Metrigloves

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Problem

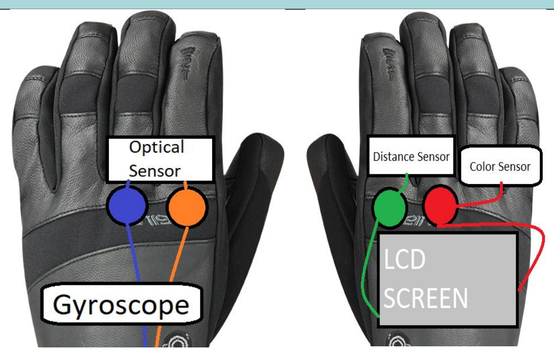
Inaccurate measurements when doing construction can be fatal. With construction work constituting 21% of deaths for private industries, any improvement to the workers' safety is beneficial.

Our Goal

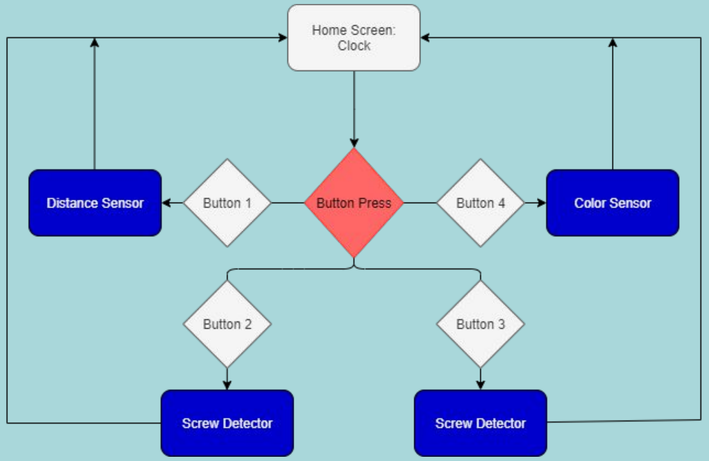
We plan to integrate measuring tools into a pair of wearable construction gloves. This combines construction tools with modern day technology to make measurement and other simple recognition tasks seamless.

Materials

- Construction gloves (Handyman Flex Grip)
- 2x Arduino Uno R3
- Gyroscope (IMU Breakout - MPU 9250)
- Color sensor (TCS230, TCS34725)
- Optical Sensor (OV7670 CMOS Camera Module)
- LCD (2.0" 320x240 Color IPS TFT Display)
- Distance Sensor (Ultrasonic, IR Proximity Sensor)



Software Flowchart



A specific sensor will activate only upon button press. Once the reading has been taken, it will return to the home screen which displays a clock.

Hardware

- Red button = color detection (attached to camera or color sensor)
- Green button = Distance (IR)
- Other buttons can have various functions (TBD)

This Quarter:

- Incorporate other functions to a second glove (other hand)
- Different colored buttons on knuckles, gyroscope and optical sensor on fingers, and with second LCD and Arduino.
- May add LEDs on glove to consider nighttime construction work.

Accomplishments

- Configured hardware for ultrasonic sensor
- Finished coding the ultrasonic distance sensor
  - Can display anywhere from 0 to 200 centimeters
- Configured hardware for real world clock
- Finished coding real time clock as home-screen
- Have code for color and gyroscopic sensor
- Began implementation with TensorFlow API for object detection.

Challenges for Winter

- Figure out how to divide currents/voltages & switch software modes
- Add optical sensor for screw detection for hardware and software
- Make sure LCD accommodates all results and updates in real time
- Soldering and placing hardware onto gloves without encumbrance

References:

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