

CAP 4453 Section:V1 Was Face-to-face RobotVision Fall 2020

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In email, always put CAP4453 as the first word of the subject, you can then put your lastname in the subject. Email your phone number to niels@cs.ucf.edu soon

Course Topics: Processing Edges; Object Detection; Motion Processing; Convolutional Neural Networks; Deep Networks; Review of Current Research Topics

Pre-requisites: COP 3503C and MAC 2312, or C.I.

Textbook: No Textbook. All materials are provided electronically at the website: www.cs.ucf.edu/courses/cap4453, which is the official class website

Evaluation:

2 tests (41%); 4 programming assignments (18%); 1 project (41%).

Based on total score, grades are given as: W, A(>95), A-(>91), B+(>88), B(>84), B-(>81), C+(>78), C(>74), C-(>70), D+(>67), D (>63), D-(>=60), F (<60) and I (rarely)

Special Pandemic Requirements:

You must have a functioning webcam that enables video zoom sessions, and later on the webcam is needed for an actual programming assignment.

Taking Tests in this class:

There are two tests, one on September 22, the second on October 20.

There are several steps needed to take any single TEST in this class:

- 1) By September 2, you email to niels@cs.ucf.edu AND TO shahsharvil96@knights.ucf.edu your cellphone number, and your mailing address.
- 2) Six days before the scheduled TEST, we will postal mail to your address the paper TEST. When you receive it, DO NOT OPEN IT. Send a confirmation email to the two email addresses above that you have received the mail from us.
- 3) At the scheduled date/time for the TEST, you will get into the zoom session with your webcam so that we are able to watch you take the TEST. You will open the

outer envelope, pull out your TEST, spend the next allotted set of minutes taking the TEST, and when time is called (or if you finish earlier), you will put your written TEST in the return envelope, then seal it, and sign your name across the seal of the envelope.

4) Then you will affix a return postage stamp, that you will have purchased yourself, and then drive to your nearest postal office (please verify in advance that they are functioning) and give them the sealed envelope (if it is after hours, then drop it in the postal drop-box). If you wish, you can send the letter by certified mail. Please note that this a cost that you have to pay for.

Course Learning Outcomes:

- Become familiar with algorithms for edge detection, object detection using AdaBoost, motion computation, convolutional neural networks for multi-class recognition.
- Write programs for vision.
- Orally present explanations for a recent vision research paper.
- Become familiar with the process of reading a recent vision research paper.
- Use existing vision libraries to demonstrate vision capabilities.

Course Abstract: The study of mechanical vision is one of the few areas of science which blends one's intuition with formal methods. Vision (whether in humans or machines) is fundamentally a computational process. Visual processes for machines must be able to deliver the kinds of capabilities that humans have: scene recognition, motion processing, navigational abilities, and so forth. This course will begin by examining some of the elementary concepts in machine vision. Subprocesses to be examined include: edge detection, object detection, motion analysis, and convolutional neural networks for machine vision. The student will be exposed to unsolved problems in these topics, the solutions to which have very high technological pay-offs. The workload consists of interesting reading, programming, a written test and a report (oral and written) on a recent research publication. This class is suitable for undergraduate students in Computer Science and Engineering disciplines, and anyone else who wishes an introduction to machine vision.

===== Schedule of Dates =====

DATE	Test (41%)	Assignmt (18%)	Project (41%)
Thu, Sep 10		Assign 1	
Tue, Sep 22,	Test One 25%		
Sat, Sep 26		Assign 2	
Thu, Oct 15		Assign 3	
Tue, Oct 20	Test Two 16%		
Thu, Oct 22			Proposal
Tue, Oct 27			Presentation One
Fri, Oct 30		WITHDRAWAL DEADLINE	
Thu, Nov 12		Assign 4	
Thu, Nov 19			Presentation Two
Wed, Dec 2			Completed Proj Report

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VERY IMPORTANT NOTES:

1) Required Text: None; all notes will be handed out or written on the zoom board day-to-day or handeor provided on the class website. The student is responsible for collecting good notes.

2) You are required to attend every zoom class, except in case of an emergency, that is, if you are sick, or someone in your family is sick.

3) Every assignment is graded as ALL or NOTHING. So, you must get an assignment fully correct to get any points. No partial credit.

4) Sharing of homework code or homework solutions is not permitted. Also, when asked to write a program, you must actually write it yourself, and not obtain it from other sources, such as, some website or students from prior offerings of vision classes. Cheating will be dealt with severely. Also, read the Academic Integrity statement below.



Academic Integrity:

Students should familiarize themselves with UCF's Rules of Conduct. According to Section 1, "Academic Misconduct", students are prohibited from engaging in Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.

Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.

Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.

Falsifying or misrepresenting the student's own academic work.

Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.

Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.

Helping another violate academic behavior standards.

Accessibility:

UCF is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need disability-related access in this course should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <http://sas.sdes.ucf.edu> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371).

Safety:

We are an on-line class, so we do not have much to say about classroom safety, except that you should practice Covid safety whenever you can, this means wear a strong mask when you are near another human (who is not family), or when you go into enclosed buildings. Wash your hands often if you can.

Active Duty:

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements