**XCS229 Resource Handout Map**

Below is an outline of all concepts covered in both XCS229i ML and XCS229ii ML Strategy and Intro to RL.

# 1 Supervised Learning

## 1.1 Supervised Learning & Discriminative Algorithms

1. Linear Regression
2. Batch/Stochastic Gradient Descent
3. Normal Equation
4. Locally Weighted Regression
5. Probabilistic Interpretation of Linear Regression
6. Logistic Regression (Further reading: BinaryClassification & Logistic Regression)
7. Newton's Method
8. Perceptron (Further reading: Perceptron)
9. Logistic Regression
10. Exponential Family
11. Generalized Linear Models (GLM)
12. Softmax Regression

## 1.2 Generative Learning Algorithms

1. Gaussian Discriminant Analysis
2. Generative & Discriminative Analysis
3. Naive Bayes
4. Laplace Smoothing
5. Event Models

## 1.3 Kernels and Support Vector Machines

1. Support Vector Machines (Further reading: Representer Functions)
2. Kernels

## 1.4 Decision Trees

1. Decision Trees
2. Ensemble Methods (Further reading: Boosting)

# 2 Unsupervised Learning

1. K-means Clustering
2. Mixture of Gaussians
3. Expectation Maximization (EM) Algorithm
4. Factor Analysis
5. Independent Component Analysis (Further reading: Principal Component Analysis)

# 3 Deep Learning (Neural Networks)

1. Backpropagation (Further reading: Supplemental notes on backpropagation)
2. Activation Functions
3. Vanishing and Exploding Gradients
4. Initialization Schemes

# 4 Machine Learning Theory

1. Bias/Variance Tradeoff (Further reading: Bias Variance Calculations)
2. Error Analysis
3. Regularization and Model Selection

# 5 Reinforcement Learning

1. Reinforcement Learning and Control
2. LQR, DDP, and LQG