

Vehicle-to-Vehicle Communication Using Li-Fi technology using Arduino Nano

<https://www.youtube.com/watch?v=QNJUkBllmvw>

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) wireless communication technology that offer unique advantages over traditional wireless communication technologies like Wi-Fi and cellular networks. Li-Fi uses light waves to transmit data over a short distance.

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. Accident sensor is used to detect the accidents, gas sensor is used to detects the gas, fire sensor is used to detect the fire and emergency button is used to send the voice alert in panic situations. Li-Fi technology is used to transmits the data using light waves and receiving the data using solar wirelessly. It helps better communication system between two vehicles by calculating distance and vehicle status like accident, gas, fire, emergency of other vehicles will be display on LCD and also voice alert will be coming from speaker. The main controlling device of the project is Arduino Nano, 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.

- **Data Transmission:** In the event of an emergency such as an accident, gas leak, or fire, the affected vehicle would transmit a distress signal encoded in light waves.
- **Reception and Display:** Nearby vehicles equipped with Li-Fi receivers would capture these signals. The received data could be displayed on an LCD screen within the vehicle, alerting the driver to the situation ahead.
- **Voice Alerts:** Simultaneously, the system could generate voice alerts through the vehicle's speaker system to ensure the driver is immediately made aware of the emergency.

The main building blocks of the project are:

- TWO Battery power supply.
- Two Arduino Nano Boards.
- LM2596 regulators.
- Ultrasonic Sensor
- LDR.
- SOLAR.
- 12V LEDs.
- Two LCD displays.
- Two vehicles.
- Accident sensor.
- Fire sensor.
- GAS sensor.
- Apr33a3 voice module.

Technologies used:

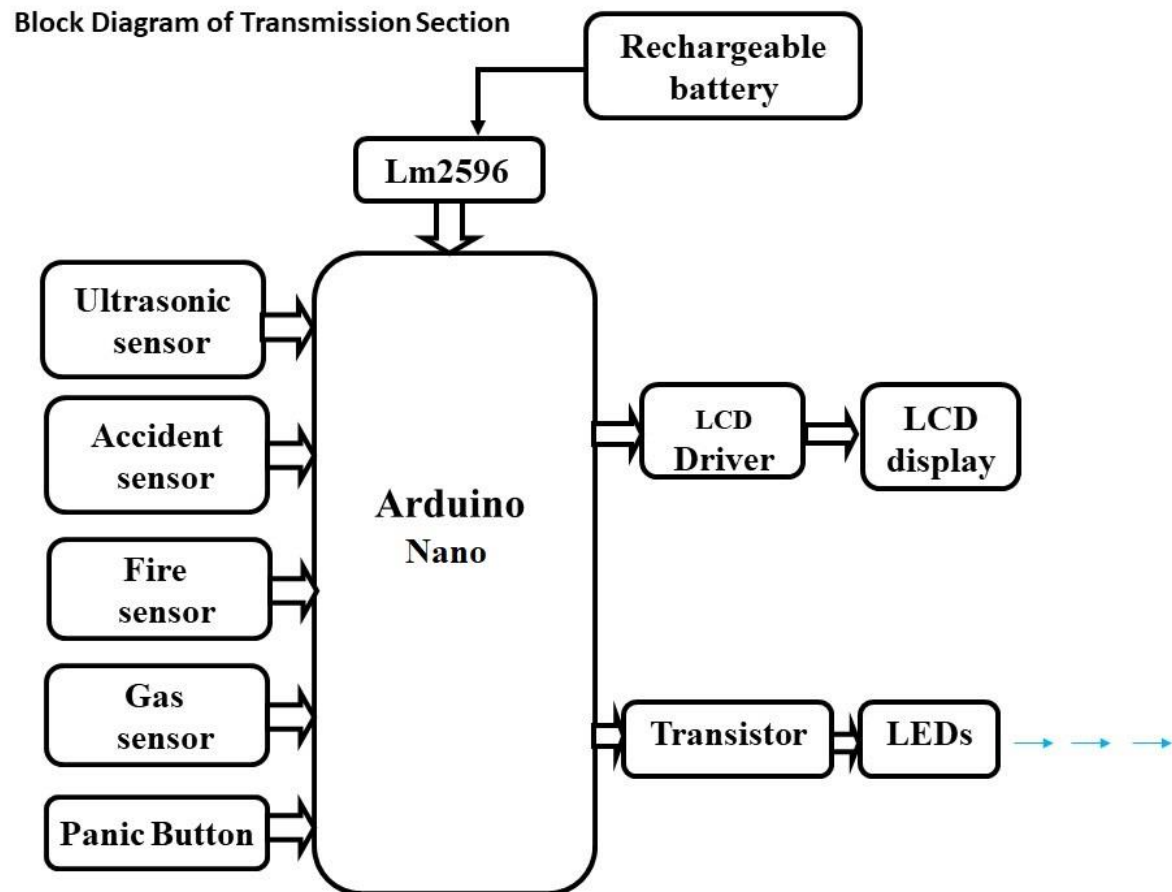
- Li-Fi Technology.

Software's used:

- Arduino IDE studio compiler to write the program.

- Express SCH for Circuit design.

Block diagram of the project:



Block Diagram of receiving Section

