

10-701 and 15-781 Machine Learning

<http://www.cs.cmu.edu/~guestri/Class/10701/>

Carlos Guestrin

Tom Mitchell

Syllabus

- Covers a wide range of Machine Learning techniques – from basic to state-of-the-art
- You will learn about the methods you heard about:
 - Naïve Bayes, logistic regression, nearest-neighbor, decision trees, boosting, neural nets, overfitting, regularization, dimensionality reduction, PCA, error bounds, VC dimension, SVMs, kernels, margin bounds, K-means, EM, mixture models, semi-supervised learning, HMMs, graphical models, active learning, reinforcement learning...
- Covers algorithms, theory and applications
- **It's going to be fun and hard work 😊**

Prerequisites

- Probabilities
 - Distributions, densities, marginalization...
- Basic statistics
 - Moments, typical distributions, regression...
- Algorithms
 - Dynamic programming, basic data structures, complexity...
- Programming
 - Mostly your choice of language
- We provide some background, but the class will be fast paced
- Ability to deal with “abstract mathematical concepts”

Four Great TAs

- Great resource for learning, interact with them!

- Kaustav Das – kaustav@cs



- Derek Hoiem – dhoiem@cs



- Zhenzhen Kou – woomy@cs



- Daniel Neill – neill@cs



First Point of Contact

- To facilitate interaction please send all communication to your “first point of contact” according to your last name:
- A-D: contact Daniel (neill@cs)
- E-Le: contact Kaustav (kaustav@cs)
- Li-P: contact Derek (dhoiem@cs)
- Q-Z: contact Zhenzhen (woomy@cs)

Review Sessions

- Very useful!
 - Review material
 - Present background
 - Answer questions
- Tuesdays at 5pm
- Usually in NSH 3305, but **check website for specific room each week**

All Text Books are Optional,
but very useful

- [*Machine Learning*](#), Tom Mitchell
- [*Pattern Classification \(2nd Edition\)*](#), Duda, Hart and Stork
- [*Neural Networks for Pattern Recognition*](#), Chris Bishop

Grading

- 5 homeworks (30%)
 - First one goes out 1/19
- Final project (20%)
 - More about project after Spring Break
- Midterm (20%)
 - March 14th
- Final (30%)
 - TBD by registrar

Homeworks

- Homeworks are hard, start early 😊
- Due in the beginning of class
- 3 late days for the semester
- After late days are used up:
 - Half credit within 48 hours
 - Zero credit after 48 hours
- All homeworks **must be handed in**, even for zero credit
- Late homeworks handed in to Sharon Cavlovich, WEH 5311
- Collaboration
 - You may **discuss** the questions
 - Each student writes their own answers
 - Write on your homework anyone with whom you collaborate

Enjoy!

- ML is becoming ubiquitous in science, engineering and beyond
- This class should give you the basic foundation for applying ML and developing new methods
- The fun begins...