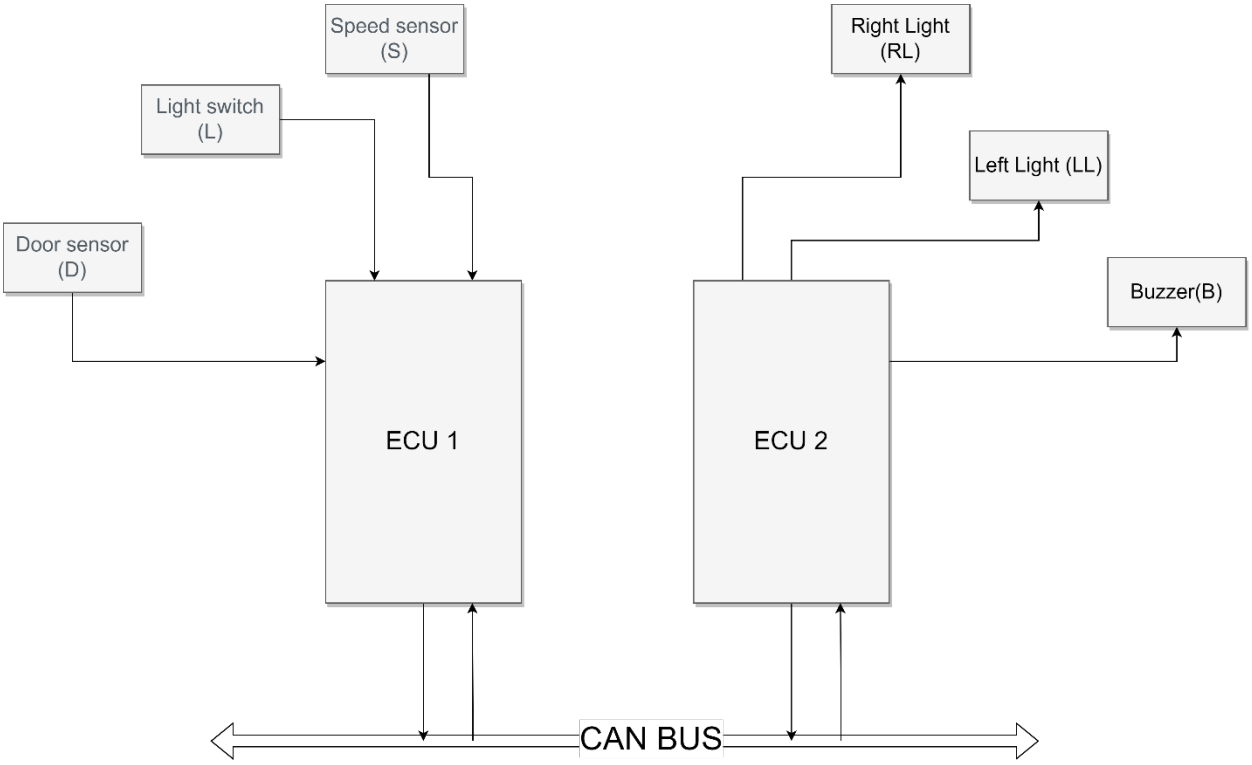
# Automotive door control system design

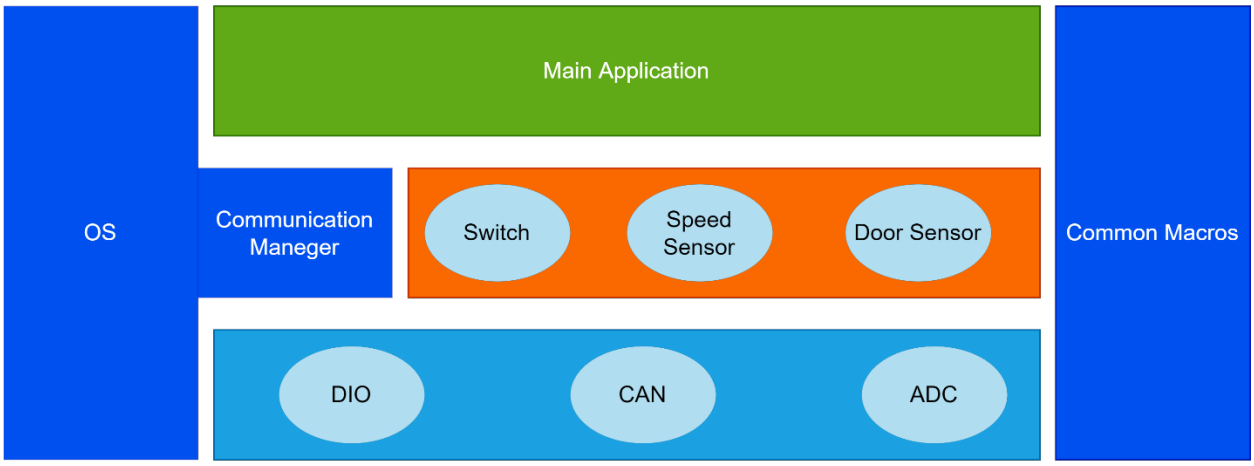
**Made By:** Omar Osama Abdelmonem

## Block Diagram

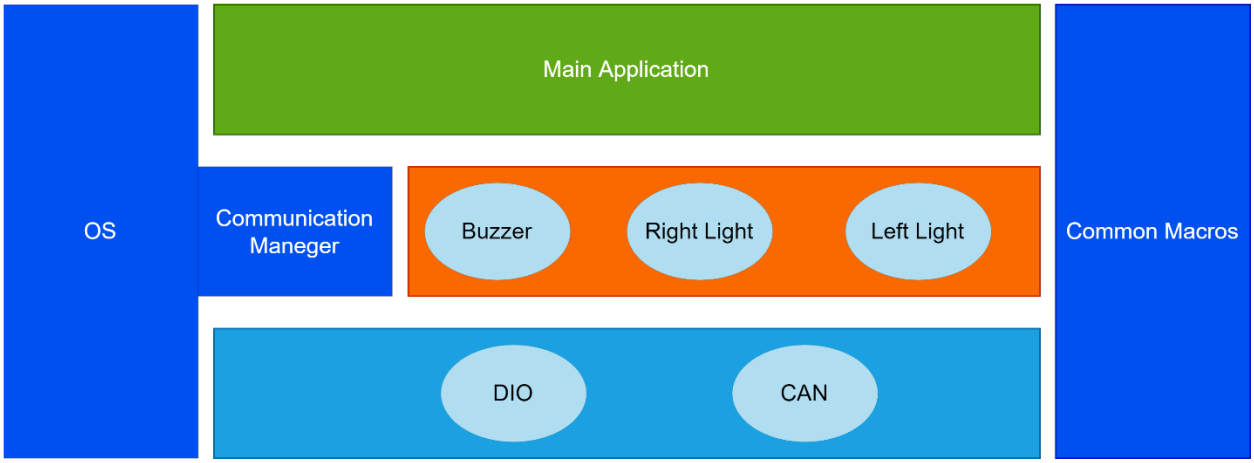


## Layered Architecture

### ECU 1




### ECU 2



## Components and Modules

| ECU 1 | | ECU 2 | |
|---|---|---|---|
| **Components** | **Modules** | **Components** | **Modules** |
| Light Switch Sensor<br>Door Sensor<br>Speed Sensor | Communication-manager<br>DIO<br>ADC<br>CAN<br>Speed Sensor Module<br>Door Sensor Module<br>Light Switch Module | Buzzer<br>Lights | Communication-manager<br>DIO<br>CAN<br>Buzzer Module<br>Lights Module |

## API Documentation

| ECU 1 APIs | | | | |
|---|---|---|---|---|
| **API Name** | **Module** | **Args** | **Return** | **Description** |
| CAN_Init | CAN | Void | Void | Initialize CAN Module |
| CAN_Send | CAN | Sensor – 0 -> 2<br>State – 0 -> 1 | Void | Send status message to Communication Manager<br><br>Sensor:<br>1- SPEED - 0<br>2- LIGHT - 1<br>3- DOOR - 2<br>State:<br>1- HIGH - 1<br>2- LOW - 0 |
| DIO_Init | DIO | Void | Void | Initialize DIO Module |
| DIO_read | DIO | Port – 0 -> 1<br>Pin – 0 -> 15 | State – 0 -> 1 | Read from sensors |
| DIO_Write | DIO | Port – 0 -> 1<br>Pin – 0 -> 15<br>State – 0 -> 1 | void | Set or reset a certain pin. |
| light_sensor_init() | Light Switch | Void | Void | Initialize Light Sensor Module |
| light_sensor_read() | Light Switch | Void | State – 0 -> 1 | Read the state of the light switch |
| door_sensor_init() | Door Sensor | Void | Void | Initialize Door Sensor Module |
| door_sensor_read() | Door Sensor | Void | State – 0 -> 1 | Read the state of the door sensor |
| speed_sensor_init() | Speed Sensor | Void | Void | Initialize Speed Sensor Module |
| speed_sensor_read() | Speed Sensor | Void | State – 0 -> 1 | Read the state of the speed sensor |

| ECU 2 APIs | | | | |
|---|---|---|---|---|
| **API Name** | **Module** | **Args** | **Return** | **Description** |
| CAN_Init | CAN | Void | Void | Initialize CAN Module |
| CAN_Recieve | CAN | Void | Sensor – 0 -> 2<br>State – 0 -> 1 | Receive status message to Communication Manager<br><br>Sensor:<br>1- SPEED - 0<br>2- LIGHT - 1<br>3- DOOR - 2<br>State:<br>1- HIGH - 1<br>2- LOW - 0 |
| DIO_Init | DIO | Void | Void | Initialize DIO Module |
| DIO_read | DIO | Port – 0 -> 1<br>Pin – 0 -> 15 | State – 0 -> 1 | Read from sensors |
| DIO_Write | DIO | Port – 0 -> 1<br>Pin – 0 -> 15<br>State – 0 -> 1 | void | Set or reset a certain pin. |
| light_init() | Lights | Void | Void | Initialize Lights Module |
| light_setState() | Lights | State – 0 -> 1 | Void | Set the state of the lights |
| buzzer_init() | Buzzer | Void | Void | Initialize Buzzer Module |
| buzzer_setState() | Buzzer | State – 0 -> 1 | Void | Set the state if the buzzer |