



**B.TECH. (CSE)
IV SEMESTER**

**UE21CS251B – MICROPROCESSOR AND COMPUTER
ARCHITECTURE LABORATORY**

**PROJECT
SYNOPSIS
ON**

Smart Traffic Light System

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ABSTRACT OF THE PROJECT :

A smart traffic light system is an intelligent system that uses sensors and controllers to optimize traffic flow and reduce congestion on roads. This system is designed to improve the efficiency and safety of traffic by monitoring the road and adjusting traffic signals based on real-time data. In this project, we propose a smart traffic light system that utilizes an Arduino micro-controller, along with various sensors, including a sound sensor, LDR sensor, PIR sensor, and ultrasonic distance sensor.

The Arduino micro-controller is used as the main control unit of the system. The system is designed to use the sound sensor to detect approaching vehicles, the PIR sensor to detect vehicles, and the ultrasonic distance sensor to measure the distance between the vehicle and traffic signal. The LDR sensor is used to detect the amount of daylight, which helps to determine the traffic light timings.

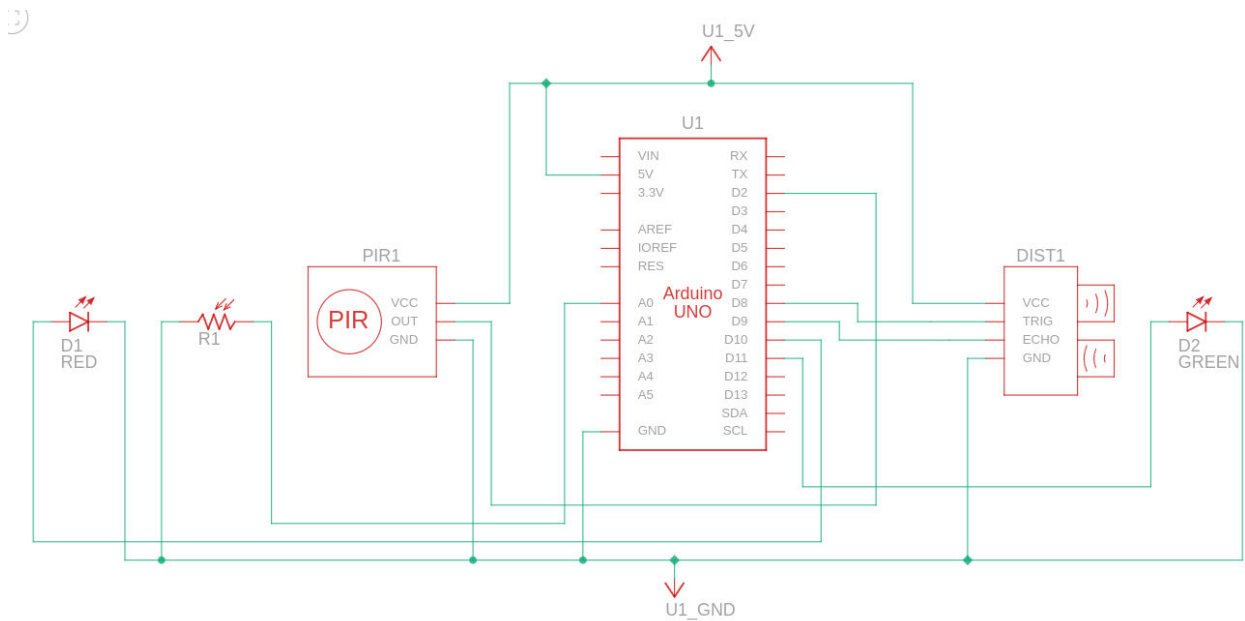
The system is designed to work in different modes, depending on the traffic flow and other environmental conditions. For example, during peak traffic hours, the traffic lights are adjusted to allow more time for vehicles on the main road. When there are fewer vehicles on the road, the system automatically switches to a more energy-efficient mode, which reduces the duration of the green light.

The sound sensor is used to detect emergency vehicles and turn the signal green. The PIR sensor is used to detect the presence of vehicles. When a vehicle is detected, the system automatically switches the traffic light to red.

The ultrasonic distance sensor is used to measure the distance between vehicle and the signal. The LDR sensor is used to detect the amount of daylight. During the daytime, the system automatically adjusts the timings of the traffic lights to match the traffic flow.

In conclusion, the proposed smart traffic light system using an Arduino micro-controller and various sensors is a promising solution for improving traffic flow and safety on roads. This system is designed to optimize traffic flow, reduce congestion, and prevent accidents by using real-time data from sensors. The system is flexible and can be easily customized to match different traffic conditions and environmental factors. The proposed system is cost-effective, easy to implement, and has the potential to revolutionize traffic management.

CIRCUIT DIAGRAM:



WORKING OF PROJECT

A smart traffic light system using an Arduino micro-controller, sound sensor, LDR sensor, PIR sensor, and ultrasonic distance sensor is an intelligent traffic management system that optimizes traffic flow and safety on roads. The system uses various sensors to detect real-time traffic and environmental conditions and adjusts traffic lights accordingly.

The system's working principle is based on sensor data acquisition and processing by the Arduino micro-controller. When the PIR sensor detects a vehicle, it sends a signal to the Arduino, which triggers the green light on the traffic signal for that lane.

The ultrasonic distance sensor is used to measure the distance between the vehicle and the traffic signal. When the distance between is too close, the system triggers the red light for that lane to prevent a collision.

The sound sensor is used to detect the presence of emergency vehicles such as ambulances or fire trucks. When the sound sensor detects a siren, the system will change the traffic lights to allow the emergency vehicle to pass through the intersection safely.

The LDR sensor is used to detect the amount of daylight. The system automatically adjusts the timing of the traffic lights based on the amount of daylight detected. During the day, the system allows more time for the green light to reduce congestion and optimize traffic flow.