Protection of Road Accident by Interconnecting Vehicle

Road accidents remain a global issue, causing countless injuries and fatalities every year. While several measures have been implemented to prevent such accidents, there is a need for more effective and innovative solutions. In today's world, Vehicle to Vehicle (V2V) communication is essential for any form of activity, to prevent accidents. Light Fidelity (Li-Fi) and LoRaWAN(Low Power Wide Area Network) are two emerging wireless communication technologies that offer unique advantages over traditional wireless communication technologies like Wi-Fi and cellular networks. Li-Fi uses light waves to transmit data, while LoRaWAN uses radio waves to communicate over long distances.

Vehicle-to-Vehicle Communication System project is to avoid the roadway collisions and to drivers prior to the collision. The ultrasonic sensors are used as a distance measurement device for this system, a low power, high-performance microcontroller is used to control the overall operations systematically. Piezoelectric sound buzzer is used to warn the user. It helps better communication system between two vehicles by calculating distance and speed of other vehicles will be display on LCD. Cost required for installation is low and easy to design with low investment. If the sensor detects object very near to the vehicle, Microcontroller can stop the vehicle automatically. By using POT (potentiometer) user can set the vehicle speed. The main controlling device of the project is Arduino UNO, to achieve this task microcontroller loaded program written in embedded C language.

Objectives:

Li-Fi Technology Implementation: Utilizing Li-Fi technology for high-speed data transmission between vehicles, ensuring quick and reliable communication.

Accident Prevention: Implementing a system that can detect potential accidents and take preventive measures to avoid collisions.

Real-time Communication: Establishing a reliable and low-latency communication network between vehicles to share important information such as speed and distance.

Inter-vehicle Coordination: Allowing vehicles to coordinate with each other to maintain safe distances and avoid sudden braking or swerving.

The main building blocks of the project are:

- TWO Battery power supply.
- Two Arduino uno Boards.
- Two lm2596 regulators.
- Ultrasonic Sensor
- LDR.
- 12V LEDs.
- Two LCD displays.
- Lora modules.
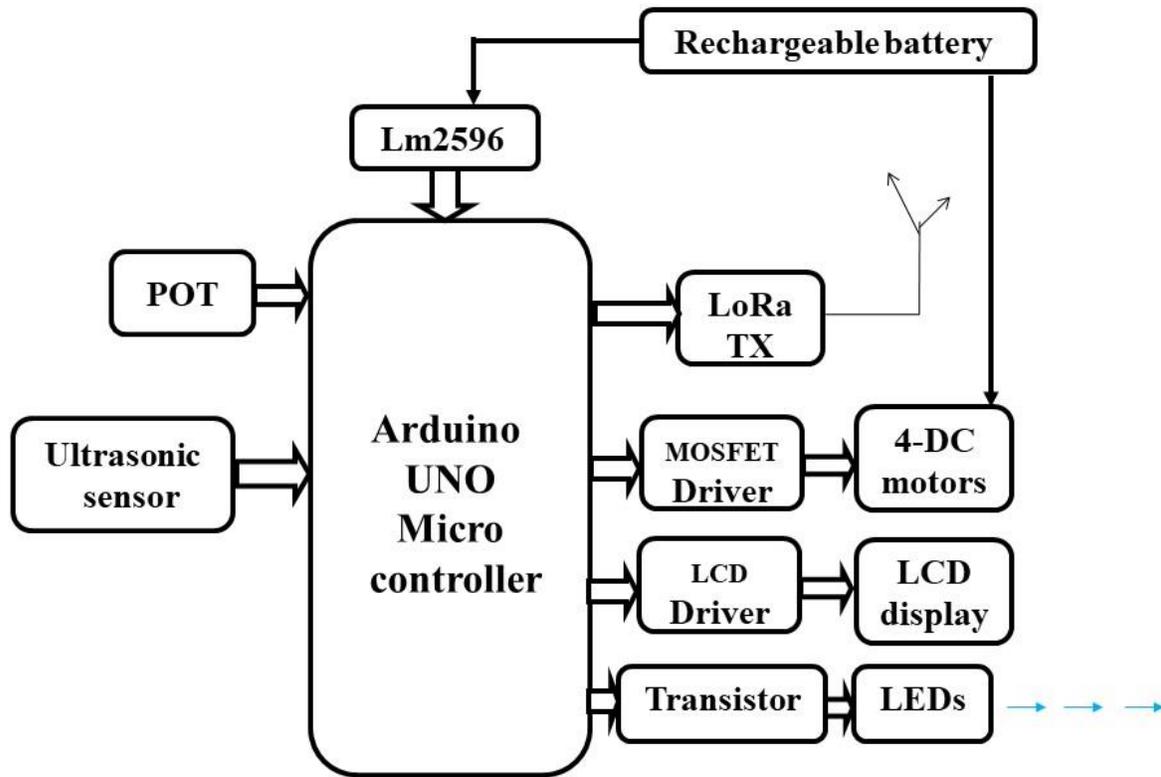- Two vehicles.

Technologies used:

- Li-Fi Technology.
- LoRa Technology.

Software's used:

- Arduino ide studio compiler to write the program.
- Express SCH for Circuit design.

Block diagram of the project:

Block Diagram of Transmission Section

Block Diagram of receiving Section