

ECE 4310/6310 Introduction to Computer Vision

Fall 2026

Objective

The purpose of a computer vision system is to take data (usually in the form of one or more images) and produce information. For example, a computer vision system might inspect bottles for proper volumes, identify abnormal tissue in a medical image, recognize a fingerprint to allow entry to a building, or tell an automated door when it is safe to close. This course teaches the mainstream theories of computer vision used to build such systems. The first part of the course covers classic computer vision. The second part covers machine learning and the use of modern neural network models (note we do not learn how to train models, just how to use them). The third part of the course covers object tracking methods. The fourth part of the course covers topics related to 3D data.

It is assumed the student has a solid mathematical background and is proficient in Python programming. Upon successful completion of the course, students will be able to apply mainstream computer vision theories in the engineering (design, implementation, testing and debugging) of modern devices and systems. Graduate students will additionally be ready to apply computer vision to research problems.

Suggested Text

None. We will strictly use online resources.

The course web site is <http://www.cecas.clemson.edu/ahoover/ece431/>.

CVonline: <http://homepages.inf.ed.ac.uk/rbf/CVonline/>

OpenCV tutorials: <https://docs.opencv.org/5.0/tutorials/tutorials.html>

OpenCV tutorial in Python: <https://www.geeksforgeeks.org/python/opencv-python-tutorial/>

Professor

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office hours walk-in anytime, or by appointment

Topics

Classic computer vision methods (4 weeks)
Machine learning methods (4 weeks)
Motion tracking sensors and algorithms (3 weeks)
3D sensors and algorithms (2 weeks)
Computer vision system demos (2 weeks)

Grading

20% in-class exercises
80% four multi-week lab exercises (20% each)
ECE6310: 10% of each of the four multi-week lab exercises will be based on AI code review

Attendance, Academic Integrity, Access Accommodations

This course follows all the procedures outlined in the ECE Common Course Syllabus.