Smart Suit for Industrial Workers

Installation & Setup Guide

This document will guide you through setting up and running the "Smart Suit for Industrial Workers" project on your system. Follow these step-by-step instructions to successfully simulate the project and visualize the data.

Prerequisites

Before starting, ensure you have the following software installed:

- Proteus Simulation Software
- Arduino IDE
- Python 3.x with required libraries (matplotlib , seaborn)

Installation Steps 1. Set Up Proteus Project

1. Download the provided Proteus project file (smart_suit.pdsprj).
2. Open Proteus and use **File > Open** to load the project file.
3. The project schematic should now appear in your Proteus workspace.

2. Upload Arduino Hex Code

1. Locate the arduino_firmware.hex file included in your project package.
2. Open your project in Proteus and navigate to the schematic containing the Arduino component.
3. Right-click on the Arduino component in your schematic.
4. Select Edit Component from the context menu.
5. In the Program File field, click the Browse button (three dots ...) and select the arduino_firmware.hex file.
6. Click OK to save the changes.
7. Locate and extract the LibraryFiles.zip folder which contains the firmware files for the MQ125 and Magnetic Hall Sensor components.
8. After extraction, ensure that the following files are available: mq125_firmware.hex and hall_sensor_firmware.hex.
9. In Proteus, right-click on the MQ125 component in your schematic.

10. Select Edit Component from the context menu.
11. In the Program File field, click the Browse button and select the mq125_firmware.hex file.
12. Click OK to save the changes.
13. Similarly, right-click on the Magnetic Hall Sensor component in your schematic.
14. Select Edit Component from the context menu.
15. In the Program File field, click the Browse button and select the hall_sensor_firmware.hex file.
16. Click OK to save the changes.

3. Run the Simulation

1. In Proteus, click the **Play** button in the control bar to start the simulation.
2. Observe the simulation running in real-time.
3. You'll see sensor readings and other data appearing in the Virtual Terminal.

4. Capture Terminal Output

1. Once the simulation has run long enough to generate sufficient data:
2. Right-click on the Virtual Terminal window.
3. Select **Copy All** to copy all the terminal output.
4. Open a text editor on your computer.
5. Create a new file named log.txt.
6. Paste the copied terminal data into this file.
7. Save the file in the project's root directory.

5. Visualize the Data

1. Open a command prompt or terminal window.
2. Navigate to the project directory where sim.py is located.
3. Run the visualization script with the command:

```
python sim.py
```

4. The script will read the data from log.txt and display visual analytics of the sensor readings.

Troubleshooting Common

Issues:

1. **Simulation Not Starting**:

   Ensure all components in Proteus are properly connected.

   Verify the hex file is correctly loaded to the Arduino component.

2. **Missing Data in Visualization**:

   Check that log.txt is in the correct directory.

   Ensure the simulation ran long enough to generate sufficient data.

   Verify the data format in log.txt matches what sim.py expects.

3. **Python Script Errors**:

   Ensure all required Python libraries are installed.

   Check Python version compatibility (Python 3.6+ recommended).