GOVT. DEGREE COLLEGE, KOLLAPUR
NAGARKURNOOL DISTRICT

(Affiliated to Palamuru University, Mahabubnagar
NAAC Accreditation by "C" Grade

JIGNASA – Student Study Project

DEPARTMENT OF PHYSICS

TOPIC TITLE :

SUSTANABLE ENVIORNMENTAL – FUEL SAVING

ACADEMIC YEAR 2023-2024

GOVT. DEGREE COLLEGE, KOLLAPUR
NAGARKURNOOL DISTRICT

STUDENT STUDY PROJECT

DEPARTMENT OF ARTS

CERTIFICATE

This is to certify that the students study project entitled a study on Effect of Sustanable Enviornmental – Fuel Saving is an original study being carried out by bonafide students of Government Degree College, Kollapur for the academic year 2023-24.

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PROJECT SUPERVISOR

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INCHARGE

SUSTANABLE ENVIORNMENTAL – FUEL SAVING

Abstract

This project aims to design and implement an automatic vehicle stop system that uses light-dependent resistors (LDRs) and relays to detect the red signal and stop the vehicles accordingly. The system also uses a microcontroller and a buzzer to alert the drivers and prevent them from moving the vehicles until the green signal is on. The system can improve the traffic safety and discipline, as well as reduce the fuel consumption and emissions caused by vehicle idling.

Introduction

Vehicle idling is the practice of keeping the engine running when the vehicle is not moving. This can happen in various situations, such as waiting at traffic signals, parking lots, or drive-throughs. Vehicle idling not only wastes fuel and money, but also produces carbon dioxide and other harmful emissions that contribute to global warming and air pollution. According to a study, an average car idles for about 16 minutes per day, which consumes about 0.6 liters of fuel and emits about 1.4 kg of carbon dioxide1.

Therefore, there is a need for an effective and efficient vehicle stop system that can automatically detect the red signal and stop the vehicles without the intervention of the drivers. Such a system can save fuel and reduce emissions, as well as improve the traffic safety and discipline by preventing the drivers from running the red light or jumping the queue.

Methodology

The proposed system consists of the following components:

LDR: A light-dependent resistor that changes its resistance according to the intensity of light. It is used to sense the red signal by detecting the reflection of light from the traffic light.

Relay: An electromechanical switch that can turn on and off a circuit by using a low-power signal. It is used to control the brake system of the vehicle by applying or releasing the brake.

Microcontroller: A programmable device that can execute a set of instructions and perform various tasks. It is used to control the logic and timing of the system by receiving the input from the LDR and sending the output to the relay and the buzzer.

Buzzer: An electronic device that can produce a loud sound or a beep. It is used to alert the drivers and prevent them from moving the vehicles until the green signal is on.

Power supply: A battery or a solar panel that can provide the required voltage and current for the system.

Vehicle: A car or a bike that has a brake system that can be controlled by the relay.

The system works as follows:

The system has an LDR, a relay, a microcontroller, a buzzer, and a power supply installed on each vehicle. The LDR is placed near the windshield and connected to the microcontroller. The relay is connected to the brake system and the microcontroller. The buzzer is connected to the microcontroller and the power supply.

The system has a traffic light that has a red, yellow, and green signal. The traffic light is controlled by a timer circuit that changes the signal sequence based on the peak and off-peak hours.

When the traffic light is green, the LDR has a high resistance and the microcontroller sends a low signal to the relay and the buzzer. This means that the brake system is released and the buzzer is silent. The vehicles can move freely through the intersection.

When the traffic light is yellow, the LDR has a medium resistance and the microcontroller sends a high signal to the buzzer and a low signal to the relay. This means that the buzzer produces a beep and the brake system is released. The vehicles can slow down and prepare to stop at the intersection.

When the traffic light is red, the LDR has a low resistance and the microcontroller sends a high signal to the relay and the buzzer. This means that the relay applies the brake and the buzzer produces a loud sound. The vehicles are stopped automatically at the intersection and cannot move until the green signal is on.

Results and Discussion

The system was tested in a simulated environment with different traffic scenarios and light conditions. The system was able to detect the red signal and stop the vehicles automatically. The system was also able to alert the drivers and prevent them from moving the vehicles until the green signal is on. The system showed an improvement in the traffic safety and discipline, as well as a reduction in the fuel consumption and emisions caused by vehicle idling.

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