Door Control System

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Agenda

- Project Overview

- Static Architecture

- Block Diagram

- Features

- Scenario-based functionality

- Future Work

Project Overview

Two microcontrollers connected via UART, the first microcontroller (ECU1) is connected to door sensor, DC motor and LCD, the second microcontroller (ECU2) is connected to light and buzzer.

ECU2 checks the state of door sensor and DC motor then it decides whether to turn on the buzzer or not.
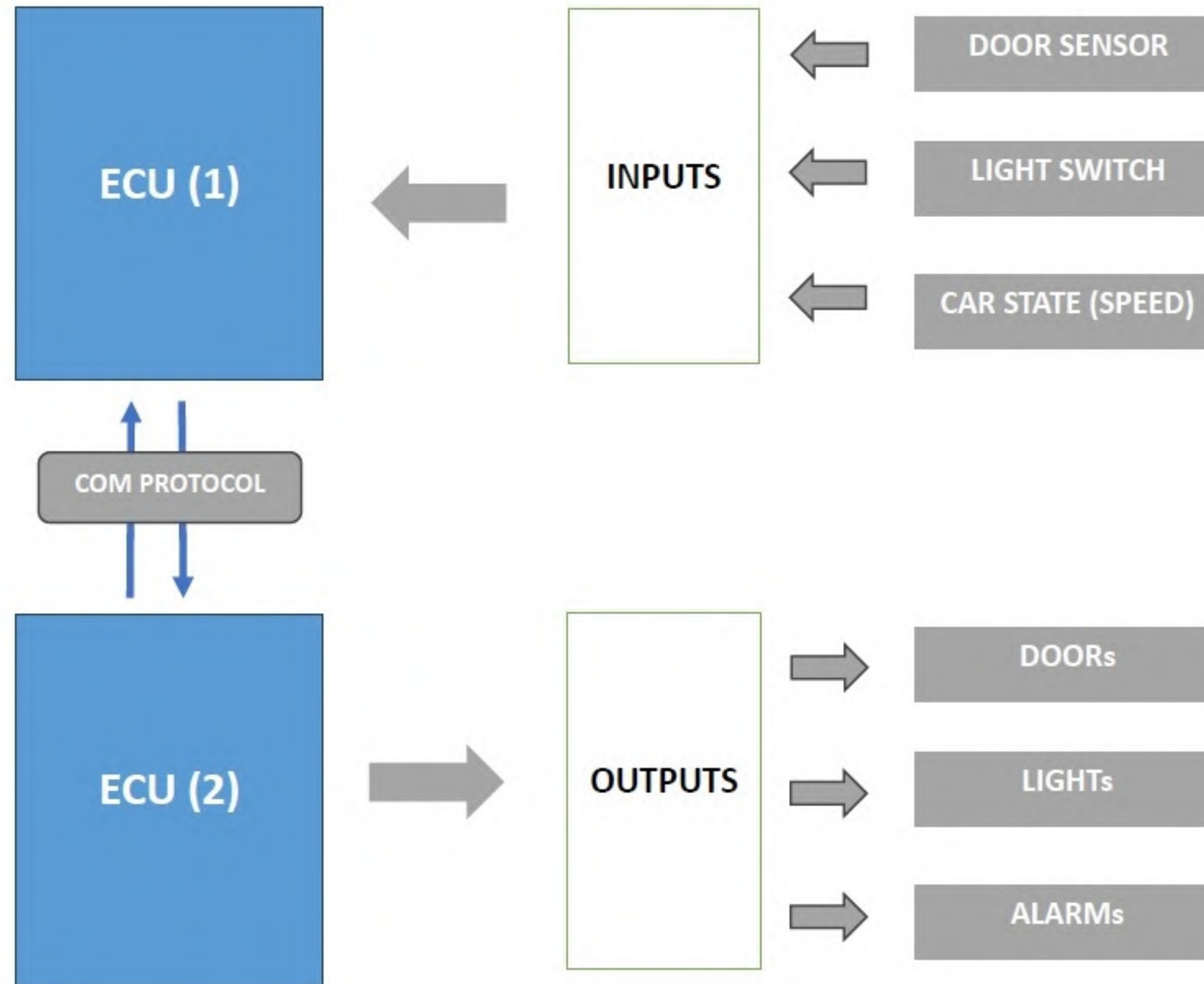
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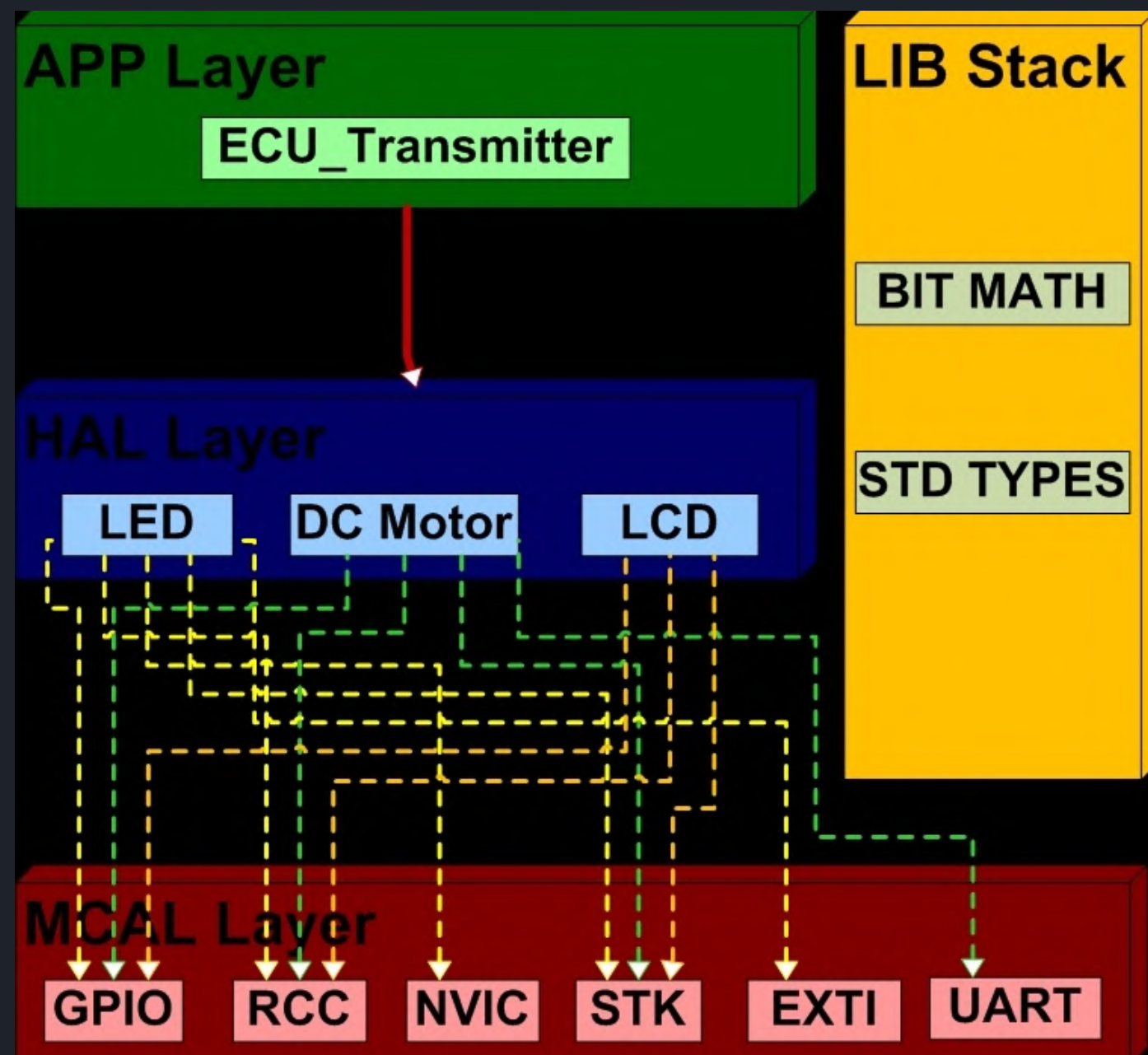
Transmitter static architecture
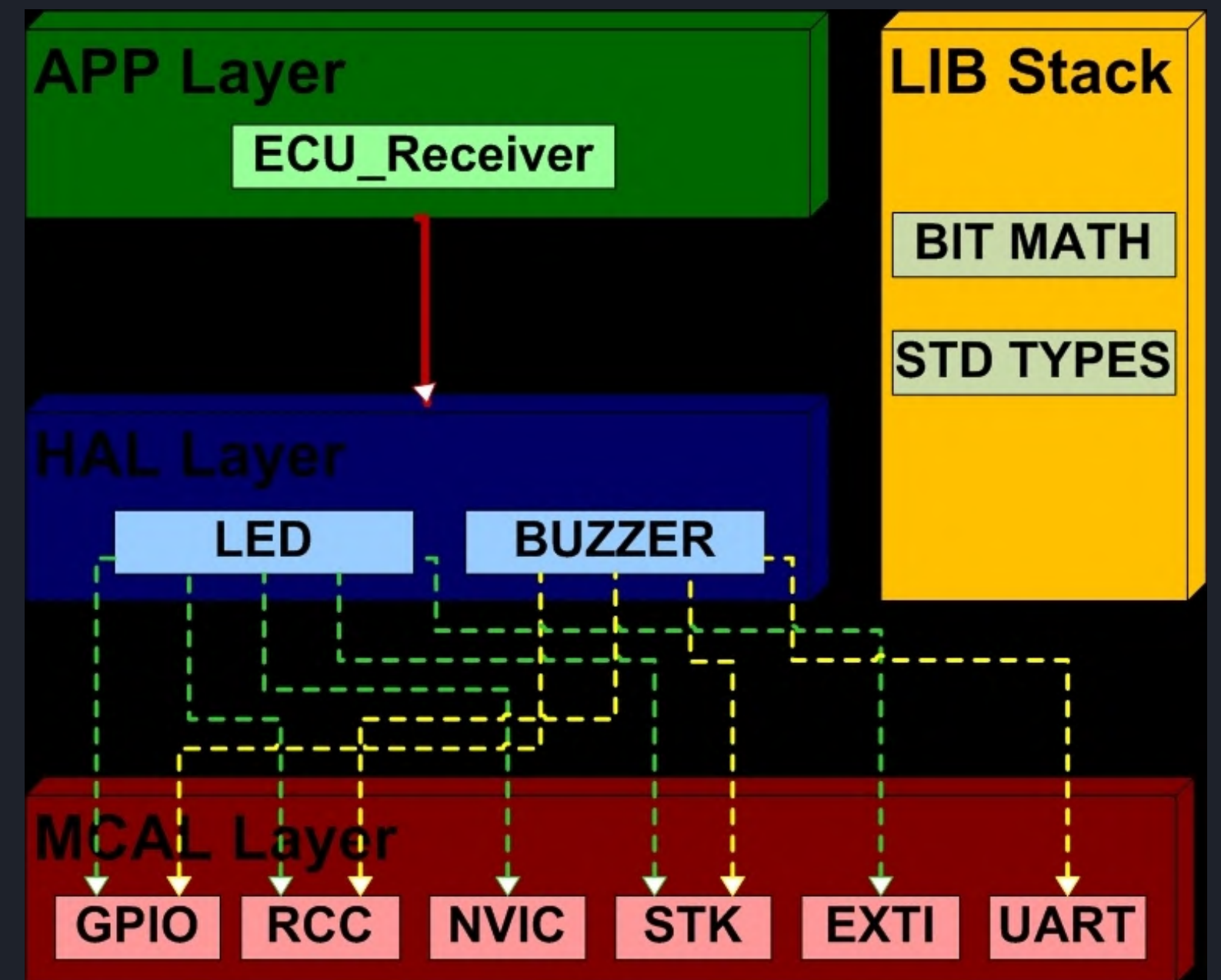
Reciever static architecture

Project Block Diagram

Features

1. Intelligent Door Sensing:

   - Utilizes advanced door sensors for accurate detection of open/closed status of vehicle doors.

2. Microcontroller Excellence:

   - Employs the powerful ARM Cortex-M4 STM32F401CC microcontroller.

   - Ensures efficient data processing and optimal control execution.

3. Contextual Car State Integration:

   - Seamlessly integrates with the car's operational state (moving or stopped).

   - Determines appropriate actions based on the car's context.

Scenario-based functionality

A. Dynamic Response to Open Door in Motion:

  - Activates the buzzer for safety when a door is detected as open while the car is in motion.

  - Keeps the lights off in this scenario.

B. Stationary Car Safety Measures:

  - Ensures car safety when a door is opened while the car is stationary.

  - Turns off the buzzer and activates lights.

C. Energy-Efficient Management:

  - Automatically turns off lights after 3 seconds when a door is closed.

  - Promotes efficient energy usage.

D. Enhanced Visibility during Driving:

  - Allows the driver to activate the lights while the car is moving.

  - Ensures the buzzer is not triggered in this situation.

Scenario-based functionality

E. Balancing Safety and Convenience:

  - Enables simultaneous activation of lights and buzzer by pressing the light switch when the car is stopped.

  - Maintains a balance between safety and convenience.

Enhanced Safety Measures:

- Suggestion: Incorporate a speed threshold to prevent doors from being opened at higher speeds.

- Enhances passenger safety by limiting certain actions based on vehicle speed.

By integrating cutting-edge technologies and employing smart decision-making, the "Automotive Door Control System Design" project revolutionizes automotive interactions. It prioritizes safety, convenience, and efficient energy usage, redefining the standards in this domain.

Future Work

2 Modes operation:

1- Family mode:

In this mode, there will be more protection by using door locker.

2- Normal Mode.

Voice commands: our system will be integrated with voice command to take actions.

language changing: our system will support many languages to interact better with the user.

Door detection: our system will detect which car door is opened.

Thank You