

Objectives

1. Create a mechanical joystick to interact with multi-touch touchscreen devices and provide tactile feedback to the user.
2. Develop software to identify the joystick footprint, generate directional data, and output data to applications.

Background

Problems with Current Technology

- Imprecise
- No Physical Feedback
- Uncomfortable for Extended Use
- Lack of Tangible Objects
- Few Fully-Mechanical Joysticks

Value proposition

Why does it matter?

Solves Problems of Current Technology

- Precise Input
- Blind Touch
- Comfort

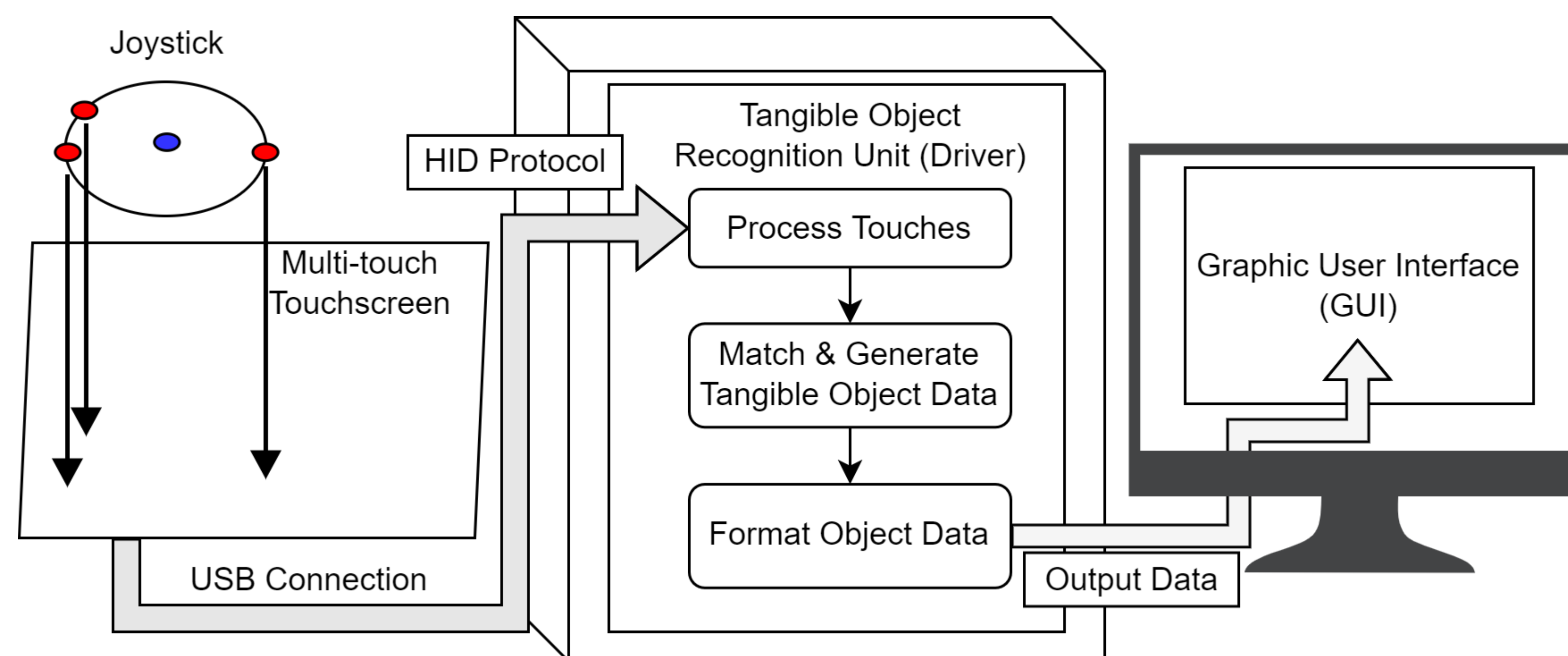
Real-World Applications

- Presenters – On-Screen Cursor
- Hobbyists – RC Car/Drone
- Doctors – Medical Instruments

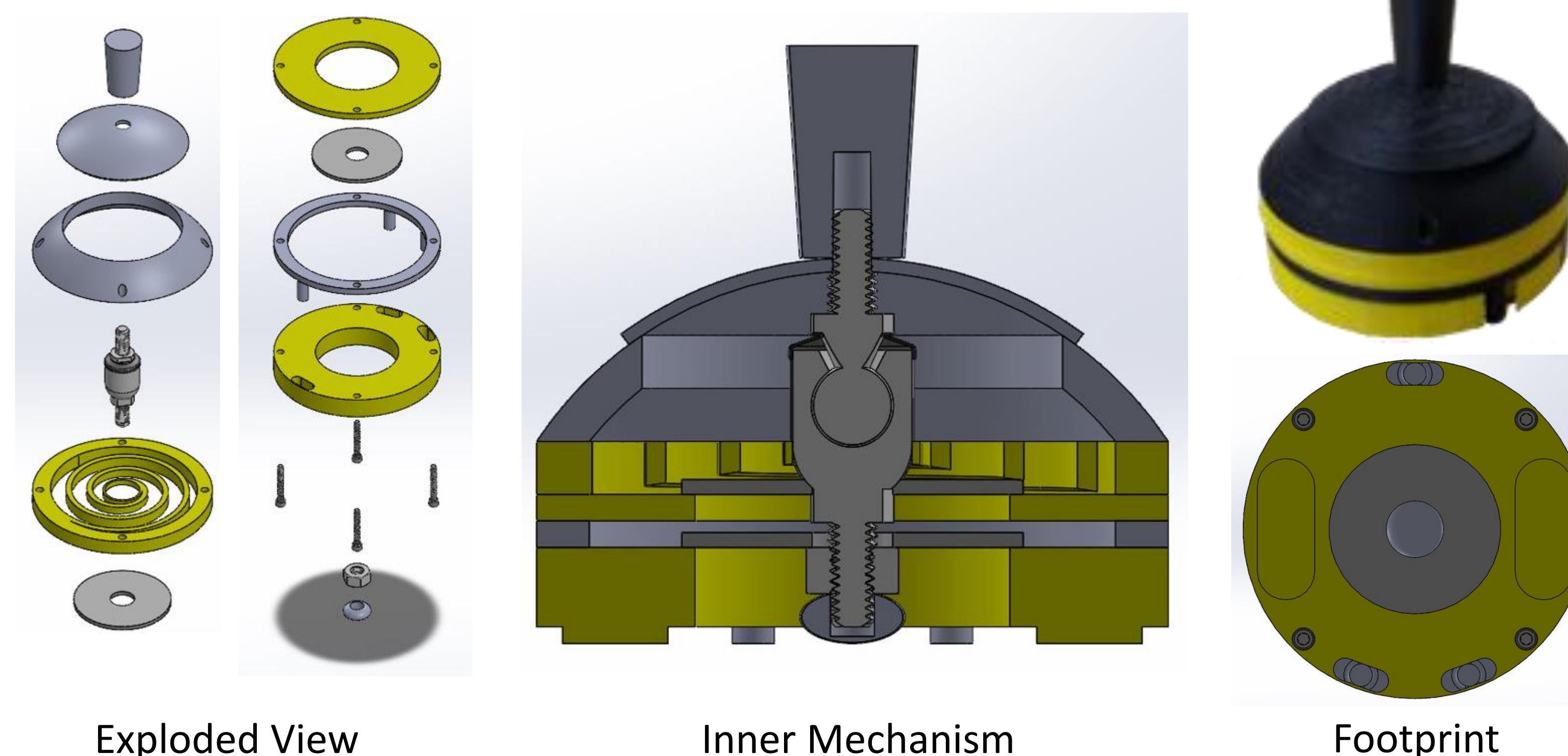
Key Requirements

- Translate Rotational Motion To Linear
- Self-Centering With Tactile Feedback
- Small Footprint
- Low Center of Gravity
- Lightweight
- Ergonomic
- No Bluetooth/Digital Communication
- Object Recognition of Joystick
- Functional Graphic User Interface (GUI)

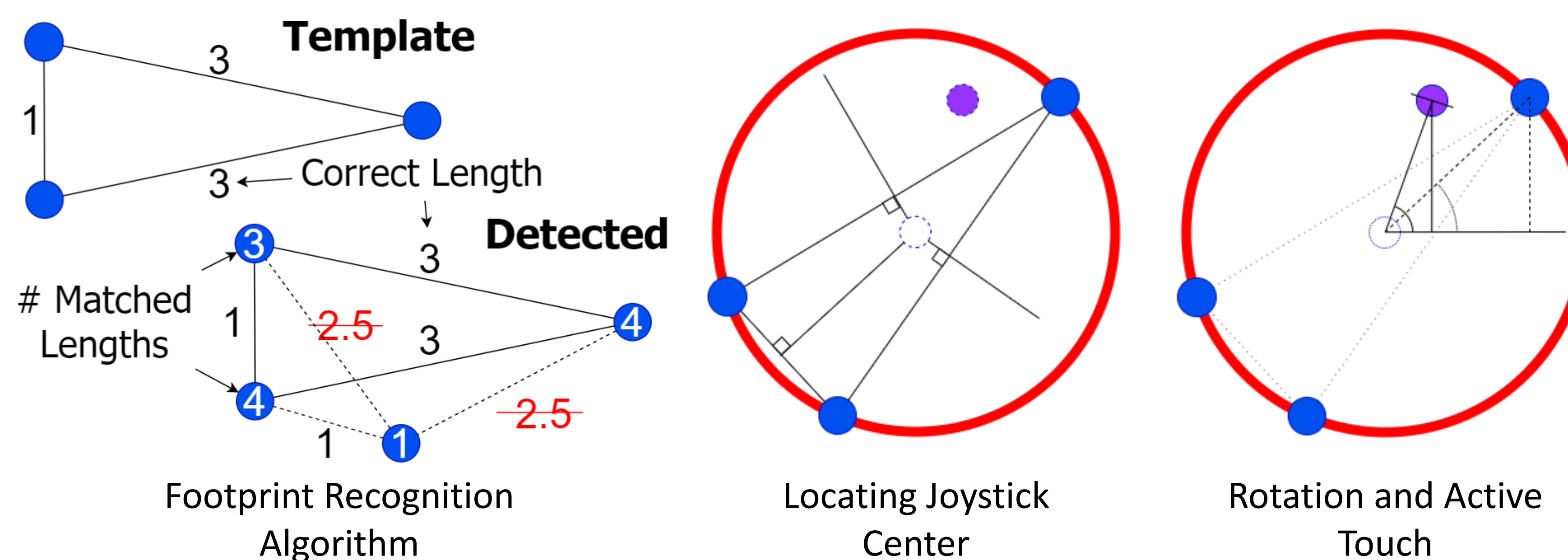
System Overview



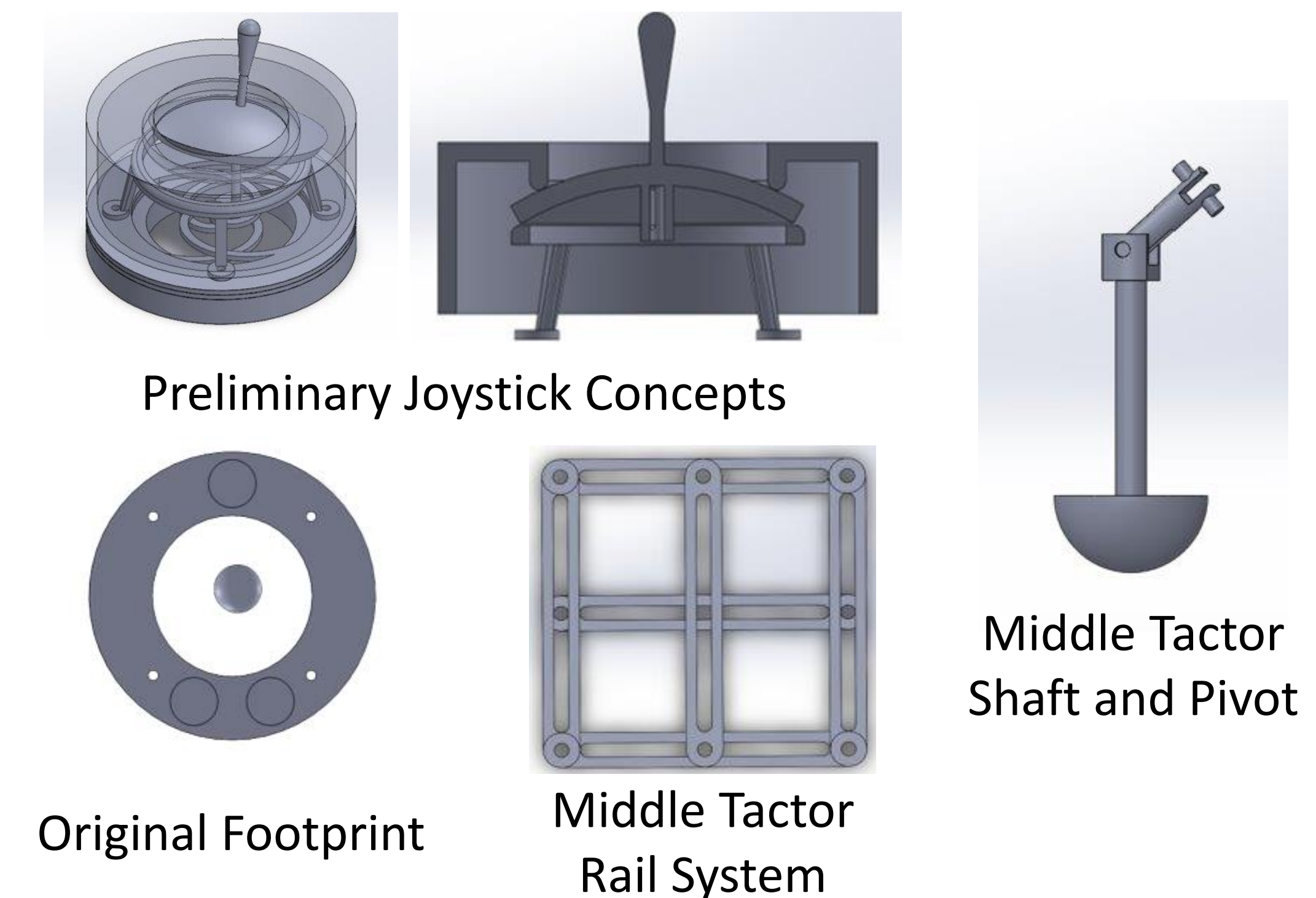
Final Design



Tangible Object Recognition Algorithms



Original Concept Development



Summary

We created a mechanical joystick that can be placed on a touchscreen device. The joystick passes human touch through its conductive material to interact with the touchscreen. The joystick operates by translating tilt to the x and y axes. Using the developed driver, software applications can read the joystick's location, rotation, throw distance, and angle of movement. Additional driver features allow for calibration of other footprints and possibilities of other footprints with an active tactor.

Recommendations

- Implement an additional spring or cover around the joint to assist in returning handle to center
- Manufacture joystick out of high-grade materials
- Add angle matching to recognition algorithm for increased accuracy

Acknowledgements



SPONSORED BY ADVANCED INPUT SYSTEMS

Special Thanks: Brett Harned & Ben Medeiros

Lead Instructors: Feng Li and Joel Perry