CSE 150 - Spring 2018
Introduction to Artificial Intelligence:
Probabilistic Reasoning and Decision Making

Prof. Lawrence Saul

Administrivia	Syllabus	Piazza	GradeSource	CAPEs

Subject

This course will introduce students to the probabilistic and statistical models at the heart of modern artificial intelligence. Specific topics to be covered include: probabilistic methods for reasoning and decision-making under uncertainty; inference and learning in Bayesian networks; prediction and planning in Markov decision processes; applications to intelligent systems, speech and natural language processing, information retrieval, and robotics.

Prerequisites

This course is aimed very broadly at undergraduates in mathematics, science, and engineering. Prerequisites are elementary probability, linear algebra, and calculus, as well as basic programming ability in some high-level language such as C, Java, Matlab, R, or Python. (Programming assignments are completed in the language of the student's choice.) Students of all backgrounds are welcome.

Texts

The course will not closely follow a particular text. The following texts, though not required, may be useful as general references:

1. K. Korb and A. Nicholson, Bayesian Artificial Intelligence.
2. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach.
3. R. Sutton and A. Barto, Reinforcement Learning: An Introduction.

Instructors

1. **Lecturer:** Lawrence Saul (saul@cs.ucsd.edu)

2. **Teaching assistants:**
   Sparsh Gupta (spg005@ucsd.edu)
   Simran Kapur (sikapur@ucsd.edu)
   Harsh Kumar (h1kumar@ucsd.edu)
   Aishma Raghu (airaghu@ucsd.edu)
   Nitesh Sekhar (snitesh@ucsd.edu)
   Nemil Shah (nbshah@ucsd.edu)

Meetings

1. **Lectures:** Tue/Thu 3:30-4:50 pm, Center 109.

2. **Instructor office hour:** Fri 10-11 am, EBU3B-3214.

3. **Discussion sections:**
   Mon 3-4 pm, HSS 2154 (Sparsh)
   Mon 5-6 pm, HSS 2154 (Harsh)
   Wed 11-noon, WLH 2206 (Nemil)
   Wed 5-6 pm, WLH 2115 (Nitesh)
   Fri 11-noon, SEQUO 147 (Simran)
   Fri 1-2 pm, HSS 2154 (Aishma)

4. **TA office hours:**
   Mon 11:30-12:30 pm, CSE B250A (Aishma)
   Tue 11-noon, CSE B250A (Sparsh)
   Wed 1-2 pm, CSE B250A (Nitesh)

Thu 12-1 pm, CSE B260A (Nemil)
Thu 2-3 pm, CSE B250A (Harsh)
Fri 2:30-3:30 pm, CSE B250A (Simran)

5. **Final exam:** Mon June 11, 3-6 pm

Grading

1. **homework** (30%) - best 6 of 7
2. **midterm exam** (20%)
3. **final exam** (50%)

Syllabus

Tue Apr 03	Administrivia and course overview.	
Thu Apr 05	Modeling uncertainty, review of probability.	
Tue Apr 10	Examples of probabilistic reasoning.	HW 1 out.
Thu Apr 12	Belief networks: from probabilities to graphs.	
Tue Apr 17	Conditional independence, d-separation.	HW 1 due. HW 2 out.
Thu Apr 19	Inference in polytrees and loopy networks.	
Tue Apr 24	Learning, maximum likelihood estimation.	HW 2 due. HW 3 out.
Thu Apr 26	Naive Bayes and Markov models.	
Tue May 01	Latent variable models, EM algorithm.	HW 3 due. HW 4 out.
Thu May 03	Examples of EM algorithm.	
Tue May 08	Hidden Markov models, speech recognition.	HW 4 due.
Thu May 10	Viterbi and forward-backward algorithms. Belief updating.	
Tue May 15	**Midterm exam**	HW 5 out.
Thu May 17	Reinforcement learning.	
Tue May 22	Markov decision processes.	HW 5 due. HW 6 out.
Thu May 24	Policy evaluation, improvement, and iteration.	
Tue May 29	Bellman optimality equation, value iteration.	HW 6 due. HW 7 out.
Thu May 31	Temporal difference learning, Q-learning.	
Tue Jun 05	TBA	
Thu Jun 07	TBA	HW 7 due.
Mon Jun 11	**Final exam**	