Qiuhan Wang - q349wang, Sri Koushik Nellutla - sk2999ne, Vichara Wijetunga - vnwijetu

Project Proposal

1. What will it do?
    a. We want to use the arduino to allow users to control the mouse functionality on a personal computer with the use of hand gestures. This includes the ability to click and browse with simple motions of the hand such as light pushes and left to right (or gyroscopic) movements. To demonstrate the ability of this mouse control we plan to develop a simple game which utilizes the gestures listed above.
2. Major Software Components of Project
    a. Since we are using gestures, we need software to read them. We plan to use Arduino Zero, a 32-bit extension of the Arduino UNO platform, and Adafruit LSM303 library will be used with a flora accelerometer.
    b. The project will be mainly written in C. To add the flora accelerometer functionality, we need to install the library from GitHub, but the coding will be done in C.
3. Prototype Plan (i.e Experimental vs Evolutionary)
    a. As discussed during the lecture the best approach for us initially would be to create an experimental prototype. With an experimental prototype we can test features one at a time to ensure we understand how a specific component works before attempting to add something new. Furthermore, if a component does not work the way we want to, then with an experimental prototype we can dismantle and start again.
4. The hardware we will use/have acquired
    a. There are 3 major hardware components which we will need for this project. The first is of course the arduino board. The board will allow us control over the different hardware devices which we plan to use. In addition, we will also need an accelerometer. This is crucial to our project as we need to be able to tell when there have been changes in direction in all 3-axis (x,y and z). These changes can then correspond to different mouse outputs. Finally we need a wi-fi module. In order to make our product more versatile and easy to use we need it to operate wirelessly and the wifi module can help set up a connection to a PC.
5. Anticipated Challenges
    a. One of the biggest challenges we may face is how to properly communicate between the main arduino board and the wifi module. We will need to ensure that the connection remains constant and data is transmitted accurately. If not, there will likely be latency between the user moving the controller and the display on the computer screen. Another challenge which we need to deal with is how to accurately process data received from the accelerometer. We need to ensure that the movements from the user can be translated into smooth mouse movements so that it is not difficult for users to use the controller.