

**FACULTY MENTOR** Javidi, Tara

**PROJECT TITLE** Real-time Object detection and Tracking for Self-driving Cars, Assistive Drones, and Smart Homes

### PROJECT DESCRIPTION

Humans possess the remarkable capability of understanding the visual world in every salient detail without exhaustively processing all the boring bits in the scene. This is possible as our visual understanding “algorithm” has a built-in attention mechanism that gradually routes its computational resources towards parts of the visual world that can contribute to better understanding. In the realm of computer vision, our prior work has shown that by processing a scene in a top-down, recursive manner, it is possible to find small objects in the scene much more efficiently. This is strong empirical evidence that inspires the following questions we intend to answer in this project: (1) How to tailor the current neural network design to have a top-down processing mechanism implemented more efficiently? (2) Can this method be ported to related video applications, such as real-time object detection and tracking by drones? (3) Can this method be helpful for pedestrian safety in self-driving car applications?, and (4) Can such hierarchical techniques be used for smart home and city applications?

**INTERNS NEEDED** 1-2 MS Students AND 1 Undergrad Student

### PREREQUISITES

Candidates are expected to be extremely comfortable coding in Python with basic knowledge of statistics and DSP. Familiarity with SDK programming and/or with basic computer vision techniques is a plus.

