**Progress Report-04**

- Completed the ML course

Content:

- WEEK-7

-Support Vector Machine

- Regularization replaced with large margin classifier

- Gaussian kernel

- Discussed on how variation of SVM parameters correspond to high bias and variance

WEEK-8

- Unsupervised Learning

- Clustering Algorithm

- K-Means

-Dimensionality Reduction

- Principal Component Analysis

- Covariance Matrix introduced in PCA Algorithm, replaced vertical projection with orthogonal distance

- Method for choice of the value of k using squared projection error and variance

- Uses of PCA include supervised learning speedup and data compression

WEEK-9

- Anomaly Detection using Density estimation

- Gaussian Normal Distribution

- Multiplicative probability due to its independent nature

- Thus, classification of an anomaly after it crosses a certain probabilistic threshold

-Differences between Anomaly detection and supervised learning

-Conversion of non-Gaussian features into Gaussian ones through specific logarithmic transformation

-Multivariate Gaussian Distribution and how it automatically captures correlations between these features.

- Recommender Systems and Collaborative Filtering

-Low Rank Matrix Factorization and classification of similar features due to their closeness of their norms.

WEEK-10

-Large Scale Machine Learning

-Stochastic Gradient Descent- looking through a single example in each iteration

-Mini-Batch Gradient Descent- looking through ”b” examples in each iteration

-Converge- Checking by gradually reducing the learning rate through each iteration

- Online Learning- enables the use of temporary data as there is a continuous stream of data

- Map Reduce Approach to split summative degrees

WEEK-11

- Photo Optical Character Recognition

- Sequential Photo OCR pipeline includes text detection, character segmentation and character recognition

- Sliding Windows for character segmentation

- Artificial Data Synthesis

- Ceiling Analysis