**MACHINE LEARNING**

Arthur Samuel first coined the term machine learning in the year 1959.Machine learning is a subset of Artificial intelligence which provides machine the ability to learn automatically and improve from experience without being explicitly programmed.

Why machine learning is important?

* Increase in Data Generation
* Improve decision making
* Handle multi-dimensional and multi variety data
* Uncover patterns and trends in data
* Solve complex problems
* Supports the development of new product.
* No human intervention needed
* Continuous improvement.

Need for Machine Learning in day to day life

* Netflix
* Facebook Tags
* Amazon Alexa
* Spam Filtering

Machine learning process

* Define objectives
* Data gathering
* Preparing data
* Data Exploration
* Building a model
* Model evaluation
* Prediction

Step 1: Define the objective of the problem

To predict the possibility of rain by studying the weather conditions.

Step 2: Data Gathering

Data such as weather conditions humidity level temperature, pressure etc are either collected manually or scraped from the web.

Step 3: Preparing Data

Data cleaning involves getting rid of inconsistencies in data such as missing values or redundant variables.

Step 4: Data Exploration

Data exploration involves understanding the patterns and trends in the data. At this stage all the useful insights are drawn and correlations between the variables are understand..

Step 5: Building a Model

At this stage a predictive model is built by using Machine learning algorithms, such as linear regression, decision trees etc.

Step 6: Model Evaluation and Optimization

The efficiency of the model is evaluated and any further improvement in the model are implemented.

Step 7: predictions

The final outcome is predicted after performing parameter tuning and improving the accuracy of the model.

Different type of machine learning

Types of machine learning are:

* Supervised Learning
* Unsupervised Learning
* Reinforcement

Supervised learning

* In supervised learning the machine learns by using labelled data to train algorithms and predict outcomes accurately
* The data type is labelled
* Type of problems including in supervised learning are regression and classification.
* Popular algorithms included ; Linear regression, Logistic regression, k-means , Decision tree, Naive bayes etc.

Regression

Regression analysis is a form of predictive modelling technique which investigates the relationship between a dependent and independent variables. Popular algorithms included, linear regression and logistic regression.

Linear regression

Linear regression is a method to predict dependent variable (Y) based on values of variable(X). It can be used for the cases where we want to predict some continuous quantity.

Uses of regression

* Analysing the impact of price changes.
* Determine the strength of predictors
* Forecasting an effect.
* Trend forecasting and sales estimates.
* Assessment of risk in financial services.

Linear regression selection criteria

* Classification and regression capabilities
* Data quality
* Computational complexity
* Comprehensible and transparent

Why not linear regression

Since our value of Y will be between 0 and 1 the linear line has to be clipped at 0 and 1. With this our resulting curve cannot be transmitted into a single formula hence we came up with logistic.

Logistic regression: what and why

Logistic regression produces results in a binary format which is used to predict the outcome of a categorical dependent variable so the outcome should be discrete/categorical such as.

* 0 0R 1
* Yes or no
* True or false
* High or low

Logistic regression poses a sigmoid curve

Uses-cases of logistic regression

* Weather prediction
* Classification problems
* Determines illness