Movement Trainer & Real Time Investigator Alert System for the MR Environment

Overview
The sponsor provided us with the problem of tracking and quantifying head movement within a mock MRI environment. Some of the challenges facing the team included the ability to provide instantaneous real time motion detection and corresponding feedback to the researcher and subject. This project incorporated structural and electronic design as well as computer coding.

Objectives
Our objective for this project was to work efficiently as a team to meet all of the customer needs. We divided the project into parts along the way and assigned a team member or members to work on each step.

Approach
- Describe the approach your team took to solve the problem using a bulleted list of steps
- Discuss basic needs and define a specific problem statement with the sponsor
- Weekly face to face meetings with the sponsor to ensure project is on schedule to satisfaction
- Design initial basic concepts through individual and team brain storming
- Research existing solutions and similar
- Refine and weight customer needs
- Select a concept to go forward with by comparing our concepts with the customer needs
- Visit the sponsor and mock MR training environment multiple times to gather data
- Learn basics of computer coding to interpret data from IMU and Arduino
- Create CAD model of final headset design
- Fabricate a prototype by purchasing headphones, IMUs, Arduinos, and other structure material
- Validate that our product works by using in the mock MR environment and tracking head movement over time

Outcomes
- This project was successful at creating a design to track and quantify head movement in a mock MR environment as well as provide real time feedback to the researcher and subject.
- The sponsor and (in the future) the medical industry will save money and time would be wasted on error and movement filled MRI sessions.