Smart Water/Fuel Monitoring System

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Abstract

This project presents an IoT-based Smart Water/Fuel Monitoring System using ESP32 and the Blynk platform. The system is designed to measure fuel or water levels using an ultrasonic sensor (HC-SR04), track usage percentage, calculate volume, and trigger alerts when fluid levels drop below a critical threshold. It also estimates remaining capacity and shows historical data trends on the mobile app. The TP4056 module is used for battery management, enabling wireless monitoring. The system aims to provide real-time tracking for water tanks or fuel storage, enhancing efficiency and avoiding sudden outages.

Keywords—ESP32, IoT, Ultrasonic Sensor, Fuel Monitoring, Blynk, TP4056

I. INTRODUCTION

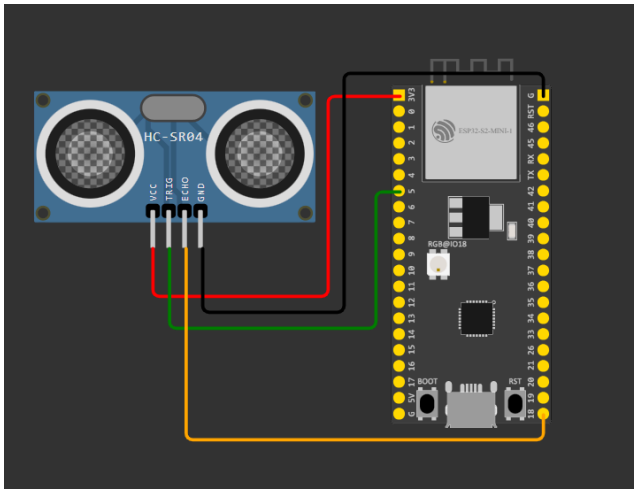
Recent developments in IoT-based monitoring have led to smart and remote fuel/water level detection solutions. Various systems have been proposed using Arduino or ESP32 microcontrollers combined with ultrasonic sensors. Traditional analog systems lack the ability to notify users remotely or show usage trends. This system uses the Blynk platform to visualize real-time sensor data, send push notifications, and remotely monitor system health. The inclusion of a TP4056 charging module ensures mobile and autonomous operation.

Proposed Solution: Our system combines ESP32, HC-SR04, and Blynk with TP4056 for power, creating a compact and cost-effective smart tank monitor.

II. SYSTEM ARCHITECTURE

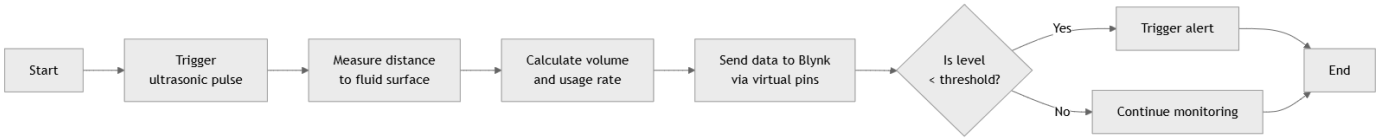
The system consists of ESP32 as the core processor, HC-SR04 for level detection, TP4056 for battery management, and Wi-Fi for remote Blynk dashboard updates.

Block Diagram: Refer to external figure or README image for visual wiring between ESP32, sensor, and TP4056.



III. METHODOLOGY

The algorithm follows these steps:

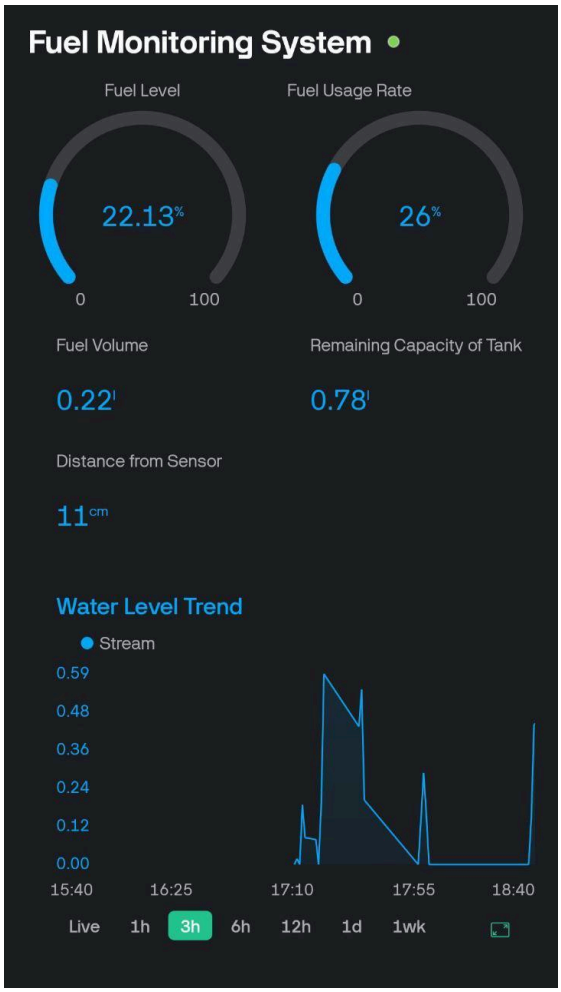


IV. RESULT & DISCUSSIONS

The system was tested with water simulating fuel. The sensor readings were accurate within ±1 cm. Fuel usage percentage and volume calculations were successfully displayed on the Blynk app. Notifications were triggered at the defined low-level threshold. Battery voltage was measured via analog input and successfully transmitted to Blynk. The system performed well on battery power with TP4056 module handling charging and output.

V. CONCLUSIONS

This project demonstrates a low-cost, scalable and efficient fuel/water monitoring system using IoT and ESP32. With real-time alerts, usage tracking, and mobile accessibility, the solution can be adapted to smart cities, agriculture, transport fleets, and household tank monitoring applications.



REFERENCES

1. [1] G. Eason, B. Noble, and I. N. Sneddon, “On certain integrals of Lipschitz-Hankel type involving products of Bessel functions,” Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955.
2. [2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
3. [3] I. S. Jacobs and C. P. Bean, “Fine particles, thin films and exchange anisotropy,” in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

Github Repository: Link