EECE 371 – Smart Embedded Systems

Fall 2018 - Project Proposal

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**Main** **Idea**

The Objective of this project is to gain a practical knowledge of machine learning and implement it into an embedded systems project. Our idea is to, using the Arduino MKR 4000 or similar MCU program (with the use of available libraries (some possibly requiring changes for our use case) allow a drone (built by us) to fly autonomously and recognize intruders using a camera and image processing. Ideally the drone would also be able to return to its base station to charge in between checks.

**Inputs**

1. GPS
2. Camera(s)
3. Ultrasonic sensors
4. Wifi/rf
5. 6 or 9 axis IMU

**Outputs**

1. Wireless video transmission

**Why is this a smart embedded system?**

This project would use image processing and machine learning to navigate a structure and identify intruders within a commercial building and maintain visual while sending the data to be logged off the drone in case of damage from intruders.

**Components**

1. GPS sensor
2. Electronic speed controllers
3. 9 axis IMU
4. Ultrasonic sensors
5. LiPo battery
6. Computer or raspberry pi
7. Camera
8. RF transceiver

**drone continuously relays video over RF or WiFi and Returns to base location using GPS after a set time if no disturbance is identified.**

**external signal is sent to the device controlling the drone (Arduino)**

**When the drone arrives at the disturbance it should Identify the disturbance (assumed to be a human)**

**The drone begins to navigate towards the disturbance using machine learning algorithm**

**The drone flies upward using the ultrasonic sensor to judge distance.**

**Arduino activates ESC’s and checks orientation using the IMU (inertial measurement unit)**