

**A  
PROJECT  
ON**

**IoT-Based Live Video Streaming and Environmental  
Monitoring System for Rescue Operations**

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## Abstract

This project focuses on developing a robot for surveillance in border or space regions to reduce human risks and prevent infiltrations. The robot is equipped with an ESP32-CAM module for real-time video streaming, providing day and night vision capabilities. It can be controlled manually or autonomously using IoT technology, allowing operation via mobile or laptop. The robot also features a metal detector to identify potential threats like bombs. An automatic light control system enhances its night vision functionality. Additionally, the project incorporates an air quality monitoring system using Arduino, integrating sensors to measure environmental parameters such as temperature and air quality. The data is displayed in real-time and stored for analysis, offering a portable and efficient solution. This robot combines surveillance, threat detection, and environmental monitoring to enhance safety and usability in critical areas.

Images captured by the onboard camera are transmitted to a mobile phone using WebSocket technology over a Wi-Fi connection, allowing live video streaming. The system is particularly valuable for rescue operations. In scenarios where a person is trapped in a confined space, such as a manhole, the car can measure the person's oxygen levels and record the ambient temperature. The live camera feed provides rescuers with real-time visual feedback on the person's condition, facilitating informed and effective rescue efforts. The car is fully controlled through a custom-designed mobile application, offering an intuitive interface for vehicle control and sensor data access.

## BLOCK DIAGRAM

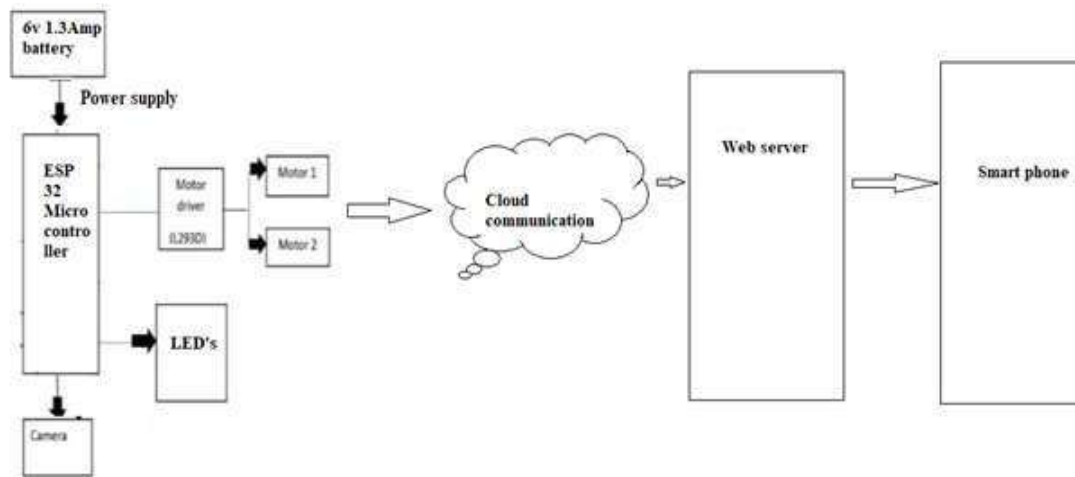


Fig 1. Block diagram of the robot

