Machine Learning

Evaluation

Minor- 25%
Major- 35%
Assignments- 40%

Fractal I: Supervised Learning

- Introduction to AI and ML;
- Different Paradigms of Machine Learning
- Bayesian Classification, Decision Tree Learning
- Ensemble methods: Bagging, Boosting, Stacking

Fractal II: Graphical Models, Neural Networks and Deep Learning

- **Introduction to Graphical Models**- HMM, MaxEnt and CRF
- **Neural Network**- Perceptron, Backpropagation
- **Deep Learning**- Recurrent Neural Network, LSTM, GRU, Encoder-Decoder, Attention, Autoencoder, GAN

Fractal-III: Unsupervised Learning and Feature selection

- **Feature Selection and Dimensionality Reduction**: PCA, LDA, Evolutionary algorithm for feature selection
- **Clustering**: k-means clustering, k-medoid, EM-algorithm, agglomerative clustering
- Hypothesis Evaluation, VC-dimension, Bias-variance Tradeoff, Regression

Resources

T. Mitchell. Machine Learning. McGraw-Hill, 1997.
Christopher Bishop. Pattern recognition and machine learning. Springer Verlag, 2006.
Hastie, Tibshirani, Friedman. The elements of Statistical Learning Springer Verlag.
Probability, Random Variables and Stochastic processes by Papoulis and Pillai, 4th Edition, Tata McGraw Hill Edition.
A. K. Jain and R. C. Dubes. Algorithms for Clustering Data. Prentice Hall, 198815