COMP 411 (01) COMPUTER VISION WITH DEEP LEARNING

Fall 2024

1. Course Information

Instructor:	Fatma Güney, FGUNEY@ku.edu.tr
KU Credits:	3.00
ECTS Credits:	6.00
Prerequisite(s):	Prerequisite: ENGR 421 or concent of the instructor
Class Location & Meeting Times:	SNA A42 - Monday, Wednesday 08:30-09:40
PS (Yes/No):	No
DS (Yes/No):	No
Lab (Yes/No):	No
Language of Instruction:	English
Office Hours:	TH, 16:15-17:15

2. Course Description

Understanding, implementing, training and debugging deep end-to-end neural network architectures for various tasks of computer vision. Image classification. Loss functions and optimization. Backpropagation. Convolutional neural networks. Recurrent neural networks for video and image analysis. Object detection and segmentation. Generative vision models.

3. Course Overview

Recent developments in deep learning have greatly advanced the performance of the state-of-the-art visual recognition systems and have thereby revolutionized the field of computer vision. This course will focus on learning deep end-to-end neural network architectures for various tasks of computer vision. Topics will include; convolutional neural networks for visual recognition; image classification; object detection and segmentation; recurrent neural networks for video analysis; generative models for image synthesis, self-supervised learning, transformers for image data. The course will involve programming assignments (in Python), in-class quizzes, a written exam as well as a course project, and will assume an introductory-level machine learning background. Some proficiency in Python will be very helpful.

Prerequisite: ENGR421 or equivalent.

Grading: There will be a single exam at the end of the semester. Homework assignments and in-class quizzes will be given on a regular basis throughout the semester. Homework assignments will involve programming in Python. An important part of the course is the term project. By the first month of the semester, every student will have chosen a topic for their project. Term project will involve design and implementation of a deep end-to-end neural architecture for a computer vision task. The task that you address can be any computer vision task; related to your research area or to some application of your interest. As your project, you can also implement a deep learning architecture/method/application described in a paper from relevant literature. A project presentation and report will be required.

4. Course Learning Outcomes (CLOs):

CLO #	**Upon successful completion of this course, students will be able to**…
1	understand cutting-edge research in computer vision in depth

2	implement, train and debug deep learning architectures to solve computer vision problems

5. Assessment Methods

Method	Description	Weight %
Homework	Programming assignments	35.00
Quiz	In-class	15.00
Written Exam	Final	20.00
Project	Term project	30.00
	Total:	100.00

6. Instructional Material and Learning Resources

- Deep Learning Book
  Author: I. Goodfellow et al.
  Publisher: MIT Press
  Material Type: Textbook
  Material Status: Recommended
- Active Use of Course Page on Blackboard: https://ku.blackboard.com/
- KOLT Tutoring: No Service Available

7. Course Schedule

Meeting Times	Subject

8. Student Code of Conduct and Academic Grievance Procedure

Student Code of Conduct

Statement on Academic Honesty with Emphasis on Plagiarism

Academic Grievance Procedure

9. Course Policies

All classes will be held face-to-face in the designated classroom, there will be pop-up quizzes during the class.The written exam will be given face-to-face, whereas homeworks will be delivered online. All announcements regarding the courselogistics and assignments as well as course resources and lecture slides will be made available throughthe course website on LearnHub.

10. Other

Moral Expectations: The students taking this course are expected to submit their own work in all exams, homeworks and quizzes. In quizzes, students show how well they have learnt the recent material. Therefore they must not exchange any information. In homeworks, students enhance their knowledge and show their skills. While doing homeworks, they can have ideas or tips from others on how to do things, but they must not exchange any material, work together, or let others do their work (even partially). In exams, all forms of information transfer between students are prohibited. Finally, being a part of a dishonest plot intentionally (for example, helping others cheat, doing others' homeworks, giving your homeworks to others) will also be considered as cheating. Please be aware that, in past semesters, a number of students had to face the Disciplinary Committee for various incidents of academic dishonesty in computer engineering courses.

Disclaimer: See also the disclaimer information on face-to-face and online class recordings.