IoT Enabled Agricultural Car

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Introduction

Agriculture is vital to human life, and combining IoT with autonomous vehicles transforms the industry by boosting efficiency. This project autonomously inspects soil quality using sensors like LM35 (temperature), LDR (light), ultrasonic (obstacles), and pH (soil acidity). Powered by the PIC16F877A microcontroller, it uses an H-Bridge motor for navigation and Bluetooth for wireless data sharing, offering farmers a real-time, portable solution for optimized agricultural practices.

Design

The IoT Enabled Agricultural Car combines hardware and software to create an efficient, modular system for agriculture. The PIC16F877A microcontroller interfaces with sensors like soil moisture, pH, and temperature, and controls motors via an H-Bridge driver.

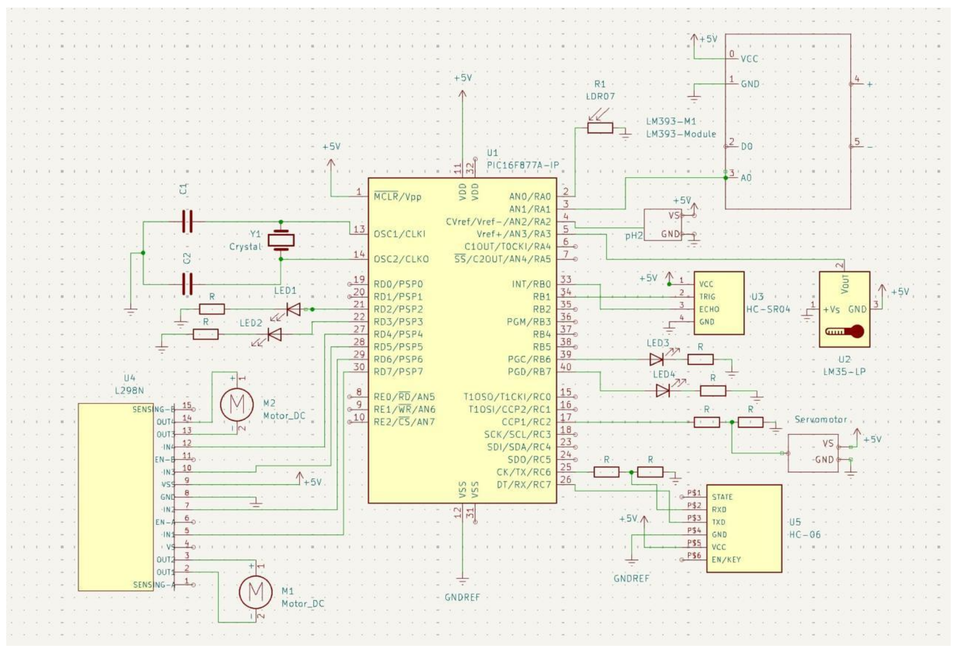

Figure 1: Electrical Design

Data is sent via Bluetooth to a host PC, where Python scripts process and transmit it to an online platform for remote monitoring. This design ensures real-time data access and control, saving farmers time and resources while remaining adaptable for future enhancements.

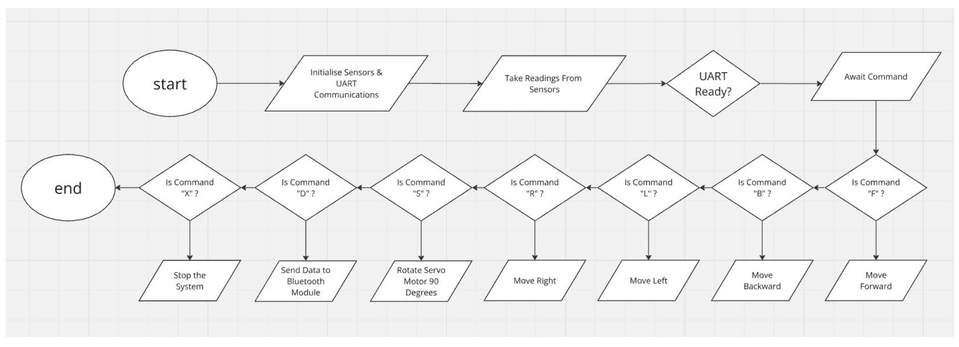

Figure 2: Software Design Flowchart

Results

The IoT-Enabled Agricultural Car effectively collects and transmits real-time sensor data, including soil moisture, pH, and temperature, to an online dashboard. Its reliable mobility and Bluetooth communication ensure smooth operation, providing farmers with a practical, time-saving solution for remote land monitoring.

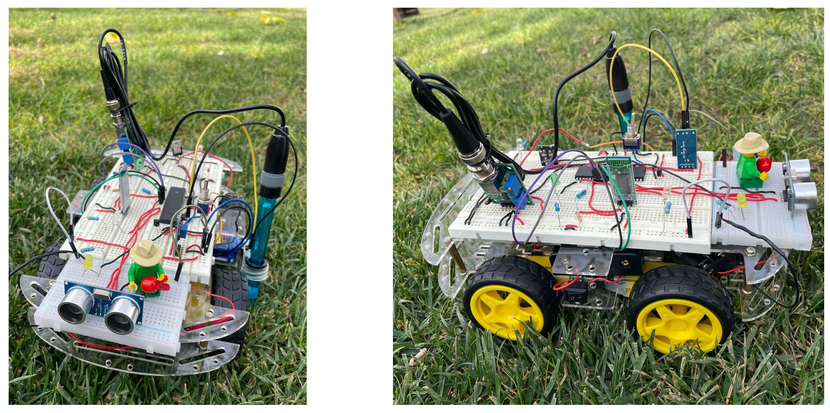

Figure 3: Car's Structure

Sensor data is transmitted via Bluetooth and sent to an online dashboard, displaying real-time readings through graphs, ensuring convenience and efficiency for users.

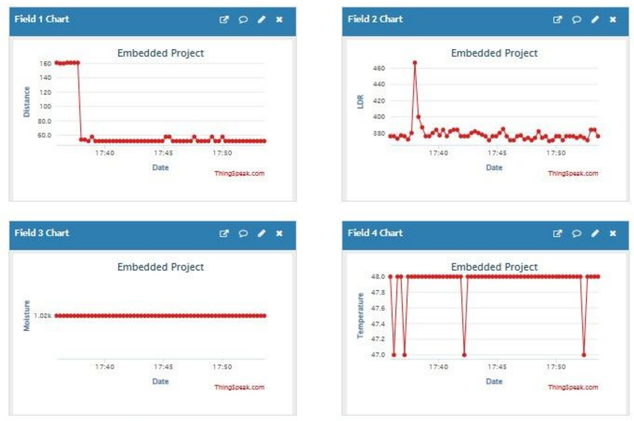

Figure 4: Platform Dashboard

The car is controlled remotely using arrow keys or a virtual keypad on the PC. Commands are sent via Bluetooth, allowing users to navigate the car and control the whole system directly.

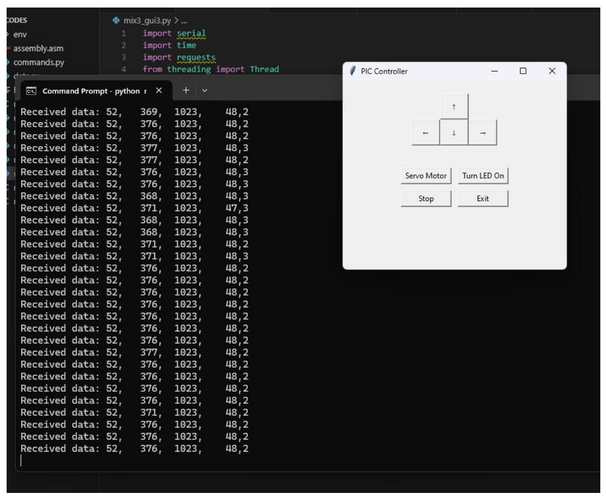

Figure 5: Virtual Remote Control

Conclusion

In conclusion, the IoT Enabled Agricultural Car provides a groundbreaking solution for the future of farming. By combining the power of IoT technology and an array of advanced sensors, this system provides farmers with real-time data, and actionable insights to assess and improve soil quality with outstanding accuracy.

The outcome of this project extends beyond increased harvests; it drives better resource management, limits waste, and supports a more smart and sustainable farming method.