IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

HUMAN DETECTION AND RESCUE ROBOT FOR DISASTER MANAGEMENT USING IOT

[1] Vigneshwaran S ,[2] Adhithiyan S , [3] Gopinath S , [4] krishnakanth R , [5] Annamalai MR,

[1] Assistant Professor, [2 3 4] Bachelor of Engineering

Department of Mechatronics Engineering,

Trichy Engineering College, Trichy, India.

Abstract

This paper presents a Human Detection and Rescue Robot designed for disaster management using IoT technology. The system integrates NodeMCU (ESP8266), ESP32-CAM, gas sensor, and mmWave human detection sensor to identify victims and hazardous conditions. The ESP32-CAM provides real-time video streaming through WiFi, which can be accessed using an IP address via IDLE Python or a web browser. The robot uses a four-wheel drive system with an L298N motor driver for stable movement across uneven terrain. The proposed system improves rescue efficiency, reduces human risk, and enables real-time monitoring in disaster environments..

Keywords

Human Detection, Rescue Robot, ESP8266, ESP32-CAM, IoT, Disaster Management, Wireless Monitoring

I. INTRODUCTION

Disaster situations such as earthquakes, fires, and building collapses create dangerous environments for rescue teams. Manual rescue operations are risky and time-consuming. To overcome these challenges, robotic systems can be used to assist in search and rescue operations.

This paper proposes a Human Detection and Rescue Robot that can detect human presence, monitor hazardous conditions, and provide live video streaming. The system uses wireless communication for remote monitoring, improving safety and efficiency.

II. EXISTING SYSTEM

Traditional rescue methods mainly depend on:

- Manual search operations
- Rescue dogs
- Thermal cameras (high cost)
- Basic sensor-based systems

Limitations

- High risk for human rescuers
- Time-consuming process
- Limited accuracy
- Difficult to operate in dangerous environments

III. PROPOSED SYSTEM

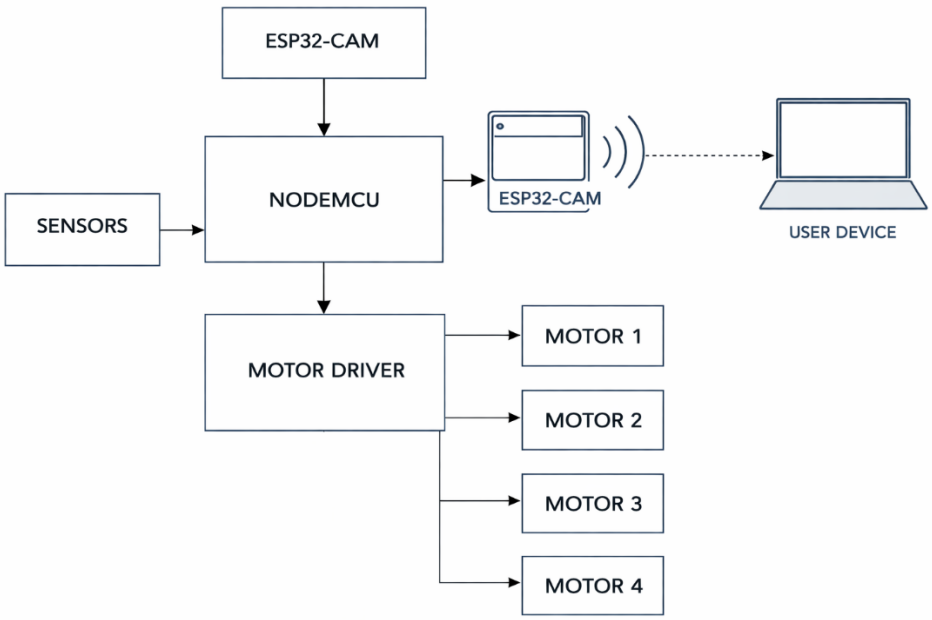
THE PROPOSED SYSTEM CONSISTS OF:

- NodeMCU (ESP8266) Controller
- ESP32-CAM Live Streaming
- Gas Sensor for hazard detection
- mmWave Sensor for human detection
- L298N Motor Driver
- 4 DC Motors (4-Wheel Drive System)
- WiFi Communication using Mobile Hotspot

SYSTEM WORKING:

- Sensors detect gas and human presence
- ESP32-CAM streams live video
- NodeMCU controls robot movement
- User connects via WiFi and monitors through IP address

BLOCK DIAGRAM



IV. RESEARCH METHODOLOGY

4.1 Human Detection

- mmWave sensor detects human presence
- Gas sensor detects smoke and harmful gases
- Sensor data sent to NodeMCU

4.2 Robot Operation

- NodeMCU processes sensor data
- Controls motor driver for movement
- Robot moves forward, backward, left, right
- 4 motors provide stable movement

4.3 Video Monitoring

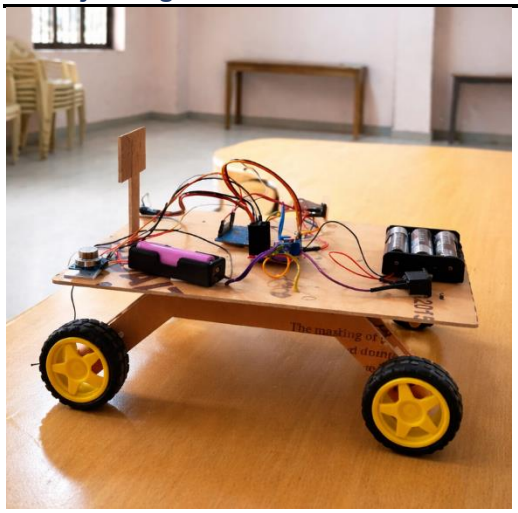
- ESP32-CAM connects to WiFi hotspot
- Generates IP address
- User accesses video via browser or IDLE Python
- Real-time monitoring of disaster area

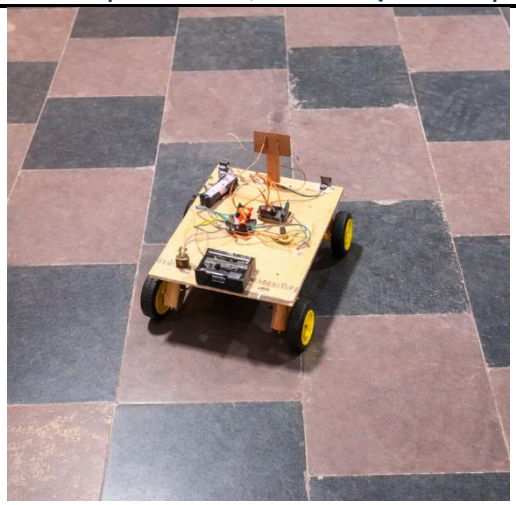
V. RESULTS AND DISCUSSION

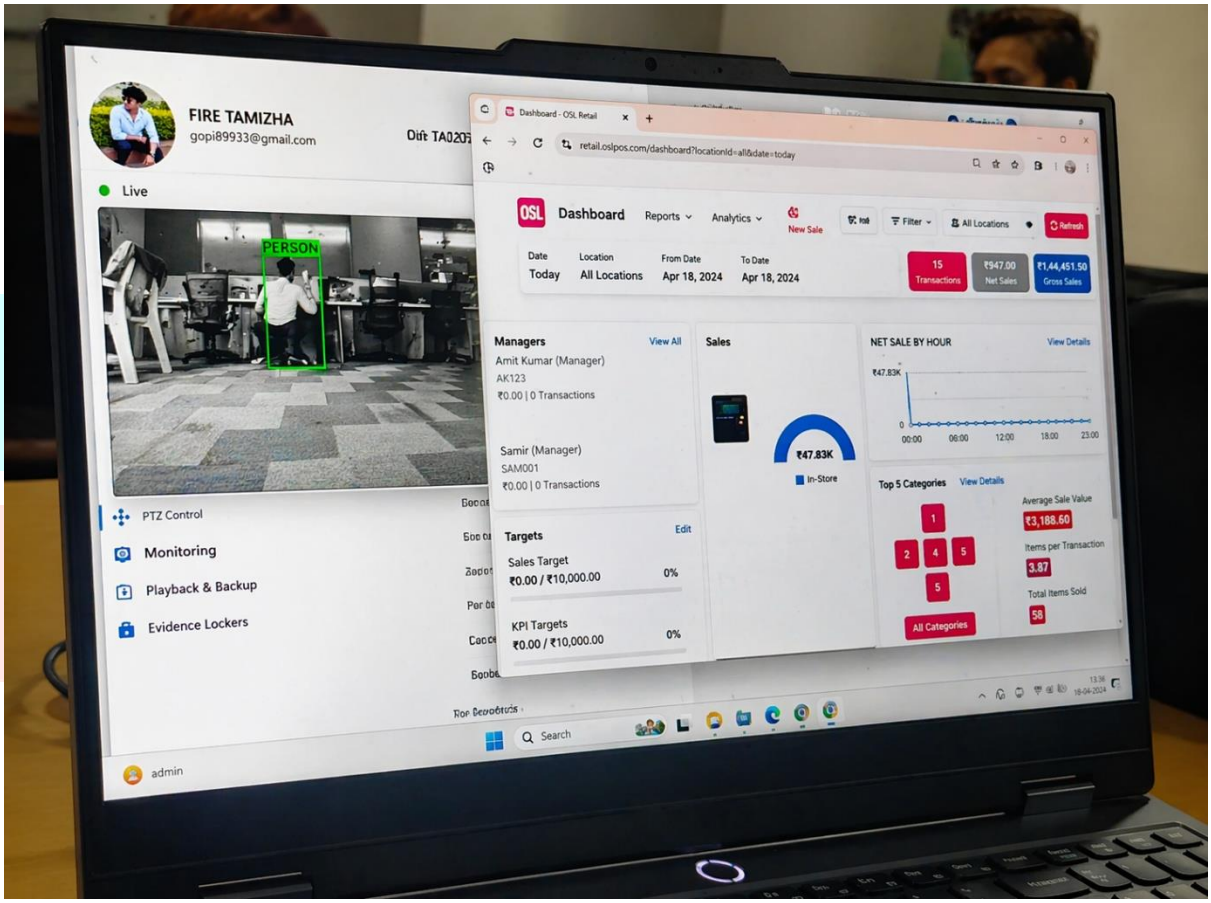
The system successfully detects human presence and hazardous gases in real time. The ESP32-CAM provides live video streaming with good clarity. The four-wheel drive system ensures smooth movement over rough surfaces.

Performance

- Human Detection: High accuracy
- Gas Detection: Reliable
- Video Streaming: Real-time
- Movement: Stable on uneven terrain







Robot Image

Object Detection

VI. CONCLUSION

The developed Human Detection and Rescue Robot effectively combines IoT and robotics for disaster management applications. The system provides real-time human detection, gas monitoring, and live video streaming. The use of NodeMCU and ESP32-CAM ensures efficient wireless communication, while the four-wheel drive system improves mobility. This system reduces risk for rescue teams and enhances the efficiency of rescue operations.

VII. FUTURE SCOPE

- AI-based human detection using OpenCV
- Thermal camera integration
- GPS tracking system
- GSM/LoRa communication
- Autonomous navigation
- Voice communication system

Acknowledgment

The authors sincerely thank the department and project guide for their continuous support and guidance in completing this project.

REFERENCES

1. Blynk. (n.d.). Blynk Documentation. Retrieved from https://docs.blynk.io
2. Espressif Systems. (n.d.). ESP8266EX Datasheet. Retrieved from https://www.espressif.com/sites/default/files/documentation/0a-esp8266ex_datasheet_en.pdf
3. Arduino. (n.d.). ESP8266WiFi Library. Retrieved from https://www.arduino.cc/en/Reference/WiFi
4. Smoke and Fire Detection and Prevention System Using IoT Technology. Retrieved from https://www.jetir.org/papers/JETIR2105114.pdf
5. Prabakar, K., & Natarajan, S. (2020). IoT Based Smart Irrigation System Using Blynk Application. International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), 9(4), 56–61.
6. Rashid, M. M., & Rahman, M. A. (2018). Design and Implementation of a Wi-Fi Based System Using ESP8266 and Blynk. International Journal of Engineering Research and Technology (IJERT), 7(10), 1–6.
7. Banzi, M., & Shiloh, M. (2014). Getting Started with Arduino: The Open Source Electronics Prototyping Platform. Maker Media, Inc.
8. Microchip Technology Inc.. (n.d.). Relay Driver Circuit Design Guide. Retrieved from https://www.microchip.com