CS615 & CS314b: MACHINE LEARNING

Course Structure

SYLLABUS

- Learning Problem, Designing a Learning System, Types of Learning. Supervise Learning: Linear and Logistic regression, Decision Tree Learning.

- Instance-Based Learning, kNN and CBR, Bayesian Learning, Naive Bayes Classifier, Bayesian Belief Network, Artificial Neural Network (ANN), SVM.

- Unsupervised Learning: Mixture Models and EM, Clustering, K-Means, Variants of K-Means, DBSCAN, Hierarchical clustering, BRICH, Grid based Clustering, Dimensionality Reduction.

- Performance Evaluation, Confusion Metrics, Evaluating Hypotheses, Confidence Interval, Hypothesis Testing Ensemble Learning Bagging and Boosting Formulating. Computational Learning Theory, Recommender System, Issues and practical advice in Machine Learning.

EVALUATION SCHEME

- Quiz I (10%), **Date: Feb 06, 2020**

- Mid Term (20%), **Date: Feb 17-21, 2020**

- Quiz II (10%), **Date: March 27, 2020**

- End Term (35%), **Date: Apr 27 – May 02, 2020**

- Project and Assignments (15% + 10%), **Date: Apr 14-17, 2020**
  - Assignment: online submission
  - Project: Report + Poster
    - Problem Identification **(Last Week of January, 2020)**
    - Literature Survey and Research Gap **(Last Week of February, 2020)**
    - Implementation and demonstration **(Last Week of March, 2020)**
    - Report and Poster Submission **(Last Week of April, 2020)**

PROJECT REPORT FORMAT

- Title of the project
- Abstract
- Introduction
- Background and problem description
- Related work
- Proposed solution
- Evaluation study
- Results
- Discussion
- Conclusion and Future direction
- References
- Appendix (Complete code with procedure)

TEXT/REFERENCE BOOKS

- Tom Mitchell. Machine Learning, Mc Graw Hill, 1997.

- Chris Bishop, Pattern Recognition and Machine Learning, Springer, 2007

- T. Hastie, R. Tibshirani and J. Friedman, The Elements of Statistical Learning, Second Edition, Springer.

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- Course Materials

  Google classroom

TEXT/REFERENCE BOOKS

- Tom Mitchell. Machine Learning, McGraw Hill, 1997.

- Stephen Marsland, Machine Learning an Algorithmic Perspective, Chapman and Hall/CRC, 2014.

- Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, Foundations of Machine Learning (Adaptive Computation and Machine Learning Series), MIT, 2012.

- Ethem Alpaydin, Introduction to Machine Learning.

- Trevor, Robert, and Jerome, The Elements of Statistical Learning.

- Shwartz, David, Understanding Machine Learning.

- Stepten, Machine Learning An Algorithm Perceptive.

- Mohri, Afshin, and Ameet, Foundation of Machine Learning.

- Gareth, Witten, Hastie, Robert, An Introduction to Statistical Learning with Applications in R.

ONLINE COURSES

- Coursera

- Edx

- Udemy

- Datacamp

- Udacity

- MITOpenCourseware

- Codecademy

- Alison

- Treehouse

- FutureLearn

- Hardvard Extension School