**AI/Machine Learning Study Plan**

**Introduction/Overview**

* ML Book Chapter 1

**Decision Trees**

* AI Book Chapter 18.3
* ML Book Chapter 3 **(read 3.7.1 in particular!)**

**Neural Networks**

* AI Book Chapter 18.7
* ML Book Chapter 4
* 3Blue1Brown: <https://www.youtube.com/watch?v=aircAruvnKk&list=PLZHQObOWTQDNU6R1_67000Dx_ZCJB-3pi>
* Stanford: <https://www.youtube.com/watch?v=vT1JzLTH4G4>

**Boosting**

* AI Book Chapter 18.10
* *“Jiri Matas and Jan Sochman’s Slides”*
* *“Schaphire’s Introduction”* – NOT WORKING

**k-Nearest Neighbors**

* ML Book Chapter 8
  + 8.3
* AI Book Chapter 18.8

**Support Vector Machines**

* ~~AI Book Chapter 18.9~~
* ML Book Chapter 8
  + 8.4
* *“An Introduction to SVMs for data mining”*
* *“Christopher Burges tutorial on SVMs for Pattern Recognition*
* *“Scholkopf’s NIPS tutorial slides on SVMs and kernel methods”* – NOT WORKING

**Computational Learning Theory**

* ML Book Chapter 7
* AI Book Chapter 18.5

**Bayesian Learning**

* ML Book Chapter 6:
  + ~~6.1~~

1. ML Chapter 7
2. Udacity SL 10 (quickly skim through 9)
3. Look through Practice of other class
4. Udacity SL 7 & 8 **IF** 1. Is not enough
   1. Look through ppt at the same time
5. ML Chapter 9 or AI chapter 4
6. Review of first 5 topics (DT – SVMs)
   * ~~6.2~~
   * ~~6.3~~
   * **~~6.4~~**
   * 6.5
     + 6.5.1
   * Other?

* **Udacity SL 10**

**Addressing Overfitting & Information Theory**

* …

**Randomized Optimization**

* ML Book Chapter 9
* AI Book Chapter 4?
* *“No Free Lunch Theorem”*
* *“Charles Isbell Notes on Information Theory”*
* *“An Introduction to Information Theory and Entropy”*

--------------------------------------------- MIDTERM EXAM ----------------------------------------------

**K-Means**

* Udacity Lesson 13: UL 2 - Clustering

**Expected Maximization (EM)**

* Udacity Lesson 13: UL 2 – Clustering
* AI Book Chapter 20.3
* ML Book Chapter 6.12

**Principal Component Analysis (PCA) & Independent Component Analysis (ICA)**

* Udacity Lesson 14: UL 3 – Feature Selection
* Udacity lesson 15: UL 4 – Feature Transformation

**Information Theory**

* Udacity Lesson 16: UL 5 – Information Theory

**Markov Decision Processes**

* ~~Udacity Lesson 17: RL 1 – Markov Decision Processes~~
* ~~AI Book Chapter 17.1~~

**Reinforcement Learning (Bellman Equation, Policy Iteration, Value Iteration)**

* ~~Udacity Lesson 17: RL 1 – Markov Decision Processes~~
* ~~AI Book Chapter 17.2-17.3~~

**Q-Learning**

* Udacity Lesson 18: RL 2 – Reinforcement Learning
* ML Book Chapter 13
* AI Book Chapter 21

**Game Theory**

* ~~Udacity Lesson 19: RL 3 – Game Theory~~ IF TIME GO OVER THOUGH
* Udacity Lesson 20: RL 4 – Game Theory Continued
* AI Book Chapter 17.5

**List of Resources**

* AI Book
* ML Book
* SCIKIT-LEARN by setndex: <https://www.youtube.com/watch?v=OGxgnH8y2NM&list=PLQVvvaa0QuDfKTOs3Keq_kaG2P55YRn5v&index=1>
  + <http://scikit-learn.org/stable/supervised_learning.html>
* Python Jupyter (<http://jupyter.org/install.html>)
* Google “Perceptron tutorial”:
  + <https://machinelearningmastery.com/implement-perceptron-algorithm-scratch-python/>
* Optimal Number of Features article: <https://academic.oup.com/bioinformatics/article/21/8/1509/249540>
* Most asked ML Interview questions: <https://cloudxlab.com/blog/machine-learning-interview-questions/?utm_source=reddit.com>
* DR. ISBELL’S COURSE: <https://classroom.udacity.com/courses/ud262>
* AWESOME SCIKIT LEARN TUTORIALS: <https://www.youtube.com/user/cristivlad25/videos>

**Terms to Learn ASAP:**

* Inductive Bias: ML Chapter 2.7
* Bias and Variance
* Target function: ML Chapter 1
* Utility Function

**Important Sections to Read**

* ~~Cross-validation: AI Chapter 18.4~~

Orange Canvas:

<https://www.youtube.com/watch?v=HXjnDIgGDuI&list=PLmNPvQr9Tf-ZSDLwOzxpvY-HrE0yv-8Fy&index=1>