

VEHICLE TO INFRASTRUCTURE V2I



Introduction

In today's fast-paced world, traffic congestion and accidents pose significant challenges to our transportation systems. To address these issues, we have developed innovative solutions that leverage technology to enhance road safety and efficiency.

- **Smart Traffic Light:**
 - **Dynamic Traffic Management:**
Optimizes signal timings based on real-time traffic conditions.
 - **Emergency Vehicle Prioritization:**
Prioritizes emergency vehicles by instantly switching traffic lights to green.
- **Collision Avoidance Warning System:**
A safety measure designed to prevent accidents on hazardous road sections, particularly mountain turns.



Problems & Solutions

1. ***Air Quality and Health Impact*:**

- Respiratory Problems
- Cardiovascular Diseases
- Vulnerable Populations

2. ***Environmental Damage*:**

- Greenhouse Gas Emission
- Smog Formation

- Acid Rain

3. ***Noise Pollution***

4. ***Socioeconomic Disparities***

SOLUTIONS

1. Smart Traffic Management Systems

2. Public Transportation Improvements

3. Integrated Traffic Information Systems

4. Urban Planning and Zoning

5. Environmental Measures

Vision and Mission

VISION

A future where intelligent transportation systems optimize traffic flow, reduce accidents, and enhance the quality of life for all.

MISSION

To develop and implement innovative transportation solutions that prioritize safety, efficiency, and sustainability, thereby improving the overall quality of life for urban communities.

Smart Traffic Light



Smart Traffic Light

REAL-TIME TRAFFIC SENSING:

- **Sensor Network**
- **Data Collection**

A network of infrared sensors is strategically placed at intersections to collect real-time traffic data.

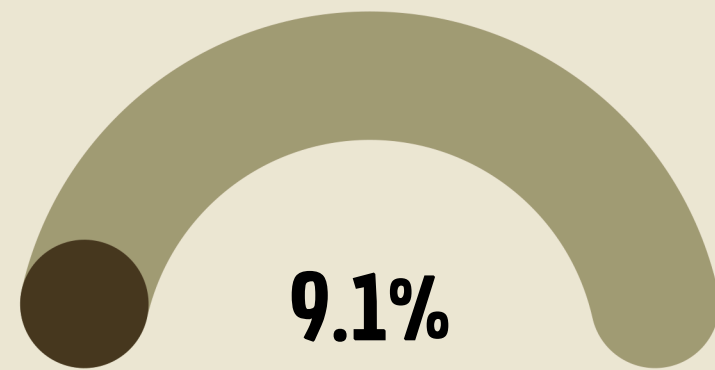
These sensors continuously monitor traffic flow.

CENTRALIZED SYSTEM

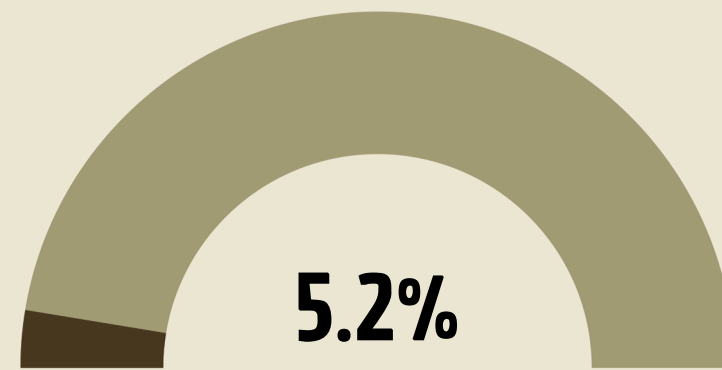
- **Aurdino**

Collected data is transmitted to a central control system. Then system analyzes traffic data to dynamically adjust the duration of green, yellow, and red lights for each traffic signal. The system can quickly adapt to changing traffic conditions, such as sudden increases in traffic volume or emergency situations.

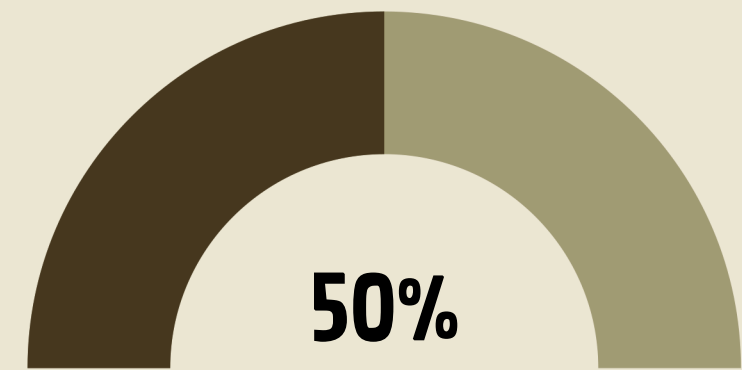
Death Rate



Death Rate/1k



Accidently /10k



Late Arival

Smart Traffic Light

EMERGENCY VEHICLE PRIORITIZATION:

- **Vehicle Detection:**

The system can detect emergency vehicles, such as ambulances and fire trucks etc. through dedicated radio frequencies.

- **Priority Signaling**

When an emergency vehicle approaches an intersection, the system can immediately switch the traffic light to green, allowing the vehicle to pass through without delay.

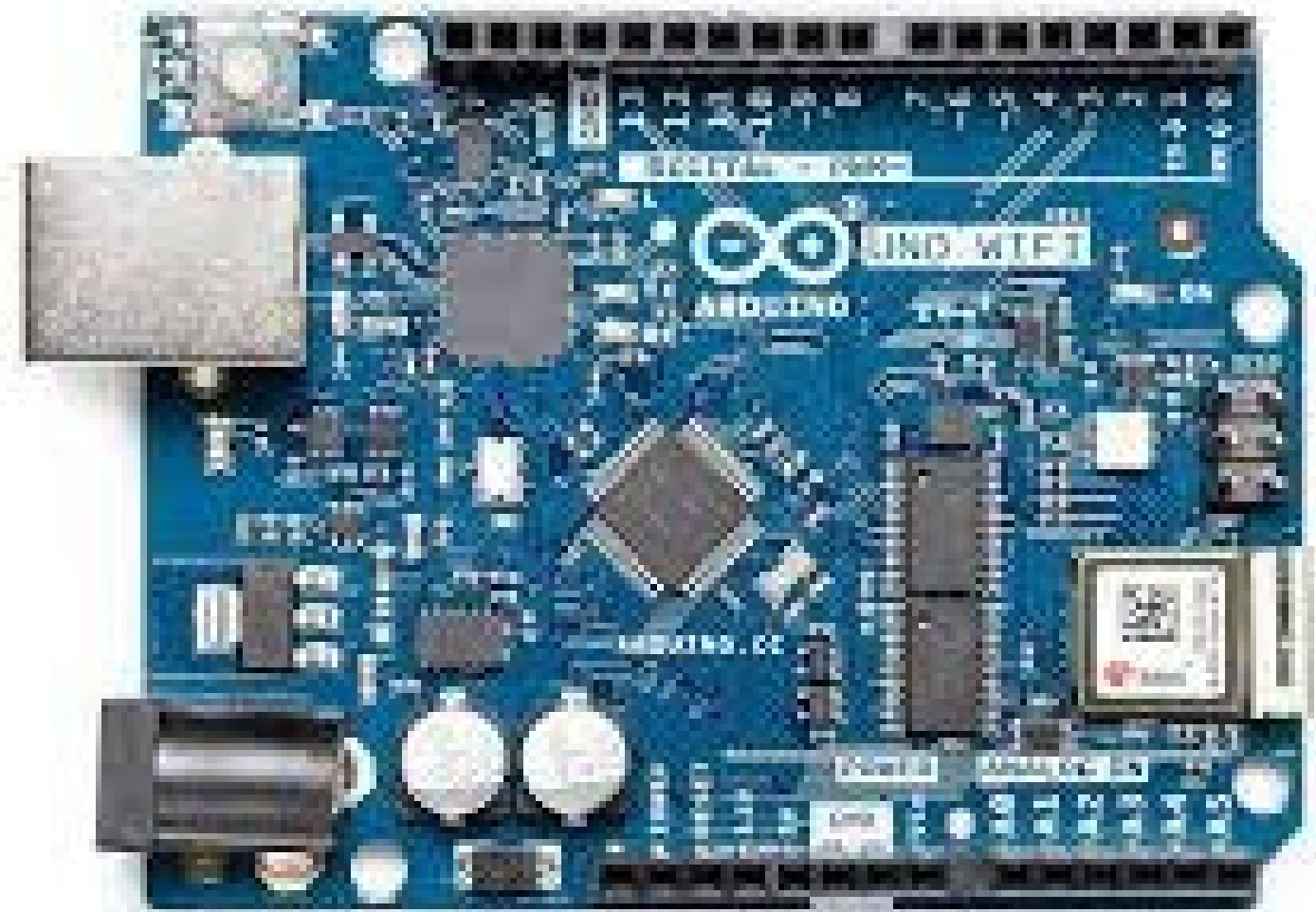
Components Used

ARDUINO

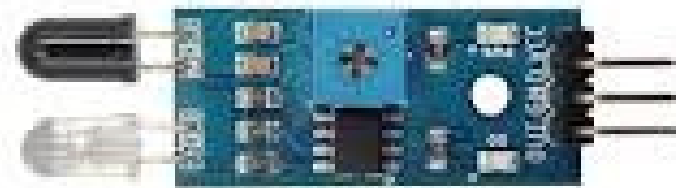
Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can communicate with software running on your computer (e.g., Flash, Processing, MaxMSP).

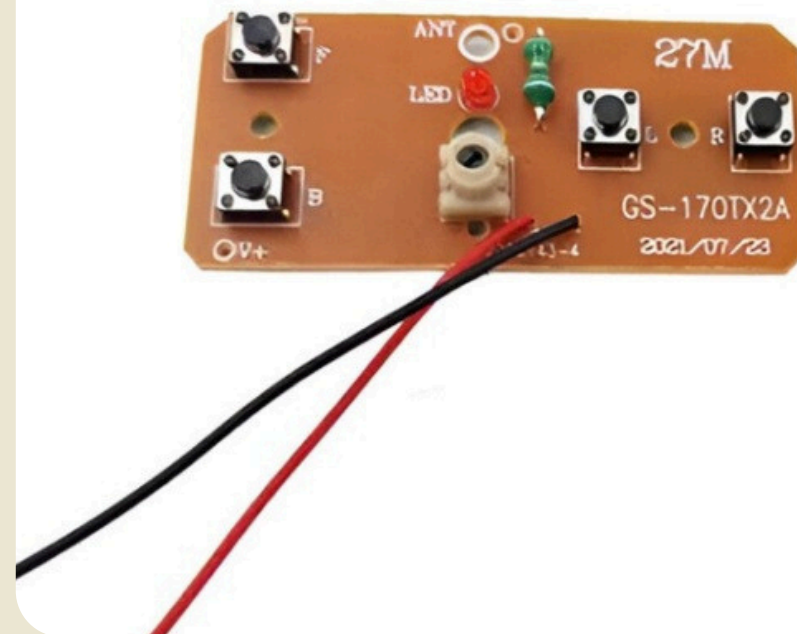
The Arduino programming language is an implementation of Wiring, a similar physical computing platform, which is based on the Processing multimedia programming environment.



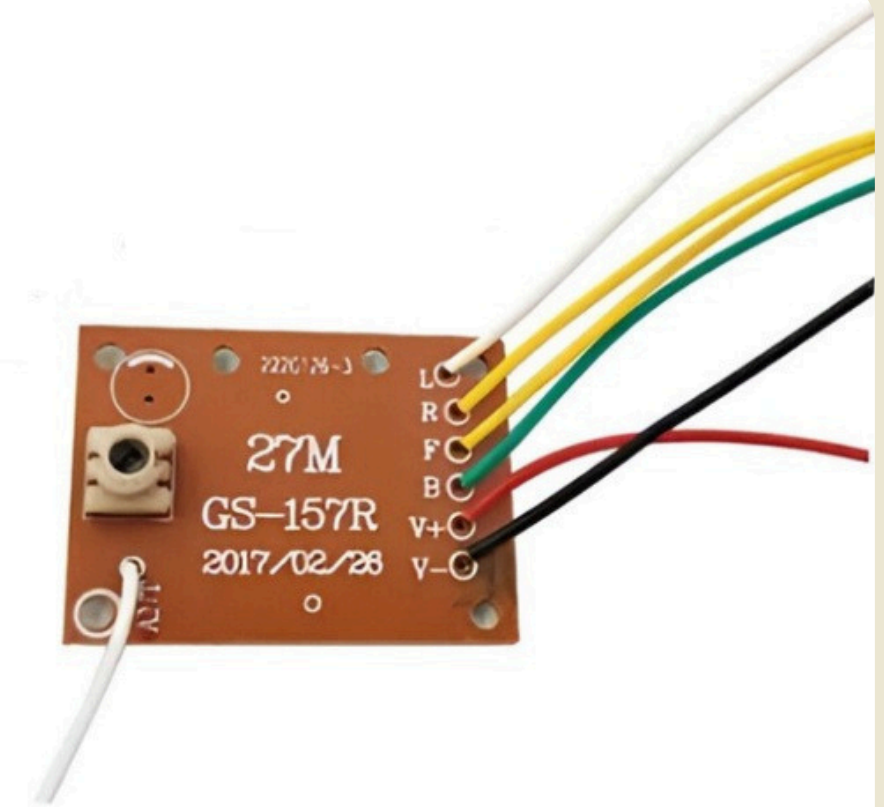
Components Used



IR SENSOR

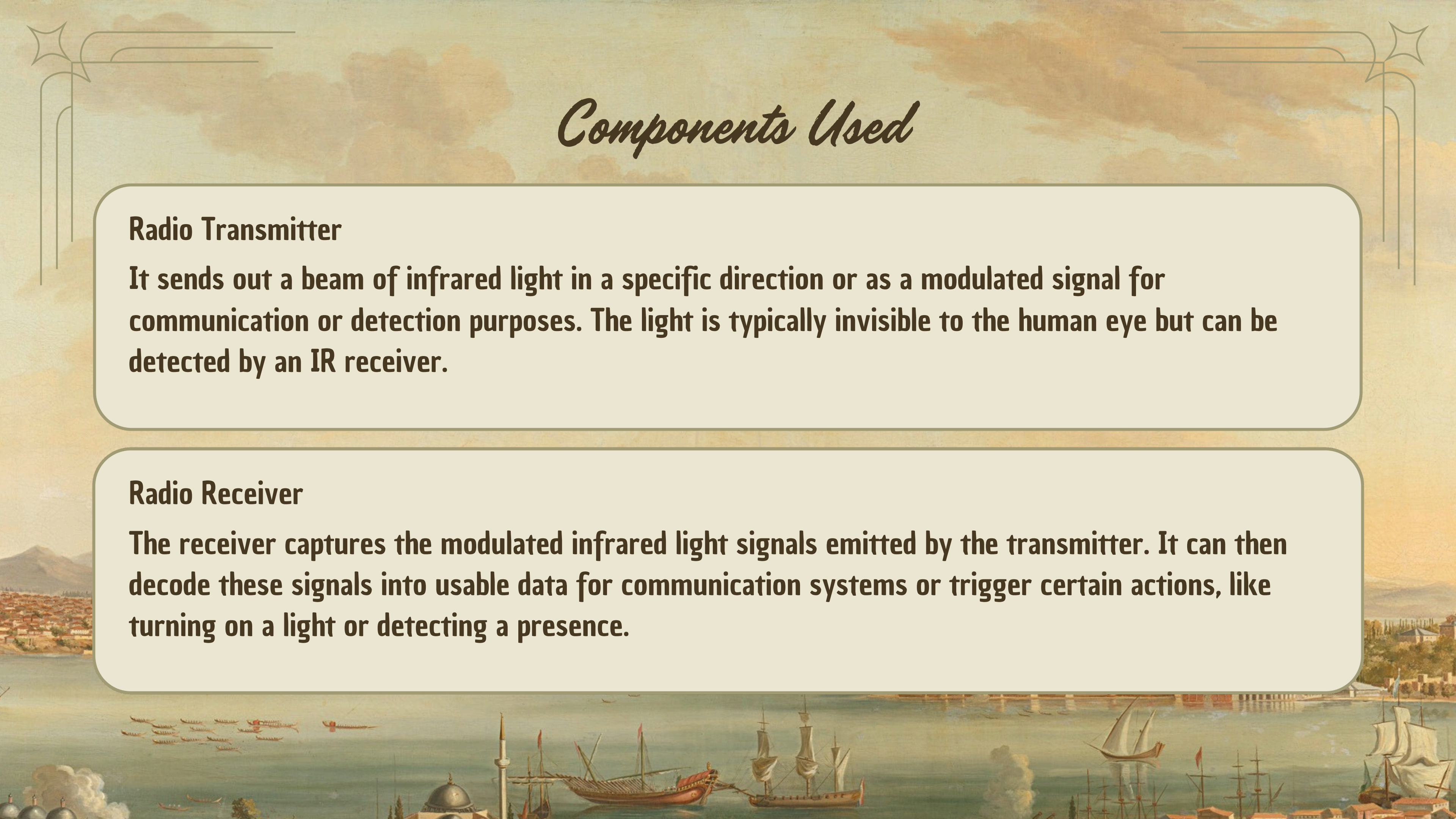


TRANSMITTER



RECEIVER

An Infrared Light-Emitting Diode (IR LED) is a Solid-State Light-Emitting device that produces light in the infrared band or range of the electromagnetic radiation spectrum. IR LEDs allow for cost-effective and efficient production of infrared light, which is electromagnetic radiation in the 700 nm to 1 mm range.

The background of the slide is a detailed historical painting of a harbor scene. In the foreground, several large sailing ships with multiple masts and sails are docked or moving through the water. To the left, a city with domed buildings and a minaret is visible on the shore. In the distance, more ships are scattered across the water, and a range of mountains is visible under a sky with soft, orange-tinted clouds. The overall style is that of a classical oil painting.

Components Used

Radio Transmitter

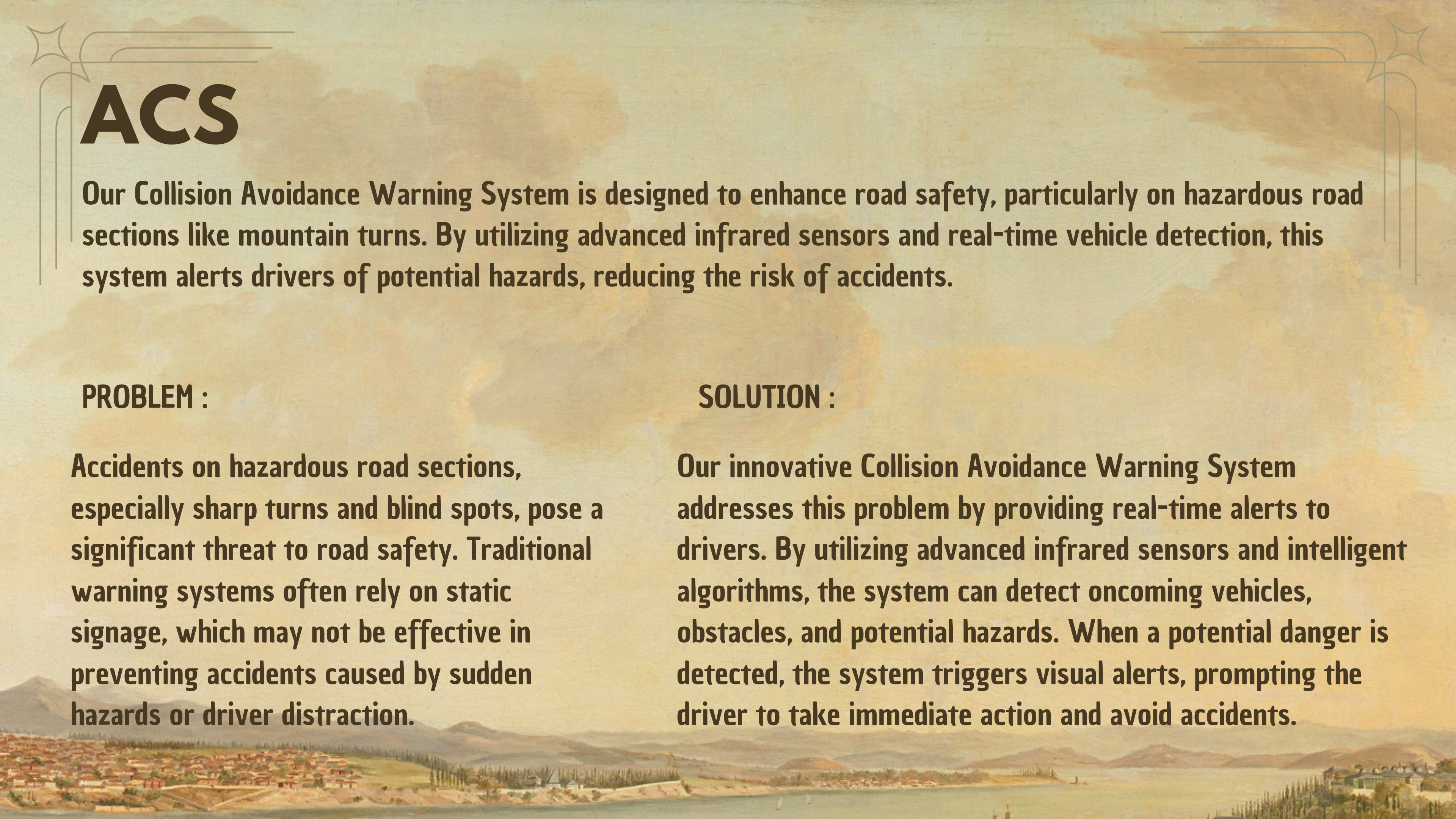
It sends out a beam of infrared light in a specific direction or as a modulated signal for communication or detection purposes. The light is typically invisible to the human eye but can be detected by an IR receiver.

Radio Receiver

The receiver captures the modulated infrared light signals emitted by the transmitter. It can then decode these signals into usable data for communication systems or trigger certain actions, like turning on a light or detecting a presence.

Anti-Collision System





ACS

Our Collision Avoidance Warning System is designed to enhance road safety, particularly on hazardous road sections like mountain turns. By utilizing advanced infrared sensors and real-time vehicle detection, this system alerts drivers of potential hazards, reducing the risk of accidents.

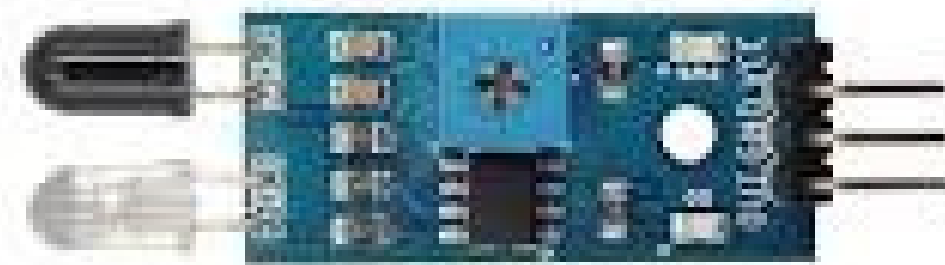
PROBLEM :

Accidents on hazardous road sections, especially sharp turns and blind spots, pose a significant threat to road safety. Traditional warning systems often rely on static signage, which may not be effective in preventing accidents caused by sudden hazards or driver distraction.

SOLUTION :

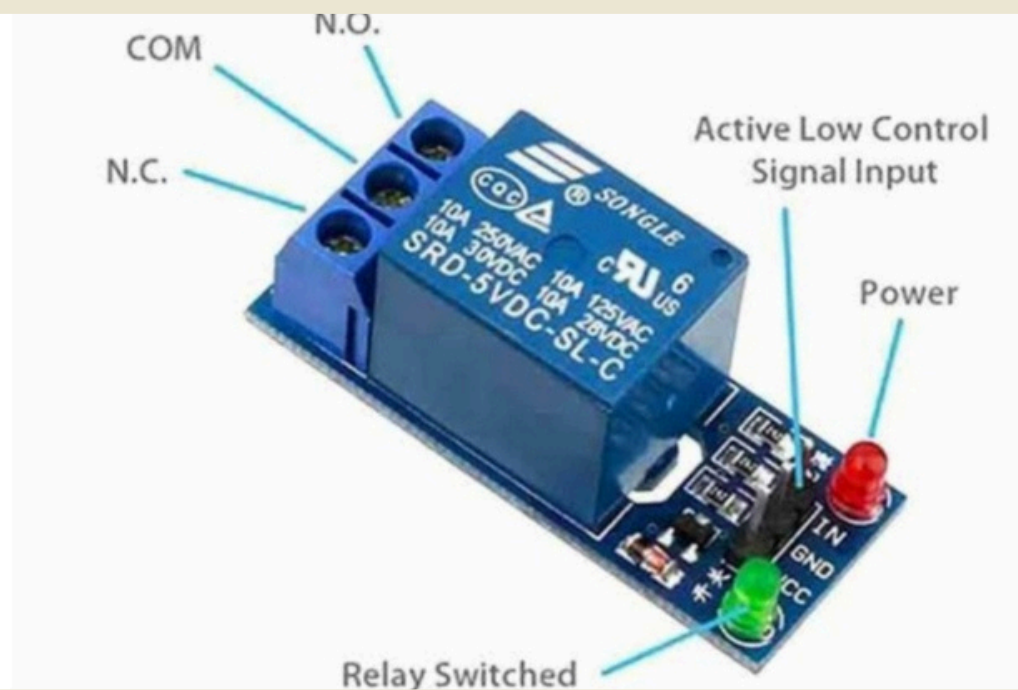
Our innovative Collision Avoidance Warning System addresses this problem by providing real-time alerts to drivers. By utilizing advanced infrared sensors and intelligent algorithms, the system can detect oncoming vehicles, obstacles, and potential hazards. When a potential danger is detected, the system triggers visual alerts, prompting the driver to take immediate action and avoid accidents.

Components Used



IR SENSOR

An Infrared Light-Emitting Diode (IR LED) is a Solid-State Light-Emitting device that produces light in the infrared band or range of the electromagnetic radiation spectrum.



RELAY MODULE

It is an electronic device that allows low-power circuits, like those from microcontrollers to control high-power electrical devices such as motors, lights, or appliances. It acts as an electrically operated switch, enabling the control of devices operating on different voltage.



LET'S WORK
Together

forabetter tomorrow

THANKS