SE101 - Lab Project

Our aim is to create a phone app-controlled drone. The main components of the drone are the frame, the propellers, the motors, the transceiver module, and the arduino board. Using the built-in accelerometer on an android phone, we want to develop an android app that allows the user to fly the drone via bluetooth. The movement of the drone will be controlled with both accelerometer based inputs and button inputs. We will need to build the drone and program the motors to be able to receive different amounts of power in order to perform the movements we want it to. As well, the android app must be able to relay this information to the arduino board on the drone.

We will be creating an evolutionary prototype for this project. We will begin by creating a basic frame, and first figuring out how to physically attach the motors and battery to the Arduino board. We will also need to program the Arduino board to control the power we send to the motors. Once we are able to ensure the motors work, we will attach the propellers and integrate very basic rising and falling movement, without the use of accelerometers. To do this we will need to attach the bluetooth module and send signals from the app to it. This will be the basis of our first prototype. Since the requirements for our project are not exact, we will be using evolutionary prototyping and continue to build on the same copy of the prototype until it becomes the final version. Next, we will create a proper, sturdy frame to ensure the drone will be able to survive crashes during testing. We will continue to develop the app and integrate the accelerometer into the input as opposed to solely button-based input.

Software:

- Android app - Java
- Working with the accelerometer and properly sensing tilt movement of the phone
- Taking the signals from the app and sending it to the drone
- Programming arduino board
- Making bluetooth module work

Hardware:

- Elegoo UNO R3 Arduino
- HC-05 Arduino Wireless Bluetooth Transceiver Module
- Gorilla Duct Tape
- Coreless Motors
- 4 Propellers
- Battery

One of the challenges we anticipate for performing this project will be in integrating the motors and propellers, and wiring them properly to the Arduino board. As we have never worked with this type of hardware before, this will prove to be a new, and difficult task.

Another challenge we anticipate is figuring out how to send wireless signals from the phone app to the drone's bluetooth transceiver. After we figure out how to send information to the drone and its motors, we can work on the specific details of the movements such as yaw, pitch and roll.