EECS 373
Introduction to Embedded System Design

The Palm Pointer

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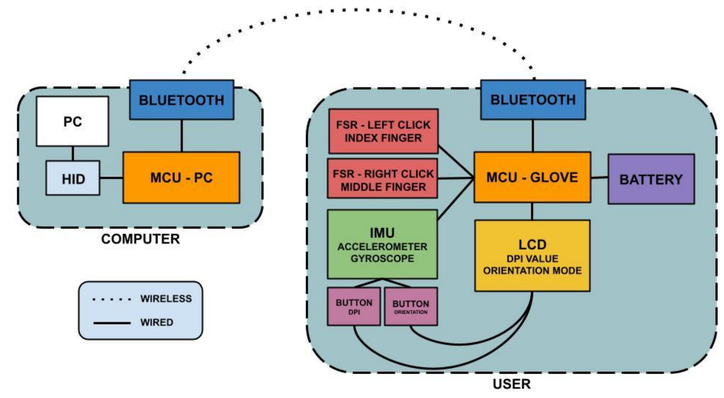
Introduction: Palm Pointer - The Idea and Implementation

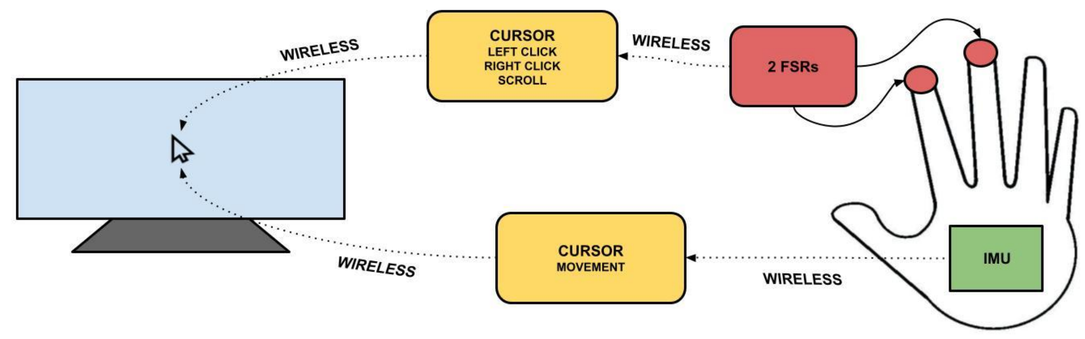
IDEA
- Allow users to interact with their computer away from a traditional desk, wirelessly
- Explore hand gestures effectiveness in acting as a cursor

IMPLEMENTATION
- Develop a glove-based system that acts as a fully functional mouse which can connect to a computer
- Use IMU to track movement and FSRs to register clicks, dragging, and scrolling



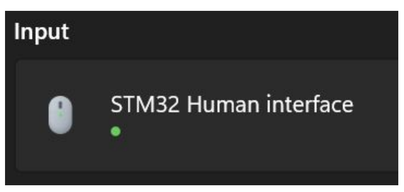
Problem Description: Giving Freedom to The Computer Mouse

OUR APPROACH
- We wanted to give users the ability to use their computer away from their desk
- Use a glove based structure to emulate using your hand as a computer mouse



Our Solution: Taking Advantage of HID, FSRs, and IMUs

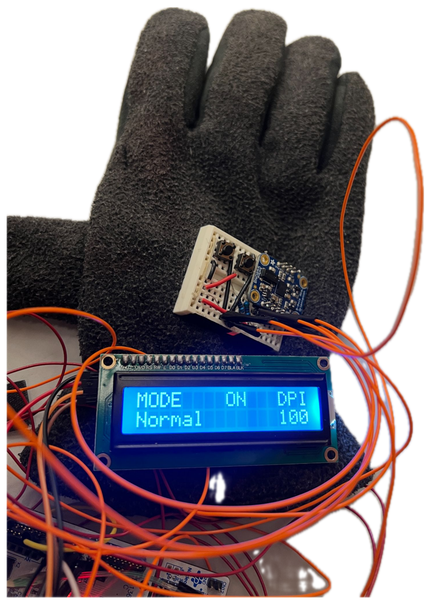
Human Interface



Serial Bluetooth Communication
- UART communication between two bluetooth modules
- Receiving module sends mouse commands to computer

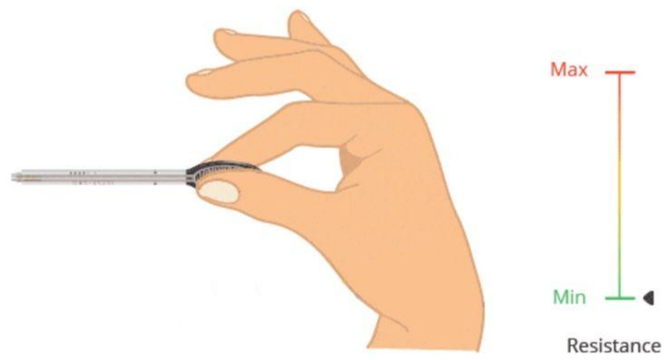
Human Interface Device (HID)
- Microcontroller connected to a computer is recognized as a mouse using HID
- Sends USB packages with clicks, X- and Y-movements as well as scroll-wheel movements

Cursor Movement



Inertial Measurement Unit
- Using 6-DOF IMU (gyroscope and accelerometer) to track user hand movements
- Gyroscope helps calibrate stable position and base coordinate system
- Accelerometer X- and Y-coordinates are used to translate hand tilts into cursor movements

Click Registering



Force Sensitive Resistors
- FSRs combined with resistors create a voltage divider
- Values are read through ADC and thresholds are established through moving averages to detect clicks

Additional Functions
- Double Tap - sleep mode
- Pinch - scroll mode