

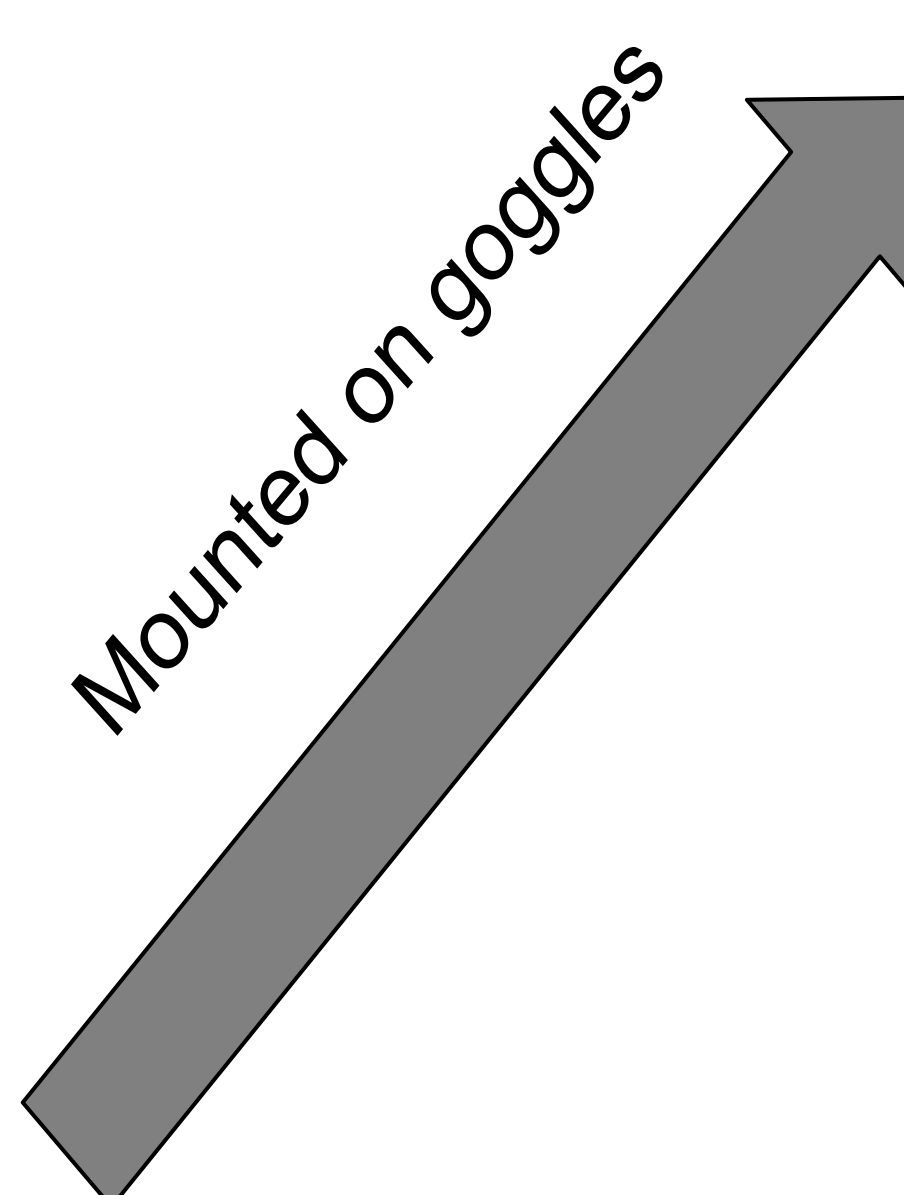
Assistive Gaze Tracking Headset

Kevin Chau, Tianyang Chen, David Arisumi, Shalin Modi

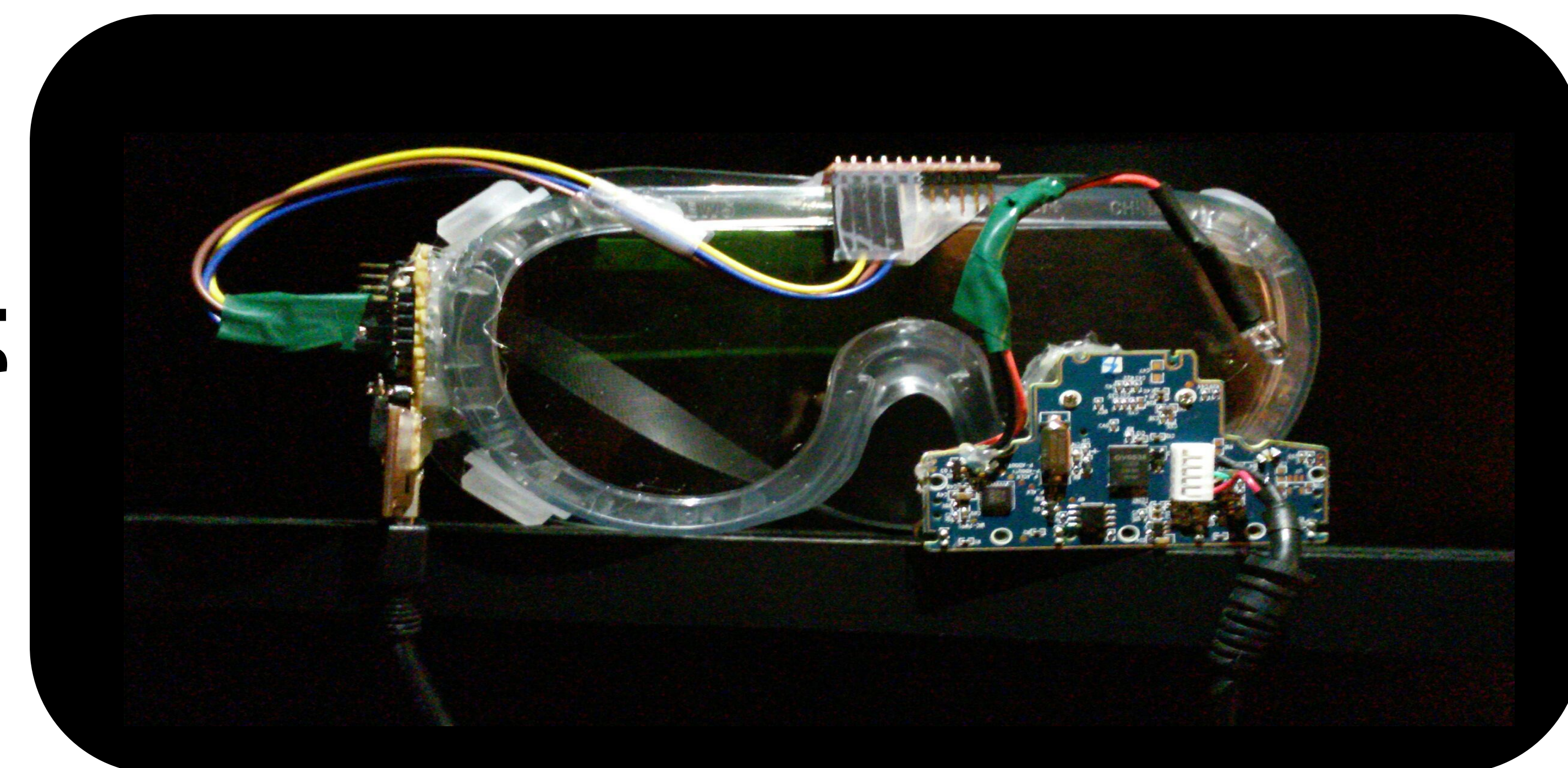
Advisors: Mingui Sun, Ching-Chung Li

Problem Statement

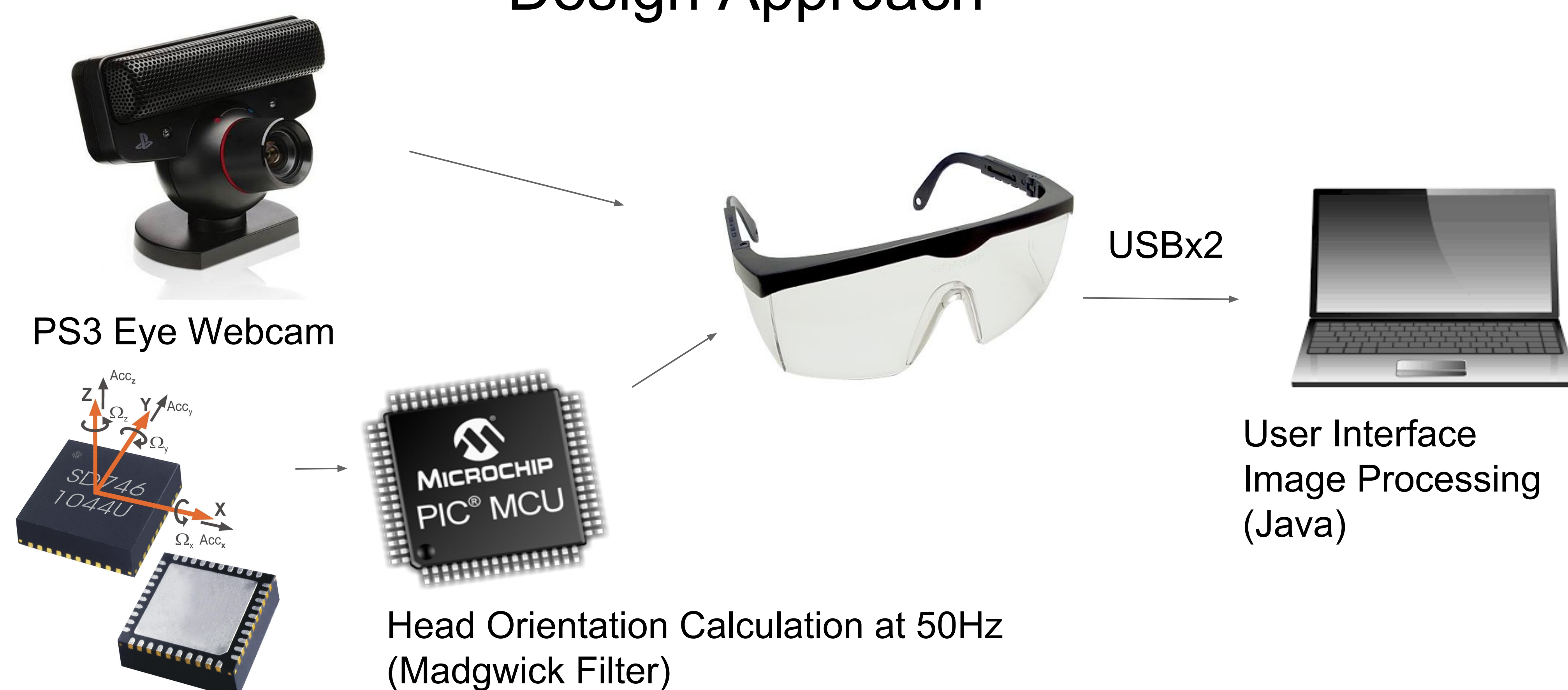
- Gaze tracking for use as an assistive technology
- Most systems require fixed head position and restrict head motion
- Flexibility of changing head orientation is crucial for computer interaction
- This project focuses on the tracking of the head and eye movement to determine the gaze
- Computer interaction by doing nothing more than looking
- Develop a low cost assistive device
- Make computer interaction easier and comfortable for people with disabilities



Prototype



Design Approach



Head Orientation

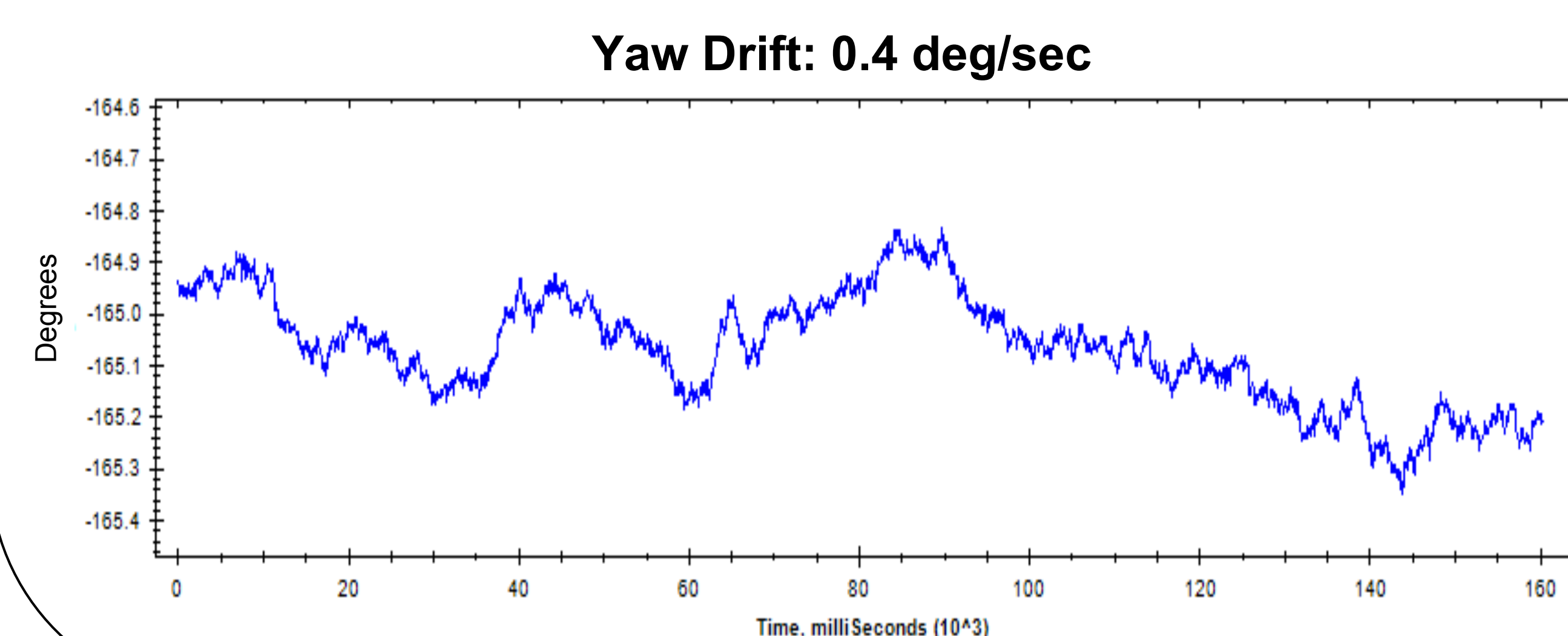
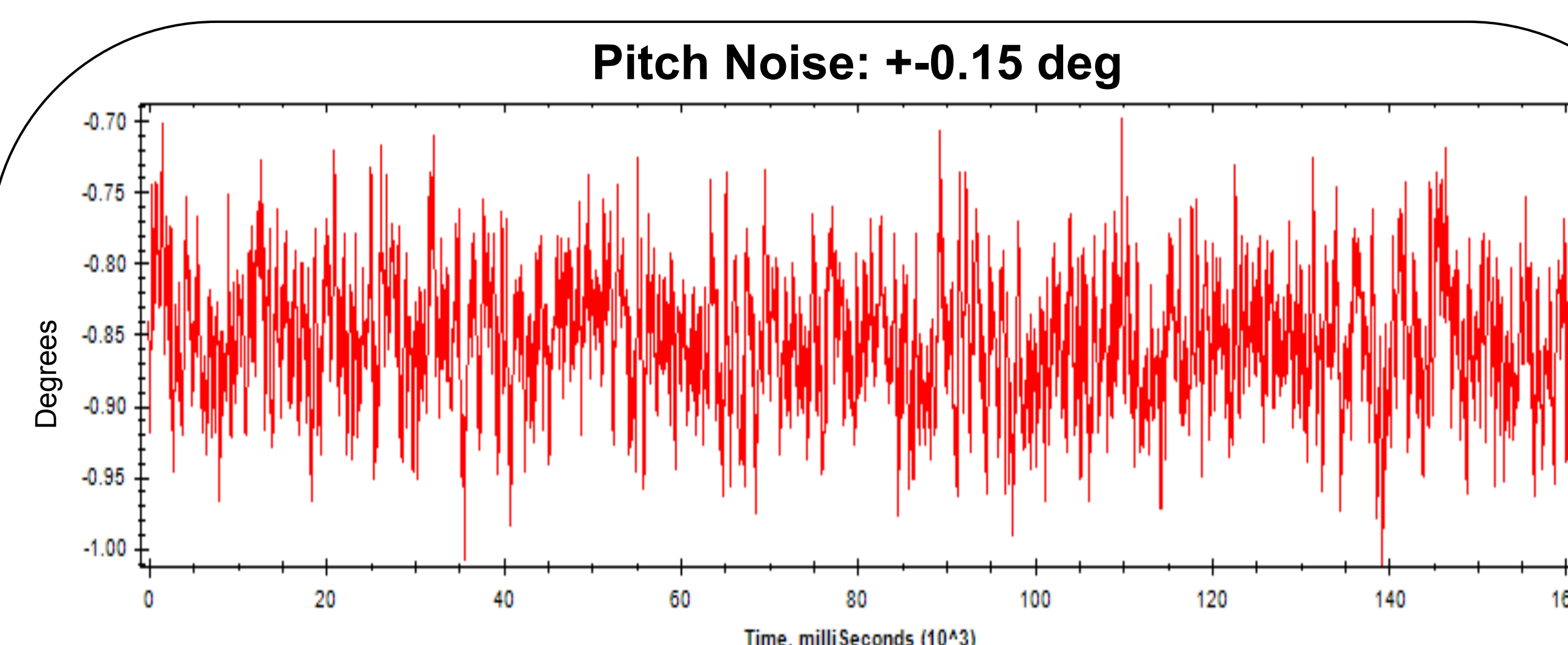


Image Processing

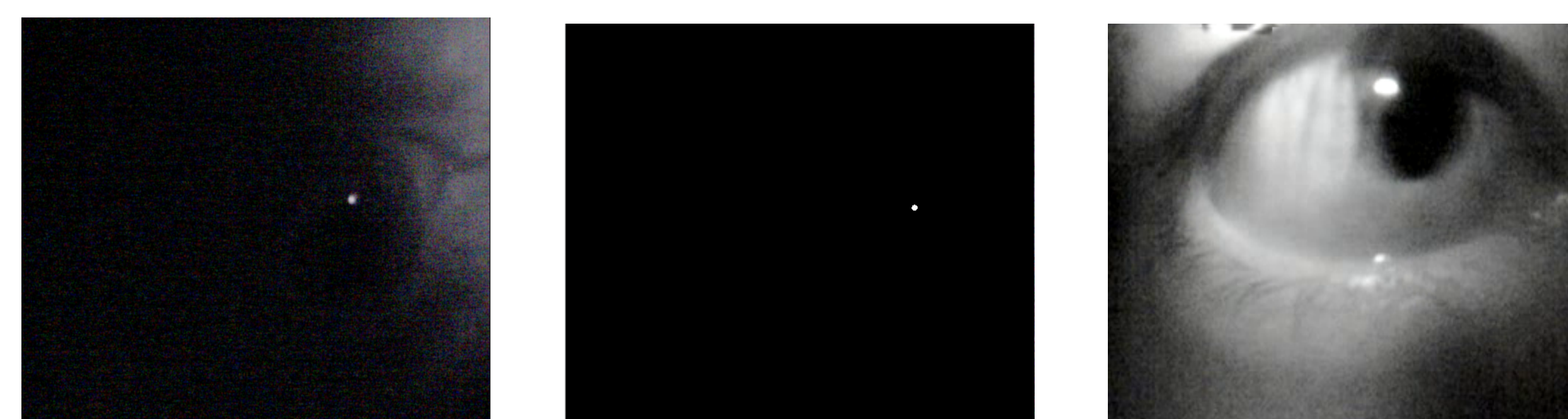
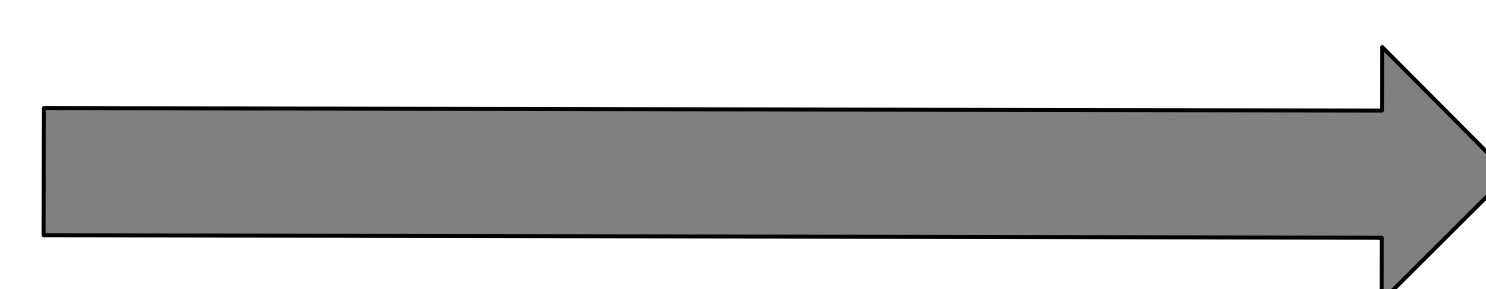


Image Taken From Camera

Image After Thresholding

Image of a moving eye

Testing With head tracking



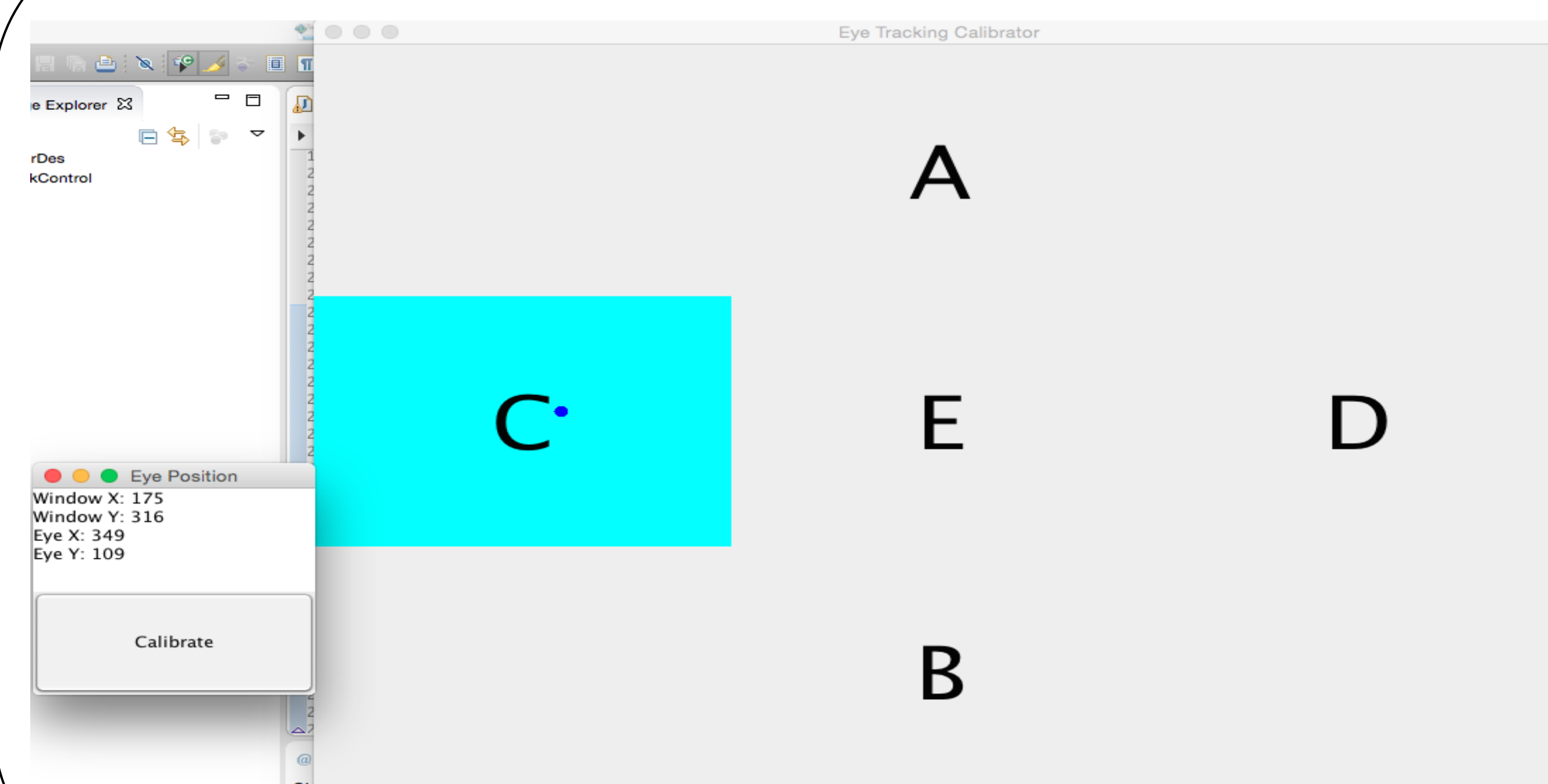
Sustainability

- All the parts are RoHS compliant.
- Total budget for a single device is \$68.25

Acknowledgment

- Dr. Wenyan Jia, Research Assistant Professor of Neurological Surgery.
- Dr. Steven Jacobs, ECE 1896 Senior Design instructor.

Detecting Quadrants



Conclusions and Future Work

- Combination of head tracking and eye tracking provides a low cost functional pointer interface.
- Input delay due to communication protocols and filtering may cause user discomfort. Eye strain can result from extended use.
- Future designs should improve comfort and reduce input delay.