DISTANCE MEASUREMENT OVER NON LINEAR SURFACES

Internet of Things (IoT)

CS - 744

A project submitted in partial fulfilment of the requirements

for the award of the degree of

Bachelor of Technology

in

Computer Science and Engineering (Dual Degree)

by

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Submitted to:

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ACKNOWLEDGEMENT

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INTRODUCTION

This IoT Project addresses a critical need in the automotive industry by leveraging IoT capabilities to revolutionize odometer tracking and management. Traditional odometer systems often suffer from inaccuracies, limited functionalities, and lack of real-time monitoring capabilities. Our project seeks to overcome these challenges by harnessing the power of IoT to create a robust and efficient odometer tracking solution.

OBJECTIVE

The objective of this Project is to revolutionize the way vehicle mileage is tracked and managed by harnessing the power of IoT technology. Through the development of a comprehensive solution, the aim is to provide accurate and real-time monitoring of odometer readings, ensuring precision and reliability in mileage tracking. By leveraging advanced sensors and data analytics, we seek to minimize errors and inaccuracies inherent in traditional odometer systems, thereby improving overall efficiency and effectiveness. Additionally, our objective includes the optimization of maintenance scheduling through the utilization of odometer data insights, enabling proactive maintenance practices based on actual vehicle usage. Furthermore, data security is a paramount concern, and our objective encompasses the implementation of robust security measures to safeguard odometer data against unauthorized access and ensure compliance with privacy regulations.

SIMULATOR USED

SimulIDE

SimulIDE is a real-time electronic circuit simulation environment with PIC, AVR, and Arduino simulation. It has a spartan interface, aiming to be fast, simple, and easy to use .

You can design your own circuits and program them with a code editor and debugger for GcBasic, Arduino, PIC, and AVR.

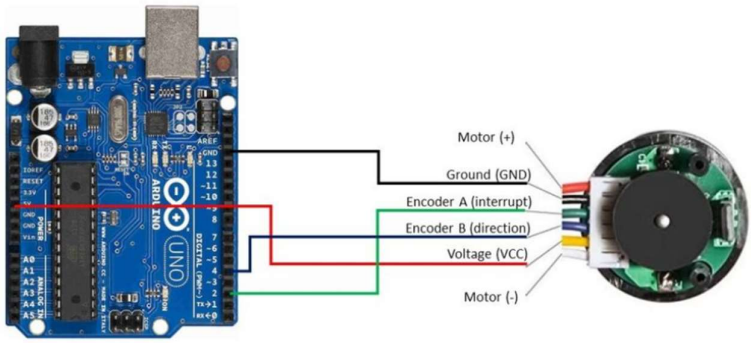
Simulation speed is one of the most relevant characteristics of this simulator. It has been well optimized to achieve excellent speeds and low cpu usage.

COMPONENTS USED

1. Arduino UNO R3

2. LCD Display

3. DC Encoder motor



4. Encoder Monitor along with positional leds

5. Wheel Radius and Torque adjustment devices

CONTROLS

- START/STOP]:
  To start or stop the measurement of distance.

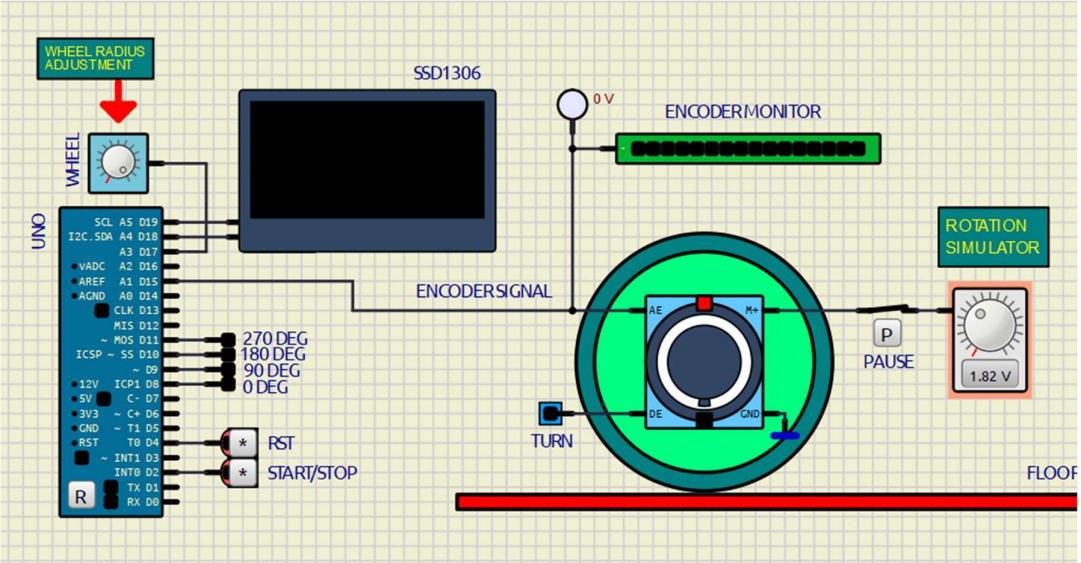
  The wheel will rotate if the <PAUSE> switch and the power supply have a voltage between 0 and 5 volts to simulate the measurement speed.
  The degree LEDs will begin to move at the rate of rotation of the measuring wheel marking each of the quarters of the wheel where the measurement is taken, these ranges are: 0 to 89 degrees, 90 to 179, 180 to 269 and 270 to 359.

- [RESET] In STOP mode the odometer counter can be reset.

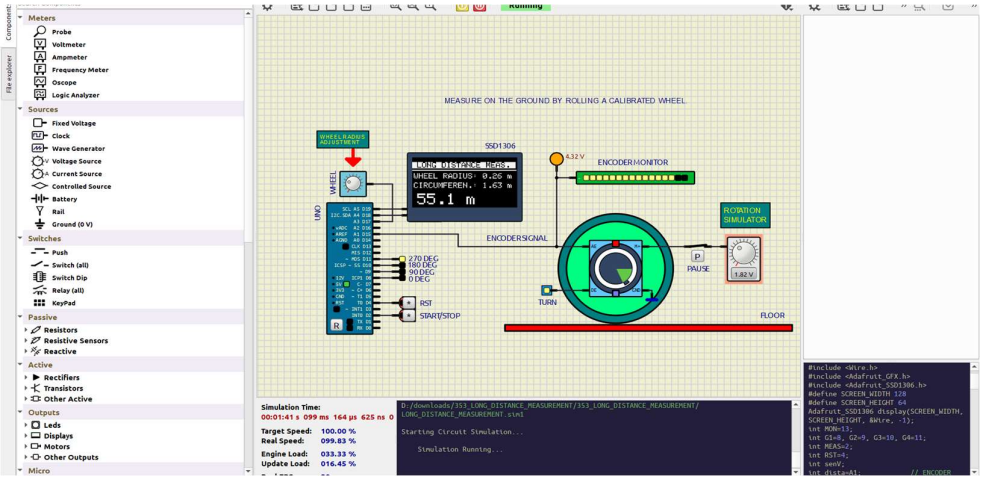
- ADJUSTMENT POTENTIOMETER. In STOP mode, the wheel radius can be adjusted from 0 to 0.99 meters. The data is displayed on the OLED.

- MEASURING WHEEL: It is associated with the motor shaft that moves the potentiometer of the internal encoder of the DC motor.

CONTROL FLOW



SIMULATION



CONCLUSION

We have demonstrated the integration of a distance measuring system using ArduinoUno and DC encoder motor within the SIMULIDE simulation environment. By using encoder monitors and adjustment devices we have showcased potential for measuring physical characteristics accurately and in remote areas without human intervention.

Moving forward, further enhancements and real world implementations can be explored to refine the system's functionality and accessibility.

FUTURE WORK

For future work, the IoT Project could focus on integrating machine learning algorithms for improved accuracy and predictive maintenance insights. Expanding compatibility, exploring blockchain for enhanced security, and implementing anomaly detection mechanisms are also key areas. Additionally, integrating environmental data and optimizing scalability and efficiency would further enhance the platform's capabilities and competitiveness in the automotive industry.

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