MIDTERM TOPICS

Note: the list below is not exhaustive, and there may be some questions outside this list at the discretion of the instructor. You are responsible for all topics covered in class

The midterm exam will primarily focus on the following topics:

1. Introduction to ML
- Definition of ML
- Various types of ML defined on the basis of data presented to the machine

2. Inductive Learning
- Trying to approximate a global function based on a limited training data
- Error functions (such as MSE)
- Gradient Descent Basics

3. Linear Regression
- Constructing a linear model
- How to find out the coefficients using gradient descent (you will not have to derive anything)

4. Decision Tree
- Entropy, Information Gain
- Decision Boundary
- Function representation using trees e.g. A ˆ B, etc.
- ID3 algorithm
- How to avoid overfitting – pruning, early stopping, etc.

4. Perceptron
- Equation and decision boundary
- Weight and offset computation
- When can it be applied
- Perceptron Training Rule

5. ANN
- Concept of hidden layers
- Activation functions and influence on decision boundary

- Backpropagation results and applications (No need to remember derivation of Backpropagation)
- Calculating output of forward pass, and backward pass on a given network
- Different types of activation functions
- Deep vs Shallow Networks (No need for details of deep learning)

6. Probability & MLE
- Basics of probability, Sum rule, Conditional Probability **
- Expected value and variance of common distributions (Bernoulli, Binomial, Uniform, Gaussian)
- MLE estimate of parameters for various distributions

7. naïve Bayes Classifier
- Understanding concept of prior, likelihood, posterior
- MAP technique
- naïve assumption
- questions based on naïve Bayes classifier
- Laplace smoothing (equation will be given to you)