General Notes

CS, ML and Stats

Patrick Daly

1. Computer Science

   (a) Algorithms
   (b) Data Structures
   (c) Linux

2. Machine Learning (combine with stats?)

   (a) Supervised
         i. Ordinary Least Squares
        ii. Logistic Regression
       iii. Linear Discriminant Analysis
        iv. Support Vector Machines
         v. K-Nearest Neighbors
        vi. Gaussian Process
       vii. Decision Trees
      viii. Random Forest
        ix. Naive Bayes
         x. Deep Learning
              A. Deep Feedforward Networks
              B. Convolutional Networks
              C. Recurrent Networks
              D. Long Short-Term Memory (LSTM)
              E. Autoencoders
   (b) Unsupervised
         i. Gaussian Mixture Models
        ii. K-Means
       iii. Density-Based Spatial Clustering of Applications with Noise (DBSCAN)
        iv. Spectral Clustering
         v. Hierarchical Clustering
        vi. Factor Analysis
       vii. Independent Component Analysis (ICA)
      viii. Principal Component Analysis
        ix. Non-Negative Matrix Factorization (NMF)

    x. Latent Dirichlet Allocation (LDA)

    xi. PCA

    xii. Outlier Dectection?

3. Linear Algebra

   (a) Norms

      i. Euclidean or Frobenius (L^2)

     ii. Manhatten (L^1)

    iii. Infinity (L^∞)

    iv. Nuclear (L^0)

     v. Spectral

   (b) Special Matrices & Vectors

      i. Diagonal

     ii. Symmetric

    iii. Positive Definite

    iv. Positive Semi-Definite

     v. Negative Definite

    vi. Negative Semi-Definite

   (c) Eigendecomposition

   (d) Singular Value Decomposition (SVD)

   (e) Principal Component Analysis (PCA)

   (f) Independent Component Analysis (ICA)

   (g) Canonical Component Analysis (CCA)

   (h) Factor Analysis

4. Statistics

   (a) Probability Theory

   (b) Distributions

      i. Discrete

        A. Binomial

        B. Geometric

        C. Uniform

        D. Exponential

          E. Poisson
- ii. Continuous
          A. Normal
          B. Log-Normal
          C. Laplace
          D. Gamma
- (c) Combinatorics