Goal

- Our main goal was to create a way for people suffering from paralysis or degenerative diseases to be able to control devices using simple head movements.
- Using this control system, we aimed to control devices such as motorized wheel chairs.
- This goal was to implement a game using an accelerometer and gyroscope, as a proof of concept. We collected the data from the sensor and then processed the data into controls.

Motivations and Objectives

- Motivations
  - The current systems in place for people with limited mobility do not satisfy their needs for a reliable and affordable system that can be used to control everyday things. Our motivation was to fulfill these needs.
- Objectives
  - Our primary objective is to have real-time control of a computer game while processing and immediately using the live data outputted by a Shimmer Sensor.
  - Next, our objective was to broaden the scale and apply that control to many other programs and devices.

Research Challenges

- Due to unforeseen circumstances, we were unable to procure a Electroencephalography (EEG) device. In order to work around this, we decided to use an accelerometer and gyroscope.
- Challenges arose when figuring out a way for the Shimmer Sensor to communicate with the program in real time, due to the logging rate of the sensor and data processing time.
- Due to various forms of values that were output from the sensor, we found it very difficult to properly parse the data.

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Methodology

- Using the Shimmer Sensor, we first collect multiple signals from the x, y, and z axis.
- The sensor’s data is parsed and processed to separate accelerometer and gyroscope data, which is then passed into the program.

Results

- Computer Game Results – We found that a user with limited mobility would successfully be able to play the computer game with only using the movement of their head.
- The control signals corresponded to the following movements:

References