**#Project Title:** IoT-Based Electric Car Control System using ESP32 and Flutter

##**Overview:**

This project demonstrates a smart robotic car controlled wirelessly via a mobile application. It uses an ESP32 microcontroller and a Flutter-based mobile app for real-time control over Wi-Fi.

**##Tools & Technologies**

* ESP32 Microcontroller (Arduino IDE)
* L298N Motor Driver
* Wi-Fi Module (built-in ESP32)
* Flutter & Dart (for Android app)
* Mobile Phone (control interface)

#**#Folder Structure**

* /Documentation → Final report and abstract
* /Code

├── ESP32\_Firmware → Arduino code (`main\_firmware.ino`)

└── Mobile\_App → Flutter project with Dart code

* /Images → designs, car images, app screenshots
* README.txt → This file

**##How to Run**

**###Hardware Setup (ESP32 + Motor Driver)**

1. Open `main\_firmware.ino` from `/Code/ESP32\_Firmware/` in Arduino IDE

2. Connect ESP32 and upload the sketch

3. ESP32 connects to Wi-Fi (SSID & Password inside code)

4. L298N driver controls motor via GPIOs

**###Mobile App Setup (Flutter)**

1. Go to `/Code/Mobile\_App/`

2. Open in Android Studio / VS Code with Flutter installed

3. Run `flutter pub get`

4. Connect mobile to the same Wi-Fi as ESP32

5. Replace the ESP32 IP address in `main.dart` if needed

6. Build and run the app on your mobile

**##Screenshots**

Check the `/Images/` folder for:

* `Circuit\_Diagram.png`: Full wiring diagram
* `Car\_Photo.jpg`: Assembled robotic car
* `App\_Screenshot.jpg`: Control interface of mobile app

**##Notes**

* Ensure mobile and ESP32 are on the \*\*same Wi-Fi network\*\*
* WebSocket or HTTP is used depending on version
* Range depends on Wi-Fi signal

**##Timeline**

* Start Date: June 2025
* Completion Date: July 2025
* Status: ✅ Completed