Rescue Robotics: Autonomous Quadcopter

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Background

The goal of this project is to design, build, and test quadcopters to search for survivors of natural disasters by utilizing autonomous flight from a microcontroller. We have teamed up with local high schools to create a competition called Rescue Robotics for their robotics programs. Our job is to do the research and provide guidance to the students and faculty as they create their own autonomous quadcopters. The competition is scheduled for May 15, 2016 in Aldrich Park.

Objectives

- Build a quadcopter using software and hardware user-friendly enough for high school students
- Autonomously navigate to victims of disasters, take a picture of the victim, and log their position
- Present documents and information to high school teachers participating in the competition

Main Components

- **APM Flight Controller** – controls the motors and flight of the quadcopter
- **Arduino microcontroller** – creates communication between the flight controller, Pixycam, and GPS
- **Pixy Cam** – detects colored object
- **GPS** – logs position of object




Purpose

The main purpose of this project is to help high school students develop interest and technical ability in STEM (Science, Technology, Engineering, Mathematics) education.

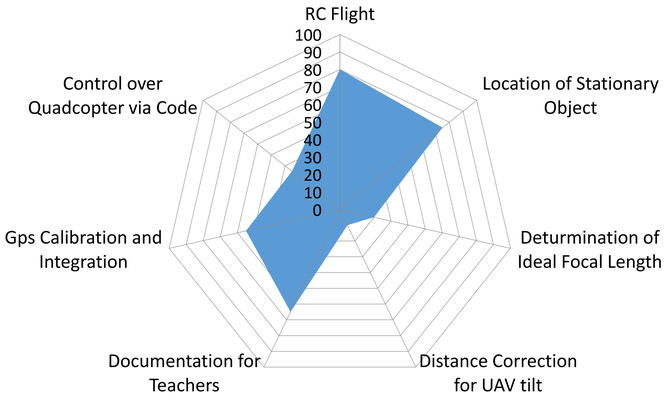
Current Status

- RC transmitter is able to control the flight of the prototype quadcopter but stability is still an issue
- Pixy Cam is capable of detecting colored objects and relaying the relative position of the object back to the Arduino
- A handheld camera mount apparatus is used to track objects since the quadcopter is not ready to fly
- We have not reached precise location, just general direction in real time
- Preparation for our first workshop with local high school teachers is underway

Next Steps

- Stabilize flight under RC control
- Write code to travel towards correct object and accommodate for inaccurate distance readings when UAV is tilted
- Experiment with additional sonic tools and rangefinders to determine a more precise measurement of our height
- Experiment with lenses to find good focal length of camera to ideally balance the distance we can be from objects while still accurately tracking them
- Create multiple strategies to systematically locate all objects on the competition field while spending the least amount of time searching

Percent Completion of Major Tasks



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