CMP 719 - Computational Vision

Fall 2020

Course Description

The ultimate goal for computer vision is to develop a machine that mimics the human visual system. In this graduate level course, we will explore the main topics and the current state- of-the-art methods that are directed towards achieving this goal. In this context, we will discuss and explore the various computer vision topics, including image formation, feature detection, segmentation, multiple view geometry, recognition, image and video analysis.

Detailed Information

Instructor: Assoc. Prof. Nazlı İkizler-Cinbiş • `nazli@cs.hacettepe.edu.tr`
Schedule: Thurdays at 13:30-16:30.

Office Hours: By appointment.

Textbook: Computer Vision: Algorithms and Applications, by Richard Szeliski, 2010.

Supplementary Books:

- I. Goodfellow, Y. Bengio, A. Courville, *Deep Learning*, Book in preparation for MIT Press, 2016. `http://www.deeplearningbook.org`.

- Computer Vision: A Modern Approach (2nd Edition), by David A. Forsyth and Jean Ponce, 2012.

- Lecture notes and various recent published papers.

Communication: The Piazza page will be updated regularly throughout the semester with lecture notes, assignments and important updates. For all communications, check Piazza: *https://piazza.com/hacettepe.edu.tr/fall2020/cmp719*.

Grading (Tentative):

- Quizzes (10%)

- Paper presentation (15%)

- Programming assignment (10%)

- Midterm exam (25%)

- Project (40%)

Project: In the context of the course, the students are expected to carry out an in-depth project on computer vision involving deep learning techniques. This project will have either one of the following themes:

- Replicate an interesting paper and extensive comparisons

- Compare different methods on a testbed

- A new approach to an existing problem

- Original research

Topic List:

1	Introduction to computer vision
2	Color and filters
3	Fitting
4	Interest Points
5	Clustering
6	Recognition
7	Deep Learning
8	Deep Learning-2
9	Convolutional Neural Networks
10	Detection
11	Video Processing
12	Sequence Processing
13	Zero-shot recognition

Academic Integrity:
The students are expected to strictly adhere to the academic integrity policy of the Department, act honestly and respect the rights of the others in carrying out all academic assignments. Academic dishonesty, including cheating, fabrication and plagiarism will not be tolerated. Unless stated otherwise, all the work on the assignments must be carried out individually. While the discussions over the general concepts about the course are allowed, discussions related to a particular solution to a specific problem, (actual or pseudo) code sharing are strictly forbidden. Using assistance from the internet without providing proper citation is also considered as violation of the academic integrity. Note that, all the aforementioned violations to academic integrity policy are subject to disciplinary action.