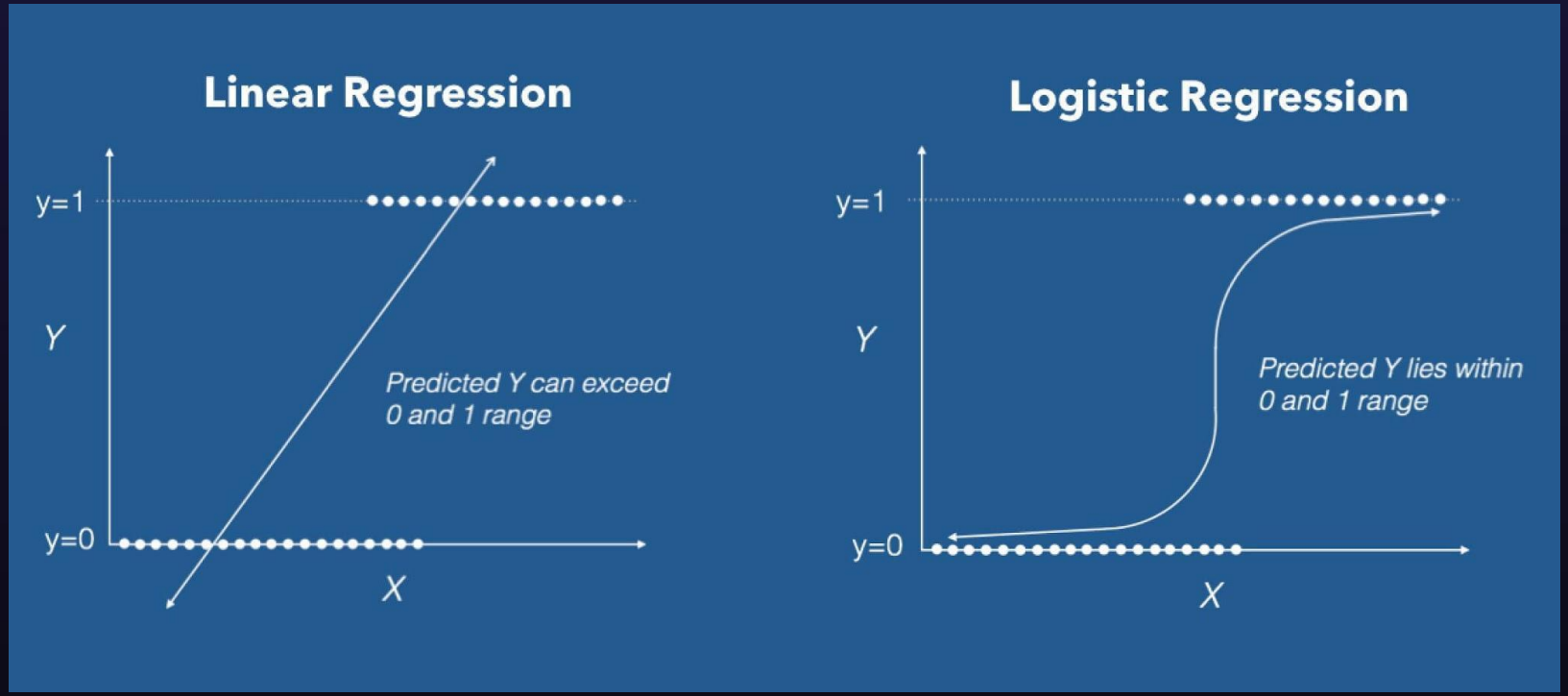
- **Decision Tree**

  Organized a series of test questions and conditions in a tree structure

- **Support Vector Machine(SVM)**

  Performs classification tasks by constructing hyperplanes in a multidimensional space that separates cases of different class labels

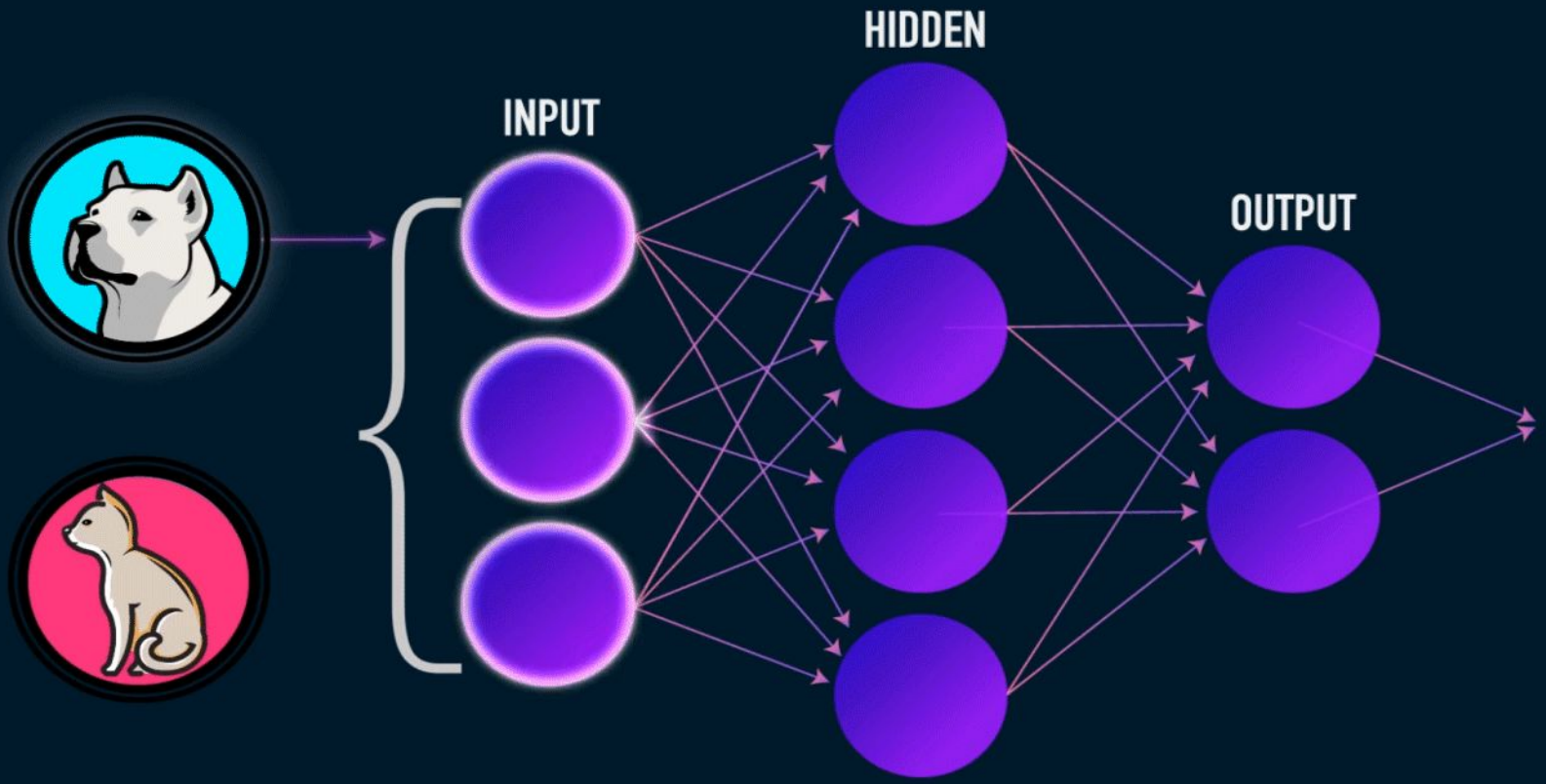
Logistic Regression



Logistic Regression falls under Supervised Machine Learning.

Instead of fitting a straight line or hyperplane, the logistic regression model uses the logistic function to squeeze the output of a linear equation between 0 and 1. The logistic function is defined as **logistic(η)=1/1+exp(−η)**

Neural Network



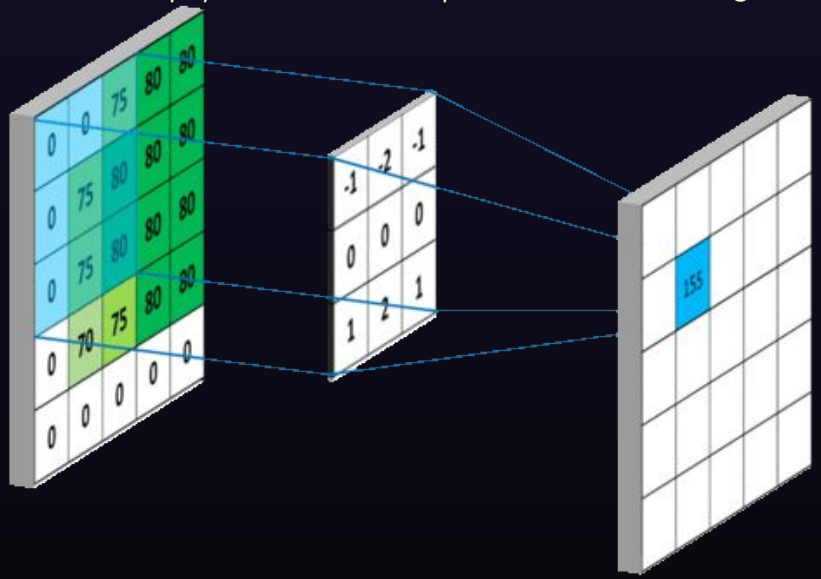
Convolution Neural Networks

Convolution: Convolution is performed on an image to identify certain features in an image. Convolution helps in blurring, sharpening, edge detection, noise reduction and more on an image that can help the machine to learn specific characteristics of an image.

Pooling: A convoluted image can be too large and therefore needs to be reduced. Pooling is mainly done to reduce the image without losing features or patterns.

Flattening: Flattening transforms a two-dimensional matrix of features into a vector of features that can be fed into a neural network or classifier.

Full-Connection: Full connection simply refers to the process of feeding the flattened image into a neural network.



TECHNOLOGY STACK

COLAB

JUPYTER NOTEBOOK

SKLEARN

TENSORFLOW

NumPy

Pandas

$$y_i t = \beta' x_{it} + \mu_i + \epsilon_{it}$$

WEEKLY TIMETABLE

10%

Data Preprocessing

Collect Dataset

Week 1

FEB 13,2019 -FEB 19,2019

30%

Logistic Regression

Multi class Model Using logistic regression

Week 2 ,3

FEB 19,2019-FEB 26,2019

60%

Neural Networks

Building Basic neural network model to classify images

Week 4,5,6

MARCH 5,2019-
MARCH 19,2019

95%

Convolution Neural Networks

Building Complex networks for better classification

Week 7,8,9

MARCH 19,2019-APR 02,2019

100%

Optimisation and Tweaks

Tweak the mode. Number of neurons,number of layers etcs

Week 10

APR 02,109-APR 10,2019

Conclusion

There are 2.5 quintillion bytes of data created each day which cannot be handled by human brains but can be handled by artificial neurons.

Neural networks have the ability to generalize the inputs and their outputs aren't limited entirely by inputs and results given to them initially.

The end target with the implementation of the classification algorithms is to further refine the data to a point where the information that results can be applied to business decisions.

By adding more features like color, patterns, shapes etc we would be approaching more real life cases.

It is this process of informing downstream processes with more refined and higher value data that is fundamental to companies who are truly harnessing the value of their data and achieving the results that they desire.