CSE 575
Statistical Machine Learning

YooJung Choi
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Goal

- Be able to recognize key paradigms in machine learning
- Understand the foundational concepts behind machine learning algorithms
- Apply ML algorithms to new problems & identify existing challenges in the field

Prerequisites

- Probability
- Linear algebra
- Algorithms
- Programming

- Self-evaluation test

Course logistics

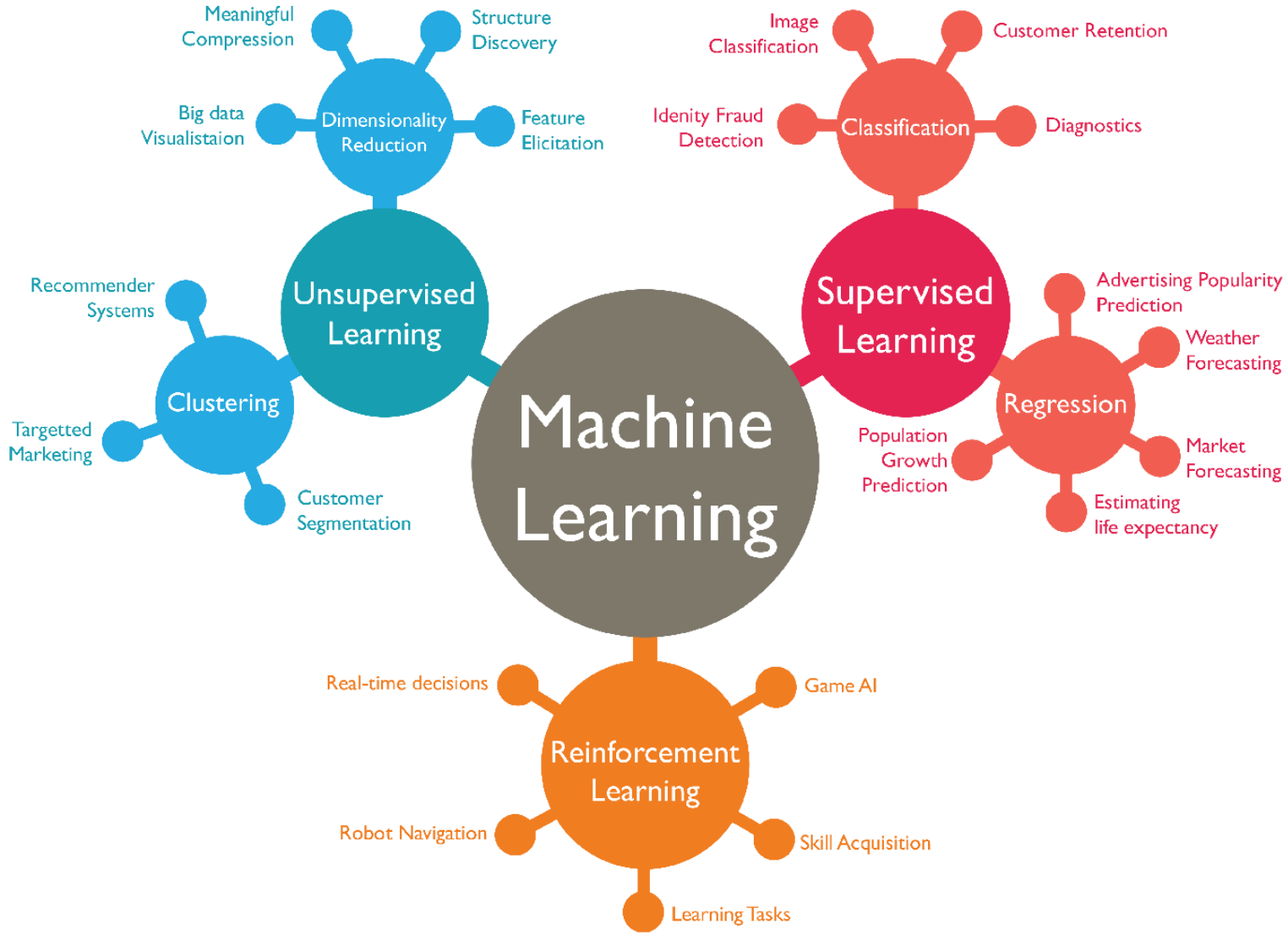
- Homework assignments (30%), two midterms (40%), final project (30%)
- Project:
  - Open-ended project
  - ~5 students / group
  - Project proposal (10%), report (10%), presentation (10%)

Course policies

- Late policy: penalized by 25% per each day late
- Grade appealing: within one week from posting of grades
- Academic honesty:
  - All submitted work must be your own.
  - Any student suspected of copying or plagiarism *will be reported.*
- Make-up policy:
  - Anticipated absence: provide proper documentation at least 7 days before
  - Illness/medical emergency: provide documentation from a health professional ASAP
- Students needing accommodations: contact SAILS https://eoss.asu.edu/accessibility

What is machine learning?

- Arthur Samuel (1959): “Field of study that gives computers the ability to learn without being explicitly programmed”
- Tom Mitchell: "A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T, as measured by P, improves with experience E."



[Image via Abdul Rahid]

Tentative schedule

Textbook: Pattern Recognition and Machine Learning, Christopher M. Bishop, 2006.

1. Intro & basic terminology: 1 week
2. Probability theory basics (Chapter 1): 1 week
3. Probability distributions (Chapter 2): 1 week
4. Linear models for regression & classification (Chapters 3&4): 2 weeks
5. Support vector machine (Chapter 7): 1 week
6. Neural networks (Chapter 5): 2 weeks
7. Graphical models (Chapter 8): 1 week
8. Clustering & mixture models (Chapter 9): 1 week
9. Principal component analysis: 1 week

Self-evaluation test