Goals
- Use active sensing technology to help drones avoid collisions while in flight
- Have drones automatically shift direction away from the detected obstacle
- Increase drone efficiency by lowering energy usage and shortening travel times
- Fundamentally change the drone market

Motivations
An overwhelming majority of drones lack a key feature that is holding back this technology from worldwide prevalence and adoption. Drones have the capability of becoming regularly used recreational and professional tools. One of the missing features is efficient collision avoidance. An autonomous flight with an automatic detection of obstacles is the last piece of the puzzle to a drone-filled efficient world.

Challenges
- Moving vs. static obstacles
- Range of sensors
- Balancing Issues
- Costly Parts
- Reading voltages through an Arduino

Methodology
- The APM (ArduPilotMega) will send out a voltage proportional to the amount of force applied by the user to the throttle, pitch, or yaw on the RC Controller.
- Ultrasonic sensors (US-4) attached to each of the drone’s arms send out a sound wave that will reflect off objects within range.
- The time that it takes from transmit to return will be used to calculate the distance and position of the closest objects.
- An Arduino, attached to the bottom of the drone, increases the voltage in steps of 0.2V to the APM voltage in order to control the electronic speed which will speed up the motor closest to the detected object, thus moving the drone away from this object.

Flight Controller
A circuit board with a 3 axis gyro. that serves to directing the RPM to each motor.

Microcontroller
Serves as a middleman between the APM and the sensors, sending voltage sources to the appropriate motor.

Sensor
Detects obstacles within the sensor’s range by sending out a pulse width signal.

Electronic Speed Controller
Controls the speed of the motors by administering a voltage between 0 and 5V.

Design

Specifications
- Weight: 1.587 kg
- Flight Time: 7 minutes
- Sensor Range: 500 cm

Future Work
- Camera
- More Sensors
- Increased Flight Time
- Follow and Track User

Acknowledgement
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