**Machine Learning in Python(6 Weeks)**

**Machine Learning Basics**

1. Converting business problems to data problems
2. Understanding supervised and unsupervised learning with examples
3. Understanding biases associated with any machine learning algorithm
4. Ways of reducing bias and increasing generalisation capabilites
5. Drivers of machine learning algorithms
6. Cost functions
7. Brief introduction to gradient descent
8. Importance of model validation
9. Methods of model validation
10. Cross validation & average error

**Generalised Linear Models in Python**

1. Linear Regression
2. Regularisation of Generalised Linear Models
3. Ridge and Lasso Regression
4. Logistic Regression
5. Methods of threshold determination and performance measures for classification score models

**Tree Models using Python**

1. Introduction to decision trees
2. Tuning tree size with cross validation
3. Introduction to bagging algorithm
4. Random Forests
5. Grid search and randomized grid search
6. ExtraTrees (Extremely Randomised Trees)
7. Partial dependence plots

**Boosting Algorithms using Python**

1. Concept of weak learners
2. Introduction to boosting algorithms
3. Adaptive Boosting
4. Extreme Gradient Boosting (XGBoost)

**Support Vector Machines (SVM) & kNN in Python**

1. Introduction to idea of observation based learning
2. Distances and similarities
3. k Nearest Neighbours (kNN) for classification
4. Brief mathematical background on SVM/li>
5. Regression with kNN & SVM

**Unsupervised learning in Python**

1. Need for dimensionality reduction
2. Principal Component Analysis (PCA)
3. Difference between PCAs and Latent Factors
4. Factor Analysis
5. Hierarchical, K-means & DBSCAN Clustering

**Text Mining in Python**

1. Gathering text data using web scraping with urllib
2. Processing raw web data with BeautifulSoup
3. Interacting with Google search using urllib with custom user agent
4. Collecting twitter data with Twitter API
5. Naive Bayes Algorithm
6. Feature Engineering with text data
7. Sentiment analysis

**Open CV**

1. Basic of Computer Vision & Open CV
2. Images Manipulations
3. Image Segmentation
4. Object Detection
5. Face, People and Car Detection
6. Face Analysis and Fulters
7. Machine Learning in Computer Vision
8. Motion Analysis & Object Tracking