

# MACHINE LEARNING

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Duration : 5 Days

## SECTION 1: INTRODUCTION TO ML

- What is ML?
- Why ML?
- Opportunities in ML
- What is ML models?
- Why R and Python is popular?

## SECTION 2: ML MODEL OVERVIEW

- Introduction to ML Model.
- Data Handling
- Data Pre-processing
- Types of ML Model.
- Supervised and Unsupervised.
- How to test your Data?
- Cross validation techniques

## SECTION 3: LINEAR REGRESSION

- What is Linear Regression?
- Gradient Descent overview.
- Gradient Descent Calculations.
- R and Python Overview.
- How to improve your model?

## SECTION 4: OVERFITTING

- Overfitting Overview
- How to use Linear Regression for Overfitting?
- How to avoid Overfitting?
- Bias-Variance Tradeoff.
- Regularization – Ridge, LASSO
- ANOVA, F tests overview.
- What is Logistic Regression?
- Classification with Logistic Regression.
- Maximum Likelihood Estimation.
- Build an end to end model with Logistic Regression using scikit Learn.
- How to build a model in the Industry?

## SECTION 5: DECISION TREES

- Why Decision Tree?
- Entropy, Gini Impurity overview
- Implement Overfitting.

- How to improve the Decision Tree model without Overfitting?
- Bagging, Boosting
- Random Forest
- AdaBoost, Gradient Boost

## SECTION 6: K-NN

- Distance based model with kNN.
- Value of k – overview.

## SECTION 7: SUPPORT VECTOR MACHINES(SVM)

- Power of SVM overview.
- Why SVM?
- What is Kernel Functions?
- What are the Kernel Functions available?
- How to Build an OCR(Optical Character Reader) with the help of SVM and Kernel functions?
- Neural Networks overview.
- Why Neural Networks?
- What is Neural Network Architecture?
- How to build AND, OR, NOT, XOR, XNOR Logic Gates with Neural Network?
- What is Forward & Backward Propagation?
- List of Activation Functions.
- Vanishing Gradient problem

## SECTION 8: DEEP NEURAL NETWORKS

- Optimization methods overview.
- Gradient Descent with Momentum, RMSProp, ADAM.
- Learning Rate Decay.
- Xavier Initialization.
- Introduction to Keras and Tensorflow(TF)
- Deep Learning in Keras with TensorFlow as the backend.

## SECTION 9: UNSUPERVISED LEARNING

- Clustering overview.
- k-means Clustering.
- Hierarchical clustering.

## SECTION 10: PCA

- Principal Component Analysis(PCA).
- Maths behind PCA.
- Engine Recommendation.
- Content and Collaborative Filtering.
- Market Basket Analysis
- What is Apriori Rule?