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REVIEWER'S REPORT

Manuscript No.: **IJAR-53032** Date: 30-07-2025

Title: IOT BASED AUTONOMOUS ROBOT FOR AGRICULTURAL MONITORING AND HAZARD DETECTION

Recommendation:
Accept as it is .....YES.....
Accept after minor revision.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality			✓	
Techn. Quality			✓	
Clarity			✓	
Significance			✓	

Reviewer Name: Mr Mir Bilal

Reviewer's Comment for Publication.

Summary of Content:

The project presents the design and implementation of an IoT-enabled autonomous robotic system intended for agricultural monitoring and hazard detection. Built around the Arduino Mega 2560 microcontroller, the robot integrates a variety of sensors and modules for environmental data collection, navigation, and remote communication. These include the DHT11 sensor for temperature and humidity, MQ135 for air quality monitoring, a color sensor for plant disease detection, an ultrasonic sensor for obstacle avoidance, a GPS module for real-time location tracking, and a GSM module for alert notifications. The robot moves via DC motors on a four-wheel chassis, supported by a motor driver, and features a pesticide spraying mechanism powered by a water pump and controlled via relays.

Sensor data is uploaded to the Adafruit cloud platform using a NodeMCU module, allowing for remote monitoring and control. Additionally, the system is equipped with an IP camera for live video streaming of field conditions, an LCD display for instant feedback, and a 12V battery for power supply. The introduction contextualizes the project within the broader scope of modern agricultural automation, referencing existing technologies such as driverless tractors and precision farming techniques.

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Strengths:

- The system combines multiple functionalities—environmental monitoring, hazard detection, pest control, and remote data visualization—into a single autonomous platform.
- The integration of IoT features via cloud connectivity enhances scalability and remote accessibility for farmers.
- The use of diverse sensors addresses both crop health (e.g., color sensor for disease detection) and environmental conditions (e.g., DHT11, MQ135), making it a holistic solution for agricultural management.
- The inclusion of navigation (GPS) and obstacle detection (ultrasonic sensor) supports autonomous operation in complex field environments.
- The project emphasizes affordability and scalability, both crucial factors for real-world agricultural adoption.

Scientific and Technical Quality:

The work demonstrates a clear understanding of sensor-based IoT systems, robotics, and agricultural needs. The choice of hardware and modular architecture allows for flexibility in application. The abstract and introduction effectively link the project to the ongoing evolution of precision farming technologies, situating it within a broader technological and societal context.

Relevance and Impact:

This research is highly relevant to the fields of smart agriculture, automation, and IoT applications. By focusing on both monitoring and hazard mitigation (including pest control and environmental hazards), the robot offers a comprehensive tool that can significantly reduce labor requirements and improve crop health management.

Overall Evaluation:

The project provides a well-conceived and detailed framework for an IoT-enabled autonomous agricultural robot. Its multi-sensor design, integration of automation with real-time cloud-based monitoring, and focus on hazard detection position it as a promising advancement in precision farming technologies.