

CSE 634: Project Proposal

Due on Autumn 2011

Prof. James W. Davis 9:30

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Outline

- **Project idea:** quadrotor object tracker
- **Data source:** streaming video feed from embedded quadrotor video camera
- **Development and Code:** quadrotor video feed processing and pilot software in C++.
- **Evaluation:** the quadrotor follows the intended object.
- **Member Tasks:**
 - Daniya: object detection and tracking algorithms
 - Michael: OpenCV, C++ implementation
 - Andrew: quadrotor control and integration, face recognition

Abstract

We propose to fly a toy quadrotor using machine vision techniques introduced in class. The toy quadrotor includes a 320 by 240 pixel color web cam and a Linux wireless network interface by which we may receive the web cam video feed and send simple flight commands from a laptop computer. The quadrotor is small, safe, and stable enough to be flown in class, but we will also prepare work based on recorded video in the case that the quadrotor fails unexpectedly.

Proposal One

We propose to track and follow a green object in flight for three minutes. To achieve this, we expect to use background subtraction, simple threshold object detection, noise filtering, moment calculation, motion detection, and object tracking. The quadrotor will attempt to keep the green object in the center of its view at a stable distance and will compensate for the angular tilt and instability as the quadrotor pitches, rolls, and drifts. When the quadrotor does not detect the green object in the upright position, it will hover in place.

Proposal Two

Extending the successful completion of Proposal One, rather than track an object, we propose to track and follow the face of one of the three team members. When the quadrotor fails to recognize the face presented in its camera, then the quadrotor will hover in place.