Machine Learning SYLLABUS

Module - 1

- Introduction to Machine Learning
- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning
- Statistical Decision Theory
- Bias – Variance

Module - 2

- Linear Regression
- Multivariate Regression
- Subset Selection
- Shrinkage Methods
- Principal Components Regression
- Partial Least Squares

Module - 3

- Linear Classification
- Logistic Regression
- Linear Discriminant Analysis
- Tutorial to live Machine Learning project
- Artificial Neural Networks - Early Models and Backpropagation
- Artificial Neural Networks - Training, Initialization and Validation
- Parameter Estimations

Module - 4

- Separating Hyperplane Approaches - Perceptron Learning
- Support Vector Machines

SVM Kernels
Hingle Loss Formulation of SVM Objective

Module - 6

Decision Trees
Regression Trees
Decision Trees Real Life Examples

Module - 7

Evaluation and Evaluation Measures
2 Class Evaluation Measures
The ROC Curve
Minimum Description Length Analysis
Ensemble Methods

Module - 8

Gradient Boosting
Random Forests
Naive Bayes
Bayesian Networks
Multiclass Classification

Module - 9

Undirected Graphical Methods
Hidden Markov Models
Variable Elimination
Tree Width and Belief Propagation

Module - 10

Partitional Clustering
Hierarchical Clustering
The BIRCH and CURE Algorithms
Density Based Clustering

Module - 11

- Gaussian Mixture Models
- Expectation Maximization

Module - 12

- Linear Theory
- Reinforcement Learning