ESP-Eye Rover

Introduction:

The **ESP-Eye Rover** is an advanced surveillance robot car project designed to offer real-time video monitoring and remote control capabilities. Utilizing the ESP32 CAM module, this project integrates modern technology to provide a seamless and interactive surveillance experience. The ESP-Eye Rover allows users to monitor live video feeds and control the robot car via Wi-Fi, making it a versatile tool for various applications including security surveillance and remote inspection.

Objective:

The primary objective of the ESP-Eye Rover project is to develop a surveillance robot car that can:

1. Capture live video through an ESP32 CAM module.
2. Transmit the video feed to a mobile device via Wi-Fi for real-time monitoring.
3. Provide remote control of the robot car's movements through Wi-Fi.
4. Integrate these functionalities into a cohesive system for effective surveillance and control.

Methodology:

1. **Component Selection and Integration**: The project began with selecting appropriate components including the ESP32 CAM module, L298N Motor driver, robot chassis, lithium-ion battery, and jumper wires. Each component was chosen for its compatibility and functionality to ensure the project’s objectives could be met.
2. **System Design**: The robot chassis was assembled to house the ESP32 CAM module and motor driver. The ESP32 CAM module was connected to the motor driver via the ESP32’s GPIO pins to manage the car's movements. The lithium-ion battery was used to power the

entire system, ensuring adequate power supply for both the camera module and motor driver.

3. **Programming and Configuration**: The ESP32 CAM module was programmed to capture and stream live video over Wi-Fi. The video feed was configured to be viewable on a mobile device through a web interface. Additionally, the control logic was implemented to allow remote operation of the robot car via Wi-Fi, using control commands sent from the mobile device.
4. **Testing and Calibration**: The system was tested to ensure reliable video streaming and responsive control. Adjustments were made to optimize video quality and control accuracy, and the overall performance was assessed to meet the project objectives.

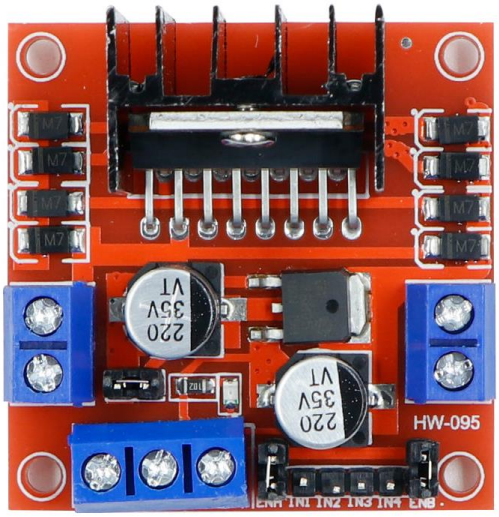
Components Used:

- **Robot Chassis**: The robot chassis serves as the foundational structure of the ESP-Eye Rover. It includes the frame, wheels, and sometimes motors, providing both stability and mobility. Designed for easy assembly, the chassis supports the mounting of various components like the ESP32 CAM module and motor driver.

- **ESP32 CAM Module**: The ESP32 CAM module is a compact, cost-effective camera solution that integrates Wi-Fi and Bluetooth capabilities. It captures high-resolution images and streams live

video, making it ideal for surveillance applications. With its built-in microcontroller.

- **L298N Motor Driver**: The L298N motor driver is a dual H-bridge driver module capable of controlling two DC motors or a single stepper motor. It allows for precise control of the robot car's movement, including direction and speed adjustments.



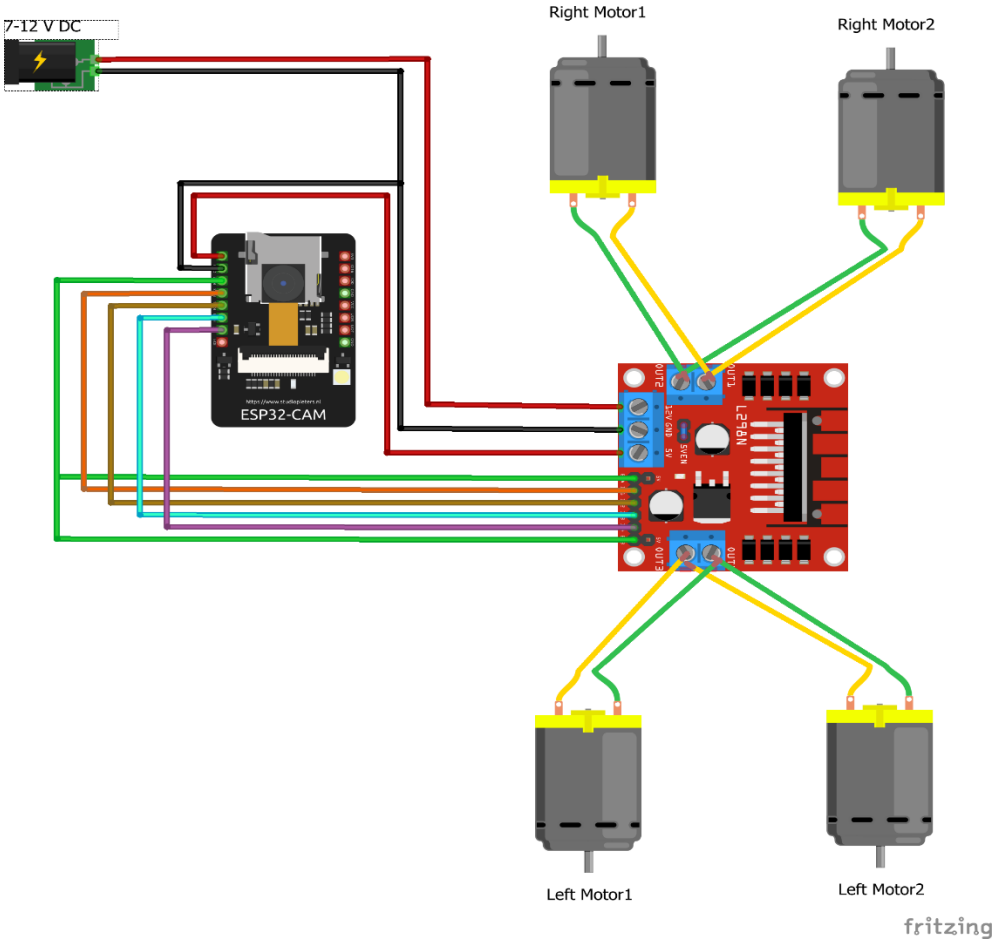
- **Lithium-Ion Battery**: A lithium-ion battery provides a reliable and rechargeable power source for the ESP-Eye Rover. It supplies power to the entire system.

- **Jumper Wires**: Connect various components and facilitate electrical connections.

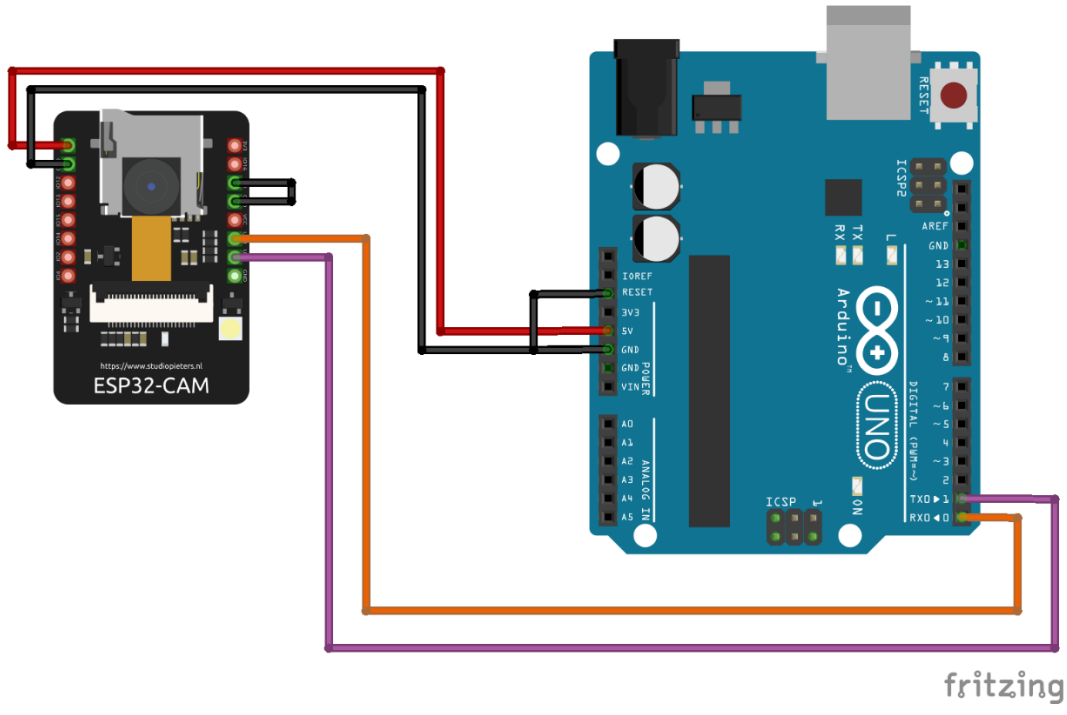
System Design:

The system design involves integrating the ESP32 CAM module with the robot chassis and motor driver to form a cohesive surveillance robot car. The ESP32 CAM module is mounted on the chassis, and its outputs are connected to the motor driver to control the car's movements. The lithium-ion battery powers the entire system, ensuring that both the camera and motor driver receive sufficient power.

Connection diagram:



Connection for uploading the code to esp32 cam:

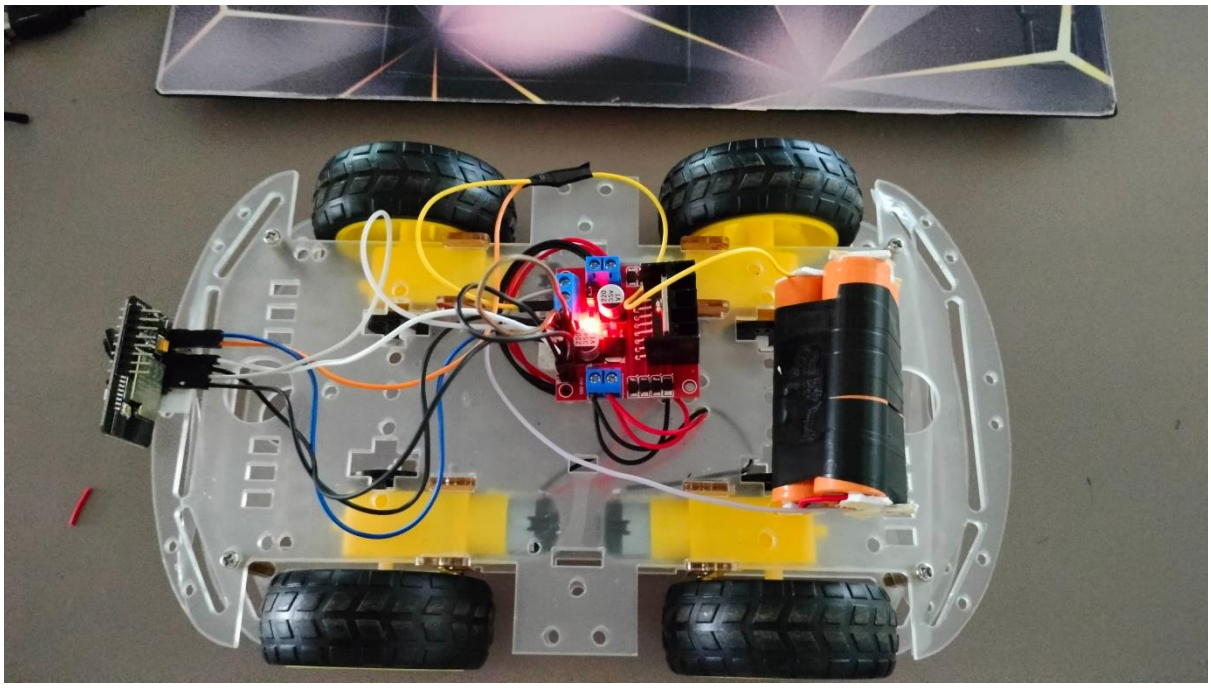


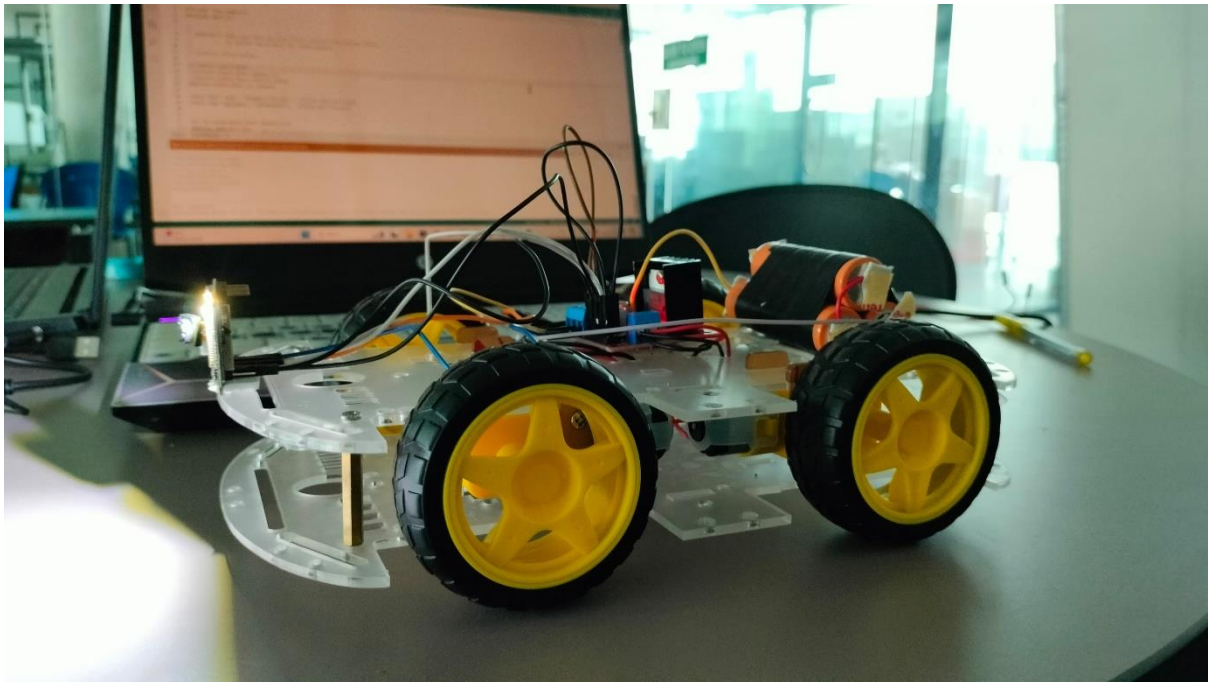
Data Collection and Transmission:

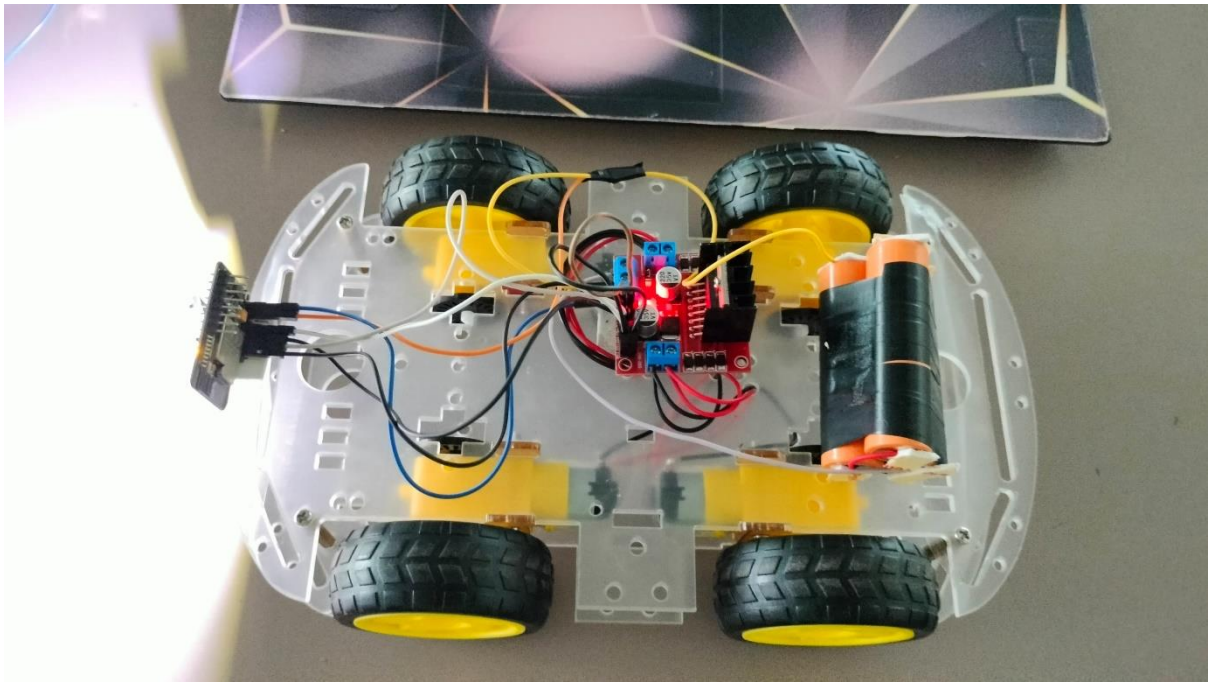
Data collection involves capturing video footage using the ESP32 CAM module. This video feed is processed and transmitted over Wi-Fi to a mobile device, where it is displayed in real-time. The data transmission is facilitated by the ESP32's Wi-Fi capabilities, allowing for seamless streaming and control.

Results:

The ESP-Eye Rover successfully meets its objectives by providing a live video feed that can be viewed on a mobile device through a web interface. The remote control functionality allows users to maneuver the robot car in various directions, and the system performs reliably under different conditions. The integration of video streaming and remote control provides an effective surveillance solution.







Video link for demonstration:

https://drive.google.com/file/d/17Qs-HLM2gSpZ5KEobzyw_KXooOYPSIzD/view?usp=sharing

Conclusion:

The ESP-Eye Rover project demonstrates the successful implementation of a surveillance robot car using modern technology. The ESP32 CAM module's video streaming capabilities, combined with remote control features, offer a practical and efficient solution for surveillance and remote monitoring. The project's success highlights the potential for further development and application of similar technologies in various fields, including security, inspection, and remote exploration.