Announcements

• Last day of classes, you’ve almost made it!

• Final exam is 6-8pm on December 22

• Today is the last day of office hours

• We will still respond on Ed Discussion
Lecture 27: Review Part 2

CIS 4190/5190
Fall 2022
Final Exam Tentative Format

• Similar length/format to the practice exam
  • $\approx 15$ questions in increasing difficulty
  • Fewer questions but more parts per question
  • Will require **less memorization** than the practice exam
  • But no cheat sheet

• Make sure you know the written homework well!
  • Also questions from practice final exam that we cover today
Final Exam Format

• We will provide any **complicated** equations necessary
  • **You do not need to know:** Entropy, sigmoid function, logistic NLL, neural network model families
  • **You should know:** Linear regression model family, decision tree model family
  • **You should know:** How to compute a derivative, probability identities, etc.
  • **You should know:** K-means clustering algorithm structure, gradient descent algorithm structure, AdaBoost structure (but not the detailed formulas)

• You should also know how different design choices/hyperparameters affect performance of each algorithm
  • E.g., $k$ in kNN, $\lambda$ in linear/logistic regression, feature dimension $d$, number of examples $n$, AdaBoost iterations $T$, random forest base models $k$, etc.
Incomplete List of Potential Topics

• **Models/algorithms**
  • What is the model family? How does its decision boundary look?
  • What is the loss function? How does it compare to the “true” loss (e.g., NLL vs. accuracy for logistic regression)?
  • What is the optimizer? Is it guaranteed to find the global optimizer?
Incomplete List of Potential Topics

- **Models/Algorithms**
  - Linear/logistic regression
  - KNNs
  - Decision trees
  - Random forests, gradient boosted decision trees
  - Feedforward neural networks, convolutional neural networks
  - K-means clustering
  - PCA
  - Bayesian networks
  - Q iteration, Q learning, epsilon-greedy exploration
  - Collaborative filtering
Incomplete List of Potential Topics

• **Concepts**
  • Supervised vs. unsupervised vs. reinforcement learning
  • Loss minimization framework
  • Maximum likelihood framework
  • Bias-variance tradeoff
  • Regularization
  • Exploration in reinforcement learning
  • ML ethics
Good Luck!!!