Mobile-Controlled Vehicle Lock/Unlock System

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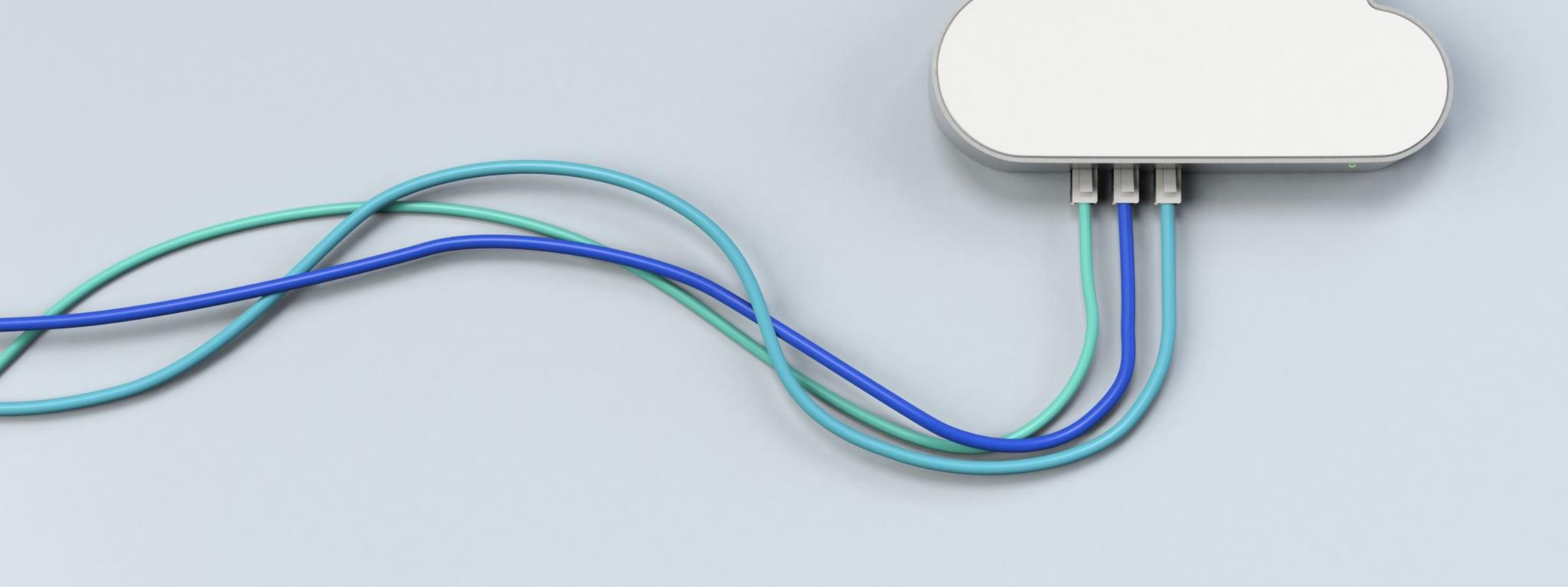


Introduction

- This project presents a smart vehicle locking system controlled via a mobile app over Wi-Fi.
- It uses a relay to simulate door locking, and a CC3200 Launchpad as the core controller.

Description

Lock Unlock control of car using a remote device such as Smartphone using an App.

Problems Addressed

- Remote control for locking/unlocking
- Lock Unlock status feedback

Goal

- To enable smart, remote-controlled vehicle locking in enhanced security and user convenience.

Key features

Dual Lock Control Modes

- Mobile Control Mode: Users can lock or unlock the vehicle remotely via a dedicated Android app. Commands are sent directly to the CC3200 over Wi-Fi.
- Manual Hardware Mode: The relay can be controlled using physical input via serial commands.

Wireless Communication (Wi-Fi AP Mode)

- The CC3200 Launchpad acts as a dedicated Wi-Fi Access Point CarLockSystem.
- Direct connection between the Android device and hardware – no external router or internet required.
- Supports simple HTTP endpoints:
- /lock, /unlock: Trigger relay

Android Mobile App Interface

- Live connection monitoring (Connected/Disconnected).
- Center-aligned lock/unlock status display with dynamic image change.
- Sound + vibration feedback for user action.
- Dark/Light theme toggle for personalized display.
- Displays Wi-Fi signal icon and connection message in top app bar.

Relay Control & Feedback

- Relay simulates the car’s central locking mechanism.
- Status changes are visualized with fade animations (locked/unlocked car image).
- Audible beep and vibration confirm user input.

System Architecture Overview

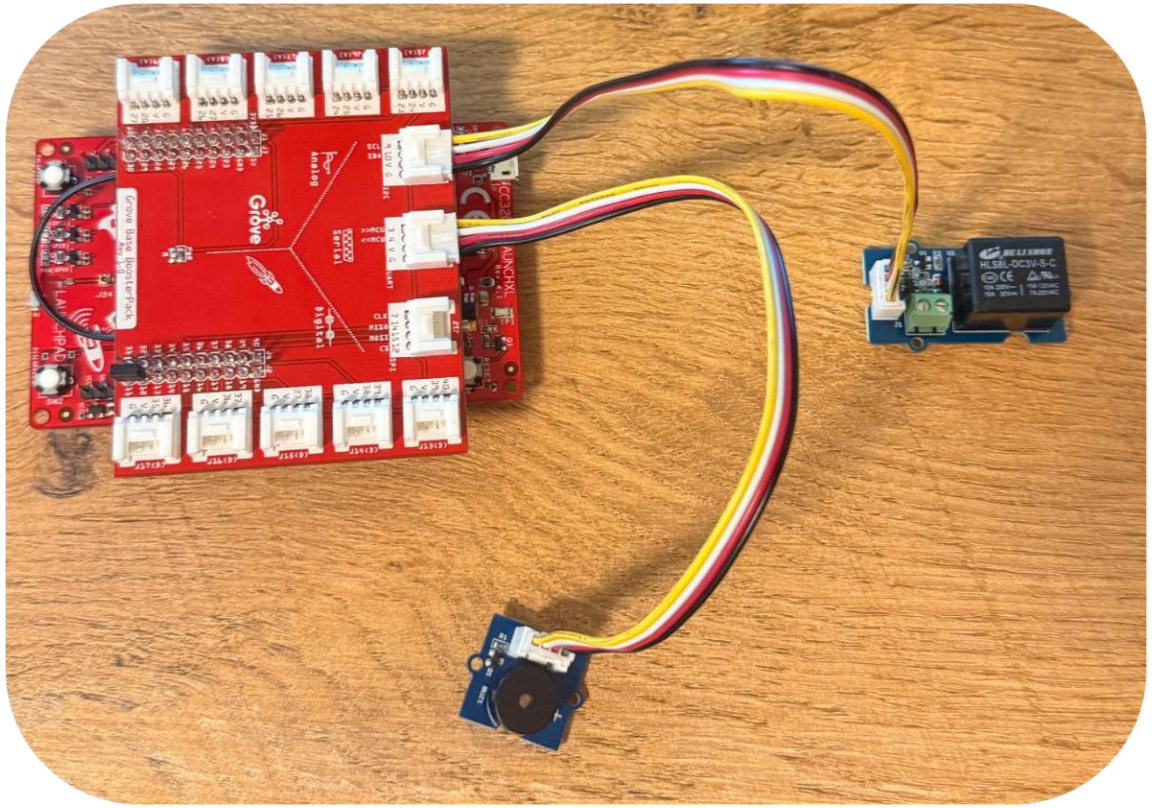
- This smart vehicle locking system uses **WiFi-based control and mobile interaction** to improve convenience and modernize user access to the car.
- **Core Components**
  - **Relay Module**
    - Simulates the car door lock by acting as a switch.
    - Controlled by the CC3200 based on /lock or /unlock command.
  - **Buzzer**
    - Provides immediate audio feedback on lock/unlock actions.
    - Beeps once when command is executed successfully.
    - Enhances user awareness and confirms relay activation.

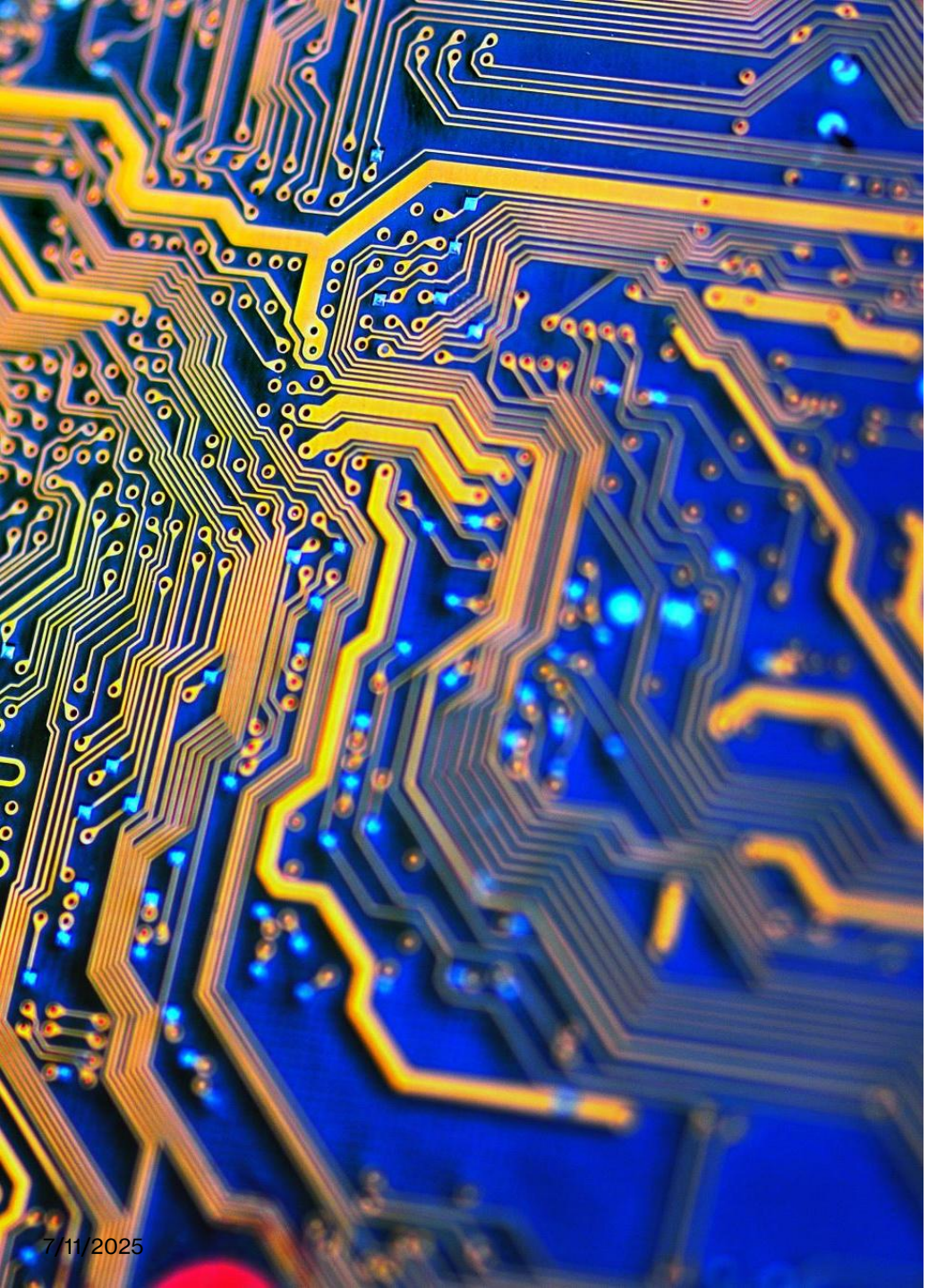
System Architecture Overview

- **CC3200 Launchpad**
  - Acts as the central controller.
  - Operates in WiFi Access Point mode CarLockSystem.
  - Hosts an HTTP server to process incoming requests and control relay.
- **Android App**
  - Connects directly to CC3200 via WiFi (no internet required).
  - Displays real-time lock status and WiFi connectivity.
  - Offers dark/light theme toggle and animated UI feedback.
  - Plays sound and vibrates on command confirmation.
- **Communication Flow**
  - Android app sends /lock or /unlock HTTP request to CC3200 over WiFi.
  - CC3200 receives the request, triggers the relay (lock) and buzzer (beep).
  - CC3200 sends an HTML response confirming the command.
  - App updates UI with lock status, sound, and vibration feedback.

Hardware Connections

- Buzzer -> J11 (serial)
- Relay Module -> J10 (serial)
- 5V and GND connected to sensors.
- CC3200 operates in Access Point Mode.





Energia Firmware Logic

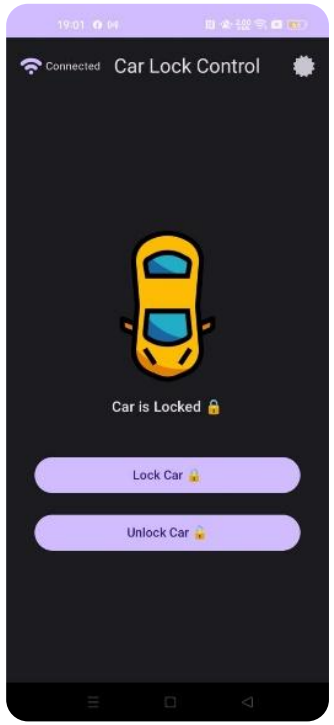
- Listens for HTTP commands via WiFi (/lock or /unlock).
- Activates or deactivates the relay based on command.
- Triggers the buzzer for feedback on every action.
- Supports manual control via serial input (L / U).
- Sends back a basic HTML response for confirmation.

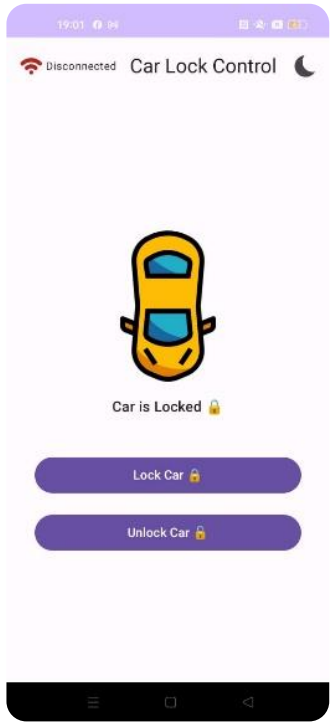
Android App UI Design

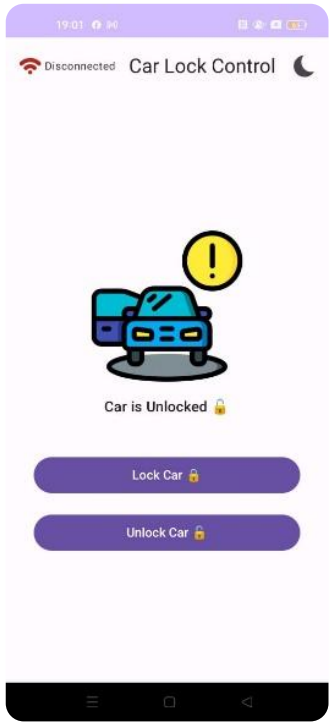
Features:

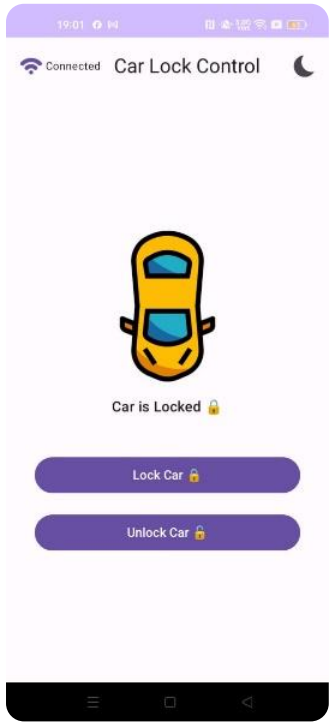
- Top bar with app title, WiFi connection status, and light/dark theme toggle.
- Dynamic car image indicating lock/unlock state.
- Status message below image.
- Two main control buttons for: Lock Car, Unlock Car
- Color-coded connection status.
- Vibration and sound feedback after action.
- Dark mode UI optimization.

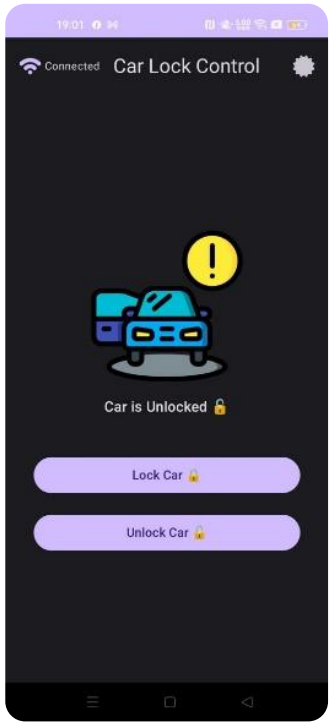
Screenshots











Evaluation

Advantages:

- Simple and intuitive lock/unlock automation
- Offline-capable using WiFi Access Point
- No third-party cloud dependency – full local control
- Compact, reusable system architecture for other vehicle control tasks
- Modern and responsive UI in Android app

Limitations:

- WiFi AP mode disables the phone’s internet access
- No persistent memory (lock state not saved after restart)
- Works within limited WiFi range only
- Only one Android device can control at a time

Future Improvements

- Add **authentication layer** (PIN/Fingerprint)
- Support **Bluetooth fallback** for emergency connection
- Include **scheduling feature** to auto-lock at specific times
- Add **logging/history feature** for lock/unlock events

Thank You