CSC420: Intro to Image Understanding

Information Sheet

January 3, 2023

1   Course Description

This class is an introduction to fundamental concepts in image understanding, the subdiscipline of artificial intelligence that tries to make the computers "see". It will survey a variety of interesting vision problems and techniques. Specifically, the course will cover image formation, features, object and scene recognition and learning, multi-view geometry and video processing. The goal of the class will be to grasp a number of computer vision problems and understand basic approaches to tackle them for real-world applications.

2   Course Information

Semester	Winter 2023
Logistics	Lecture (GB 248): Mondays 14:00–16:00 Tutorials (GB 119): Wednesdays 15:00–16:00 TA Office Hours (BA 2270): Thursdays 10:00–11:00 Instructor Office Hours (BA 7228): Mondays 16:00–17:00
Webpage	https://www.cs.toronto.edu/~lindell/teaching/420/ Assignments will be posted on Quercus.
Forum	Ed Discussion TAs will try to answer unanswered questions within 2 business days. **Do not expect immediate response** from the TAs. Do not expect answers during the weekends.
Textbook	http://szeliski.org/Book/ Richard Szeliski's on-line textbook is a very good resource and is freely available online. We will assign readings from the Sept 3, 2010 version, but you can also check out the draft of the newer (2021) version on the same link. For newer topics we will assign papers and online material to read.
Assignments	https://markus.teach.cs.toronto.edu/csc420-2023-01/ Posted on Quercus and should be submitted on MarkUs. You will automatically be added to MarkUs if you're taking the course. Please do **not** email me or the teaching support staff if you are not on it yet at the beginning of the semesters. This will happen in a week or two.

3   Instructor

Name   David Lindell

Email   csc420-2023-01@cs.toronto.edu
        The instructor will not respond to CSC420 related emails sent to other addresses.
        You **must** include CSC420 in the subject line.
        Questions about the course material and assignments **must** be posted on the forum or asked during office hours.
        Do **not** attempt to send zip files via email, they will be deleted by the mail server.

4   TAs

Yun-Chun Chen
Anagh Malik
Shayan Shekarforoush

Please do **not** email the TAs directly to ask questions. Answering email questions is not part of their contract and they are instructed not to respond. Please post questions about the course material and assignments on the forum, or ask them during the office hours.

5   Grading

Assignments   64%
               There will be 4 assignments, posted every two weeks, starting with the second week. Assignments 1 will be worth 12% of the grade. Assignment 2 will be worth 20% of the grade. And Assignments 3 and 4 will each be worth 16%. Assignments will consist of problem sets and programming problems with the goal of deepening your understanding of the material covered in class.

Ethics Module 1%
               2 surveys, 0.5 each.

Final exam   35%

6 Policy

Assignments	Individually! For each assignment, you are allowed to work together with **one** other student in class. However, you are still expected to write the solutions/code/report in your own words; i.e. no copying. If you choose to work together with another student, you **must** write this in your assignment submission. For example, on the first line of your **report.pdf** file (after your own name an information, and before starting your answer to Q1), you should have a sentence that says: *"In solving the questions in this assignment, I worked together with my classmate [name & student number]. I confirm that I have written the solutions/code/report in my own words".*
Attendance	You are expected to attend the lectures. I will expand on the slides, write down math proofs, etc. Materials I write down during the lecture are important for you to learn; so please attend and take notes if you want.
Deadline	The solutions to the assignments should be submitted by **11:59:00 pm on the date they are due**. Any submissions up to 24 hours after this will count as one late day.
Lateness	Each student will be given a total of 3 free late days (**grace tokens**). This means that one can hand in three of the assignments one day late, or one assignment three days late. It is up to the student to make a good planning of his/her work. After one has used the 3 day budget, the late assignments will not be accepted.
Plagiarism	We take plagiarism very seriously. Assignments must represent your own work. Read how not to plagiarize here.
Remark requests	Must be submitted within 1 week of graded assignments being returned. Will not be accepted afterwards.

Policy (cont'd)

Special Considerations	**Assignment Deadline Extensions** 1. Only request an extension on the assignment deadline if you really have a situation that warrants an extension <u>as you judge</u>. 2. Extensions longer than 7 days will not be granted under any circumstances. 3. In such cases, be aware that it may take much longer to grade and return your assignment. 4. Remember that an extension may take away time from working on subsequent assignments. 5. For non-emergent circumstances, please use your late days to extend the deadline rather than requesting an extension.

7 Deadlines

The table provides **tentative** dates on which assignments will be posted and their due date.

Term Work	Post Date	Due Date	Time to work on the assignment / Survey
Assignment 1	Monday Jan 9	Friday Jan 27	19 days
Ethics Survey #1	Monday Jan 30	Friday Feb 3	5 days
Assignment 2	Monday Jan 30	Friday Feb 17	19 days (including the reading week)
Ethics Survey #2	Monday Feb 13	Friday Feb 17	5 days
Assignment 3	Monday Feb 20	Friday Mar 10	19 days
Assignment 4	Monday Mar 13	Friday Mar 31	19 days

8 Course Schedule

A very **tentative** schedule for this term is as follows:

Week #	Dates	Topic
1	Jan 9	Introduction & linear filters
2	Jan 16	Edges
3	Jan 23	Image pyramids
4	Jan 30	Deep learning
5	Feb 6	Deep learning + ethics
6	Feb 13	Corner detection & optical flow
-	(reading week)	-
8	Feb 27	Scale-invariant keypoints & SIFT
9	Mar 6	Affine transformation & RANSAC
10	Mar 13	Camera models & homography
11	Mar 20	Homography (cont'd)
12	Mar 27	Stereo
13	Apr 3	Object detection