



Human Target Detection and GPS Transmission Vehicle

PROBLEM STATEMENT

Ensuring effective surveillance and timely response in security-sensitive areas, such as military zones, disaster-stricken regions, or remote locations, remains a critical challenge. Manual monitoring methods are often inefficient, prone to human error, and may pose risks to personnel. The lack of an automated, reliable solution for detecting human targets and transmitting their precise GPS location hampers operational efficiency and decision-making. This project aims to develop an advanced, vehicle-based system capable of accurate human target detection and seamless real-time GPS data transmission, addressing the need for enhanced situational awareness and response capabilities.

PROJECT OVERVIEW

The **Autonomous Vehicle-Based System** is an advanced AI-powered surveillance solution designed to autonomously navigate and detect human presence in various environments using computer vision and deep learning. Equipped with **GPS-based location tracking**, the system precisely pinpoints and transmits human coordinates, making it invaluable for search and rescue, security, and military applications. Real-time **wireless data transmission via Wi-Fi/ESP8266** ensures seamless communication with monitoring stations, while integrated **cameras, motors, and GPS sensors** enhance detection accuracy across diverse terrains. The system supports **remote monitoring and control**, allowing operators to track and manage movements via applications for improved operational efficiency. Designed for **energy efficiency**, it optimizes battery usage and can integrate renewable energy sources for extended operation. Its **versatile applications** include military surveillance, disaster response, security patrols, and remote monitoring, ensuring enhanced situational awareness and rapid response in critical areas, ultimately reducing reliance on manual monitoring and improving decision-making efficiency.

SOLUTION OFFERED

The **Autonomous Vehicle-Based System** is a comprehensive solution that integrates multiple sensors and modules for efficient human detection and location tracking. The system is powered by an **ESP8266** microcontroller, which facilitates wireless communication and controls the overall operations. An **ESP32-CAM module** is used for AI-powered **human detection** through real-time image processing and computer vision techniques. For accurate **GPS-based tracking**, a **NEO-6M GPS module** is included, ensuring precise location transmission. The **L298N motor driver** controls the movement of the vehicle using **DC motors**, allowing smooth navigation in different environments. A **Li-Ion battery pack** provides efficient and long-lasting power to all components. The system communicates wirelessly over **Wi-Fi**, enabling **remote monitoring and control**, where operators can access real-time data and vehicle movements via a web interface. Designed for applications in **military surveillance, disaster rescue, security patrols, and remote monitoring**, this energy-efficient system offers a highly reliable and autonomous solution for human detection and location tracking.

WHO ARE THE END USERS?

Security & Surveillance – Detect intruders.
Search & Rescue – Identify stranded people.
Military Patrols – Autonomous defence.

TECHNOLOGY USED TO SOLVE THE PROBLEM

1) IoT:

C++: C++ programming language is used to program sensors and camera module.

ESP8266: ESP8266 is used as the microcontroller for the modules.

ESP32 camera module: The ESP32 camera modules are used for real-time live tracking.

L298N motor driver: To control the motors like forward, Backward, Turn left, Turn Right and stop.

12V Motors

Car Chassis Kit

Arduino Uno

GPS Neo-6m

2) Deep Learning:

Open CV

Media Pipe

3) Data Retrieval:

Flask