Crowdsourcing for Computer Vision (INF385T)
University of Texas at Austin School of Information

Class Meetings
Wednesdays 3-6pm
UTA 1.210A

Instructor
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Course Overview

Summary
This class will cover fundamental and state-of-art problems in computer vision, the sub-discipline of artificial intelligence that tries to create computers that can "see". Students will explore this field through examination of the human-based challenges faced when teaching computers to see. Classes will be a mix of lectures and hands-on training to develop practical skills in web development and crowdsourcing.

Objectives
By the end of the course, the goals are for students to:

1. Recognize core and cutting edge computer vision concepts, a critical precursor to effective collaborations in industry or academia. Towards this aim, students will:

   - Critique research papers that establish the datasets which define and promote computer vision problems for investigation by the research community at large

2. Design crowdsourcing systems that can be harnessed to efficiently create high quality "big" datasets. Towards this aim, students will:

   - Evaluate crowdsourcing systems discussed in computer vision research papers
   - Employ Amazon Mechanical Turk (AMT) workers via an application programming interface (api)
   - Utilize command line tools

3. Create interactive web pages for generating computer vision datasets. Towards this aim, students will:

   - Architect web tools using HTML and CSS
   - Develop programming skills by writing code in Javascript

4. Understand the key ideas in machine learning. Towards this aim, students will:

   - Characterize the process to train and test machine learning algorithms
   - Experiment with various machine learning algorithms

5. Conduct and communicate original research. Towards this aim, students will:

- Propose a novel research idea (this will be an iterative process)
- Design and execute experiments to support the proposed idea
- Write a research paper about the project (and possibly submit it for publication)
- Present the project to the class

Prerequisites
While there are no requirements, a background in programming will be helpful.

Website
https://www.ischool.utexas.edu/~dannag/Courses/INF385T/

Class Participation
Students are expected to attend every class. Every student should demonstrate ongoing engagement in class discussions and complete the material discussed in every lab session.

Reading Assignments
Students will have weekly assigned readings with associated questions to answer about the material. Each assignment description will be posted on the course website before the due date. These assignments will offer training in thinking critically about existing computer vision research and brainstorming novel research ideas to fill existing gaps/problems. Each assignment must be submitted in Canvas by 11:59pm on its due date.

Lab Assignments
Four lab assignments will be assigned for the first half of the course. Each assignment description will be posted on the course website before the due date. These lab assignments will develop students' skills to build systems similar to those described in the weekly readings. Each assignment must be submitted in Canvas by 11:59pm on its due date.

Final Project
Assignments related to the final project will be due during the second half of the course. Details about each assignment will be posted on the course website prior to its deadline. The goal for the final project is to further develop students' skills in conducting and communicating original research.

Tentative Schedule

Date	Lecture Topic(s)	Lab Topic(s)	Assignment(s) Due
Week 1	Introduction	HTML	
Week 2	Object Recognition	HTML, CSS	Readings
Week 3	Crowdsourcing, AMT	AMT GUI	Readings, Lab 1
Week 4	Scene Classification	Javascript	Readings
Week 5	Attribute Labeling	Javascript, Development Tools	Readings, Lab 2
Week 6	Object Detection	Javascript	Readings
Week 7	Segmentation	Command Line	Reading, Lab 3
Week 8	Video Annotation	Javascript	Readings, Pre-Proposal
Week 9	Machine Learning	Machine Learning Tools	Readings, Lab 4
Week 10	Images and Language	Javascript	Readings, Proposal
Week 11	3D Vision	Javascript	Readings
Week 12	Subjective Problems	Open Lab	Readings, Outline
	No Class (Thanksgiving Break)		
Week 13	Crowd-Powered Systems	Open Lab	Readings
Week 14	*Students' Project Presentations*		
	NA	NA	Peer Project Review
	NA	NA	Project Write-Up

Grading

Final course scores will be calculated as follows:

	% of Final Class Grade
Class Participation	10%
Reading Assignments	20%
Lab Assignments	30%
Final Project	40%

Final course scores represent the following grades (scores are rounded to the nearest integer):

Grade	% of Final Class Grade
A+	97-100%
A	94-96%
A-	90-93%
B+	87-89%
B	84-86%
B-	80-83%
C+	77-79%
C	74-76%

For detailed information about what grade is required for you to receive credit for this class, please refer to UT's Graduate Catalog. For example, students in the School of Information (iSchool) are required to receive a grade of B or higher in order to include this course in their program of work toward graduation. In addition, the UT Graduate School requires a minimum grade of C or higher to count a course for credit.

Late Policy
Late submissions will be penalized 1% of the grade per hour up to 12 hours. After 12 hours, no credit will be given.

Resources

There are no required textbooks. We will draw heavily from research papers and online tutorials. Links to these resources will be posted on the course website for each class meeting.

Policies

Academic Honor Code
Students who violate University rules on academic dishonesty are subject to severe disciplinary penalties, such as automatically failing the course and potentially being dismissed from the University. Please do not take the risk. The following site offers more details: http://deanofstudents.utexas.edu/sjs.

Coping with Stress and Personal Hardships
Life can bring extreme challenges and unexpected, undesired surprises to each of us. If you are facing any personal difficulties in coping with your life experiences, please consider taking advantage of the incredibly valuable services available to you from the Counseling and Mental Health Center. Having support and assistance can make a huge difference when facing life difficulties.

Accommodations for Disability
If you qualify for accommodations because of a disability, please submit to me a letter from the Division of Diversity and Community Engagement, Services for Students with Disabilities in a timely manner so that your needs can be addressed. To determine if you qualify, please contact the Services for Students with Disabilities at 512-471-6259 (voice) or 512-471-4641 (TTY for users who are deaf or hard of hearing).

Excused Absences: Religious Observance and Military Service
A student will be given an opportunity to complete any work missed due to absences in observance of a religious holy day or military service. For a holy day, the student must notify me at least two weeks in advance of the absence. Please see the following link for more details: http://catalog.utexas.edu/general-information/academic-policies-and-procedures/attendance/. The student will not be penalized for excused absences, but must complete the missed material within a reasonable time after the excused absence.