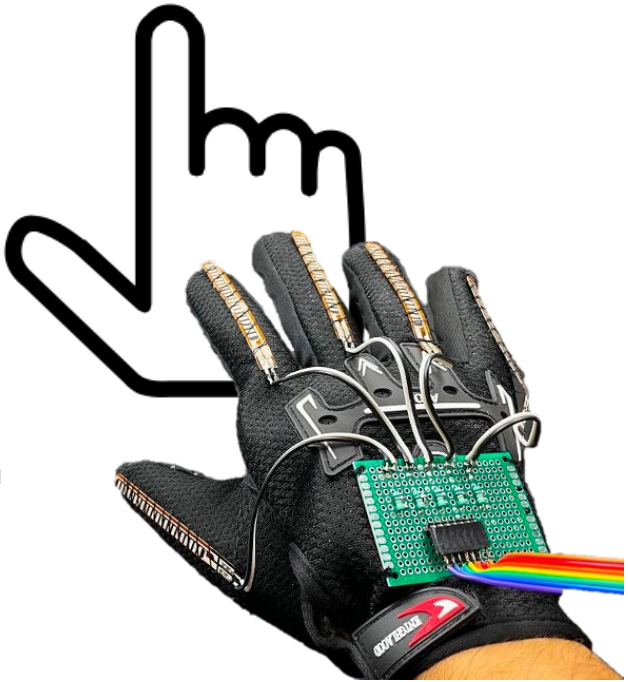
Use Case

- Controlling your laptop from afar is difficult
- Remotes and mice
  - Cumbersome away from desk
  - Can be activated mistakenly
- This process can be made more convenient

Solution

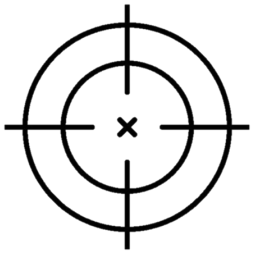
- The Mouseketool
  - Gesture glove
  - Remotely interact with laptop
  - Less mobility requirements
  - Wearable
- Implementation
  - Glove embedded with sensors that converts motion to mouse movement and touch to keystrokes
- ECE Areas: Software, Hardware, Embedded Systems



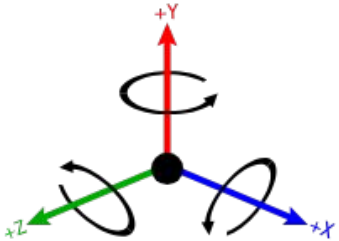
Use Case - Requirements

Requirement	Metric
Latency	300 ms
Weight	4-6 ounces
Accuracy	90% user rating
Wireless Range	7.5 feet
Battery Life	2-3 hours

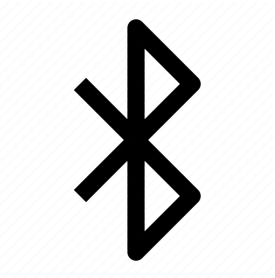
Technical Challenges



Sensor Calibration



IMU Processing



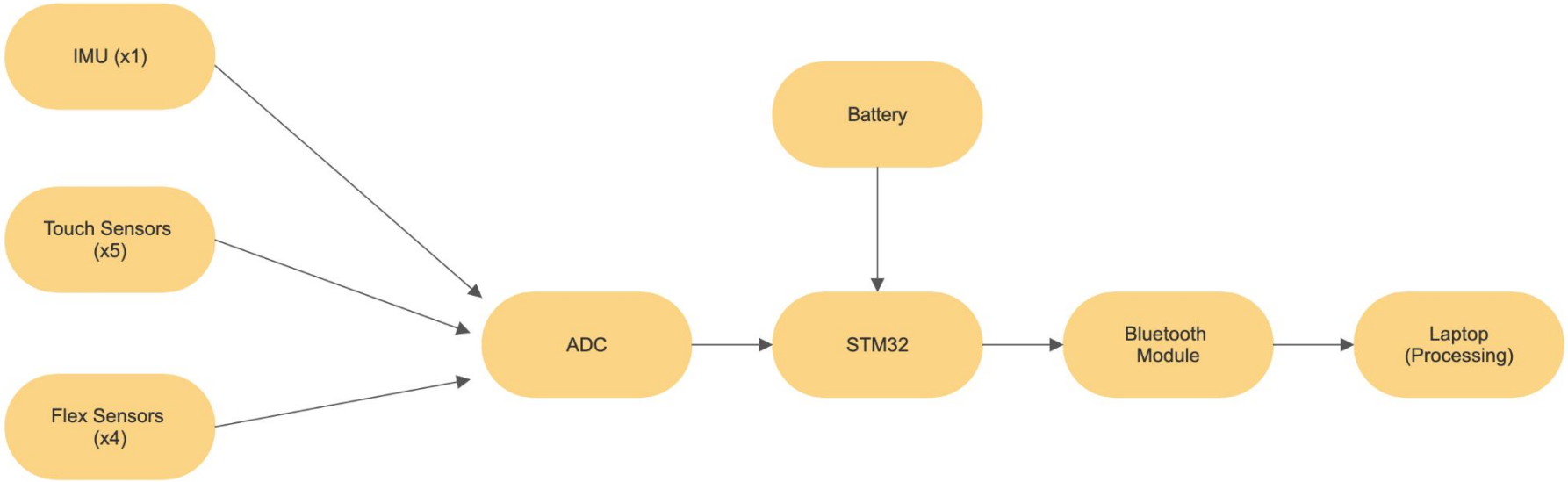
Bluetooth Communication

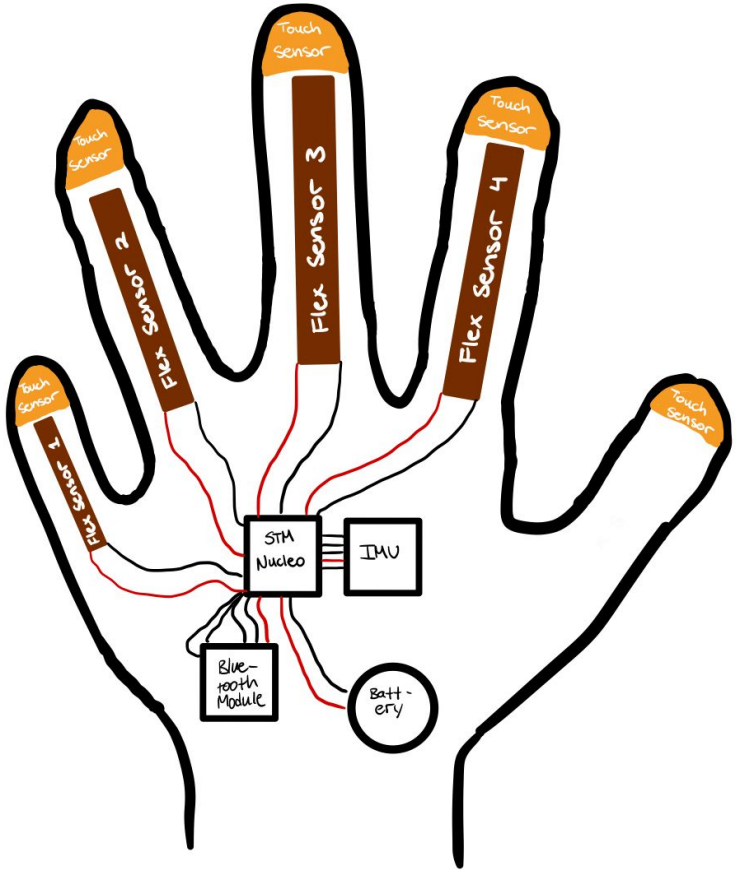
Human Variation

Solution Approach

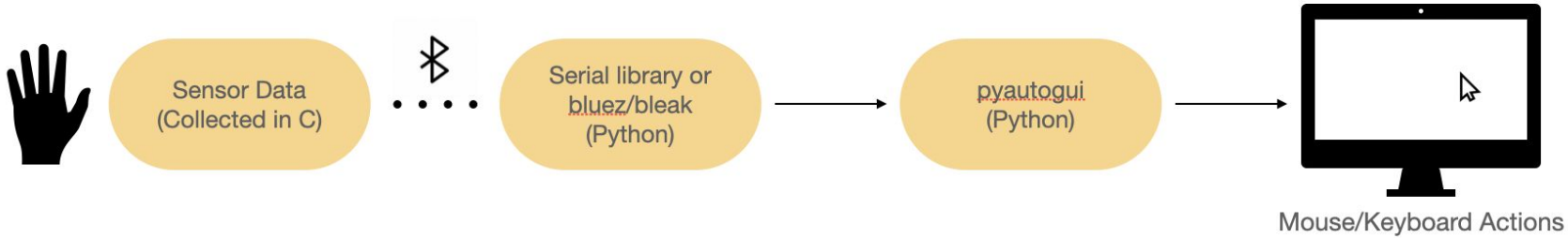
- Hardware:
  - Microcontroller (STM32 nucleo board)
  - IMU
  - Flex Sensors
  - Touch Sensors
  - PCB with extra ADCs (if needed)
- Software:
  - STM32Cube IDE
  - C and Python
  - Bluetooth

Hardware Flow Chart

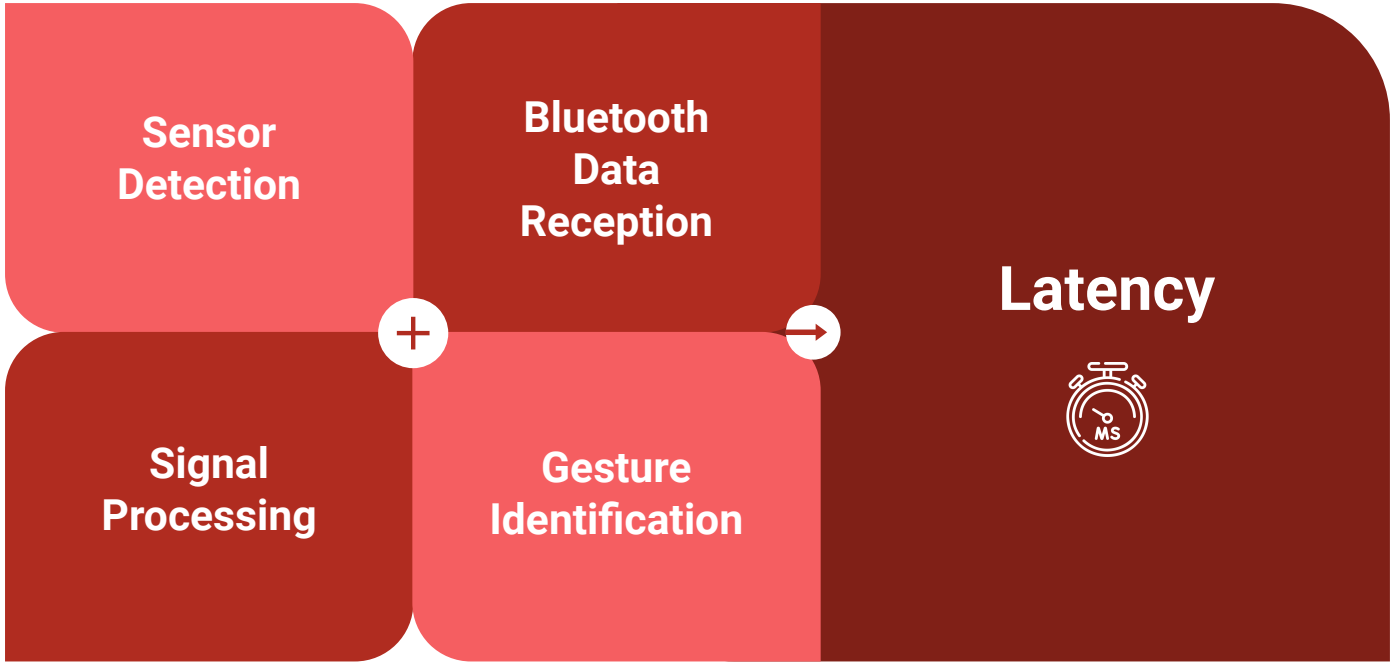



Touch Sensor
Touch Sensor
Touch Sensor
Touch Sensor
Touch Sensor
Flex Sensor 1
Flex Sensor 2
Flex Sensor 3
Flex Sensor 4
STM Nucleo
IMU
Blue-tooth Module
Batt-ery

Software Flow Chart

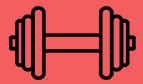


Testing, Verification, & Metrics - Latency



Testing, Verification, & Metrics - Other

Weight Test

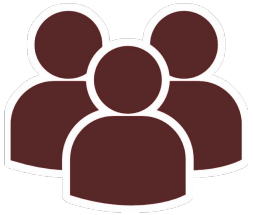


Accuracy Test

Range Test

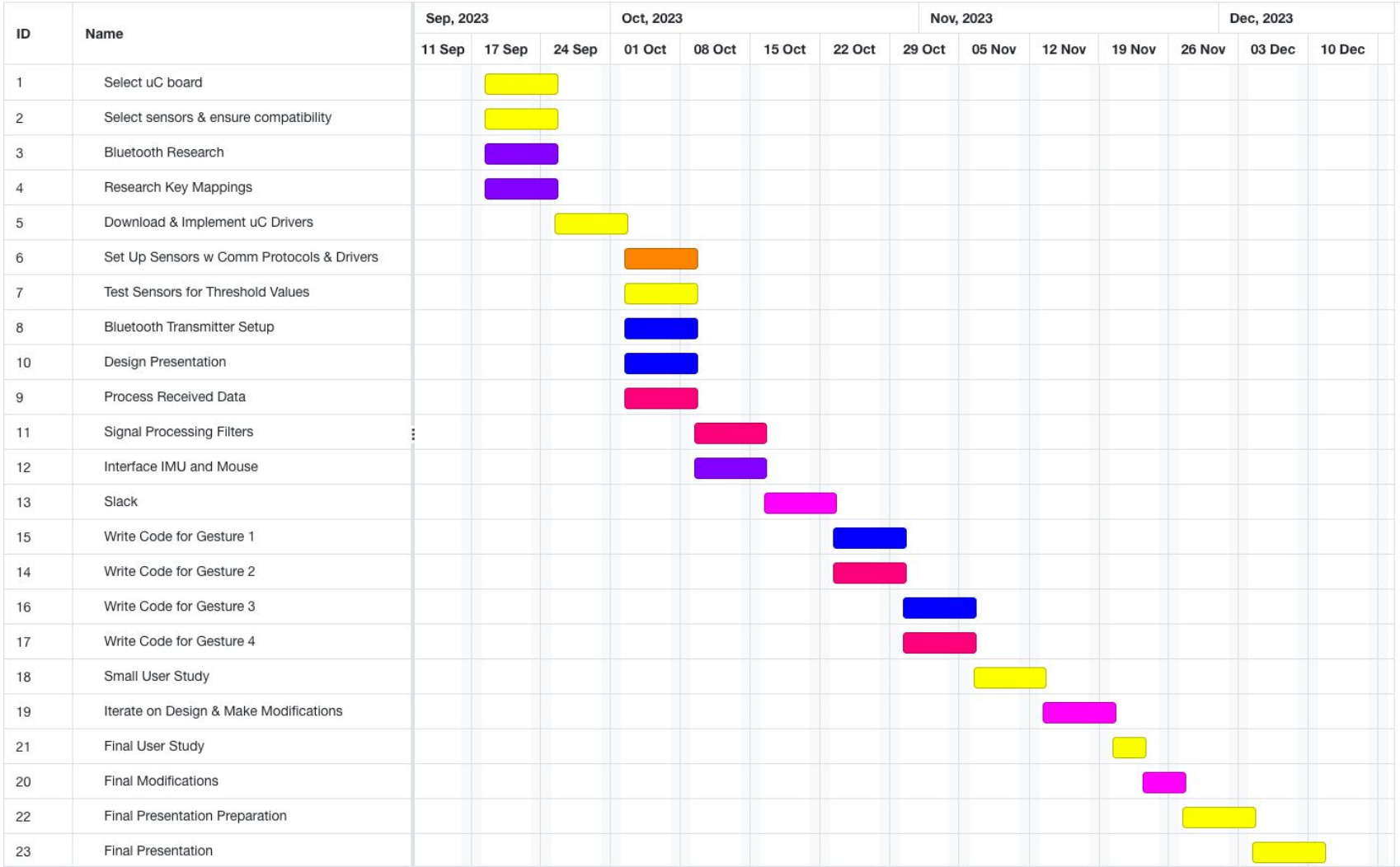
Battery Life Test

Tasks & Division of Labor



Who?	Task
Sarah	HW-SW Interfacing, Hardware Connections, Sensor Calibration, ADC Calculations
Saumya	Bluetooth Networking, IMU Processing for Mouse, Physics
Rosina	Gesture Thresholding, Sensor Processing for Keystrokes, GUI for Configuration

SCHEDULE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24 Sep
01 Oct
08 Oct
15 Oct
22 Oct
29 Oct
05 Nov
12 Nov
19 Nov
26 Nov
03 Dec
10 Dec
1 Select uC board
2 Select sensors & ensure compatibility
3 Bluetooth Research
4 Research Key Mappings
5 Download & Implement uC Drivers
6 Set Up Sensors w Comm Protocols & Drivers
7 Test Sensors for Threshold Values
8 Bluetooth Transmitter Setup
10 Design Presentation
9 Process Received Data
11 Signal Processing Filters
12 Interface IMU and Mouse
13 Slack
15 Write Code for Gesture 1
14 Write Code for Gesture 2
16 Write Code for Gesture 3
17 Write Code for Gesture 4
18 Small User Study
19 Iterate on Design & Make Modifications
21 Final User Study
20 Final Modifications
22 Final Presentation Preparation
23 Final Presentation