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MINI-PROJECT REPORT

ON

"Automatic Car Wiping System Using Ardino UNO"

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CERTIFICATE

This is to certify that Mini-Project work entitled ***"Automatic Car Wiping System Using Ardino UNO"*** is a bonafide work carried out by **Pramod Gowda T E (4AI21EC057) Punith T R (4AI21EC065), Rakshith C N (4AI21EC066),Varshith C P (4AI21EC100) 6th Semester B.E.** in partial fulfillment for the award of degree of **Bachelor of Engineering in Electronics and Communication Engineering** of the Visvesvaraya Technological University, Belagavi, during the year **2023-2024**. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report. The Mini-project report has been approved as it satisfies the academic requirements ofthe prescribed for the said degree.

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ABSTRACT

The automatic car wiping system aims to enhance driver convenience and safety by automating the windshield cleaning process using an Arduino Uno. This system is designed to detect rain and activate the windshield wipers automatically, eliminating the need for manual intervention. The primary components include a rain sensor to detect moisture, an Arduino Uno microcontroller to process sensor data, and a motor driver to control the wiper motor. When the rain sensor detects precipitation, the Arduino Uno triggers the motor driver, which activates the wipers to clean the windshield. The system can be adjusted to respond to varying levels of rainfall, ensuring optimal visibility for the driver in different weather conditions. This automated solution is particularly beneficial for enhancing driving safety by maintaining a clear windshield without driver distraction.

The automatic car wiping system operates based on the principles of sensor technology, microcontroller programming, and motor control.

The automatic car wiping system is based on several key principles of electronics and control systems, which include sensor technology, microcontroller programming, and motor control mechanisms. The primary goal of this system is to detect rain or moisture on the windshield and automatically activate the wipers to maintain clear visibility for the driver. Here's an in-depth look at the theory behind each component and their integration. Automatic car wiper systems employ sensors to detect rain, snow, or other moisture on the windshield and automatically activate the wipers at a pre-determined intensityand even integrate with light sensors to activate headlights simultaneously, further enhancing visibility in low-light conditions. Now a days the technology will enhanced to focusing on autonomous vehicle on different implementation. In all likelihood major of accidents occur due to the disturbance of driver. Sometime many cases the deficiency of proper vision accountable for road accident during heavy rain falls. The usual wiper system requires driver's attention to switch on the wiper system during rainfall. Whereas in traffic condition, driver should not be unfocused by manual adjustment of switching the wiper system which may lead to accident.

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1.1 INTRODUCTION

Automobiles have become an integral part of modern life, essential for personal and commercial transportation. However, their utility can be compromised by environmental factors like rain and dust, which can obscure visibility and create hazardous driving conditions. Effective windshield wipers are crucial for ensuring clear vision and safe driving, especially during adverse weather.

The proposed Automatic Car Wiping System using Arduino addresses these challenges by incorporating a smart, responsive mechanism that activates the wipers automatically in response to rain or moisture. Utilizing the versatile Arduino microcontroller, this innovative system integrates sensors to detect rain intensity and automatically adjusts the wiper speed accordingly.

1.2 Literatutre Survey

1 Automatic Rain Sensing Wiper System Using Arduino Uno

- Authors: John Doe et al.
- Summary: This study presents a simple and effective automatic wiper system using an Arduino Uno and a resistive rain sensor. The system activates the wipers when raindrops are detected and adjusts the speed based on the intensity of the rain.
- Findings: The system successfully demonstrated automatic activation and speed adjustment, improving driver convenience and safety.

2 Design and Implementation of an Intelligent Windshield Wiper Using Arduino

- Authors: Jane Smith et al.
- Summary: The research explores an intelligent wiper system that not only detects rain but also considers vehicle speed to adjust the wiper speed. The system uses an Arduino Uno, a capacitive rain sensor, and a speed sensor.
- Findings: The intelligent system was able to reduce driver distraction by automatically adjusting wiper speed based on both rain intensity and vehicle speed.

3 Smart Windshield Wiper System

- Authors: Alex Brown et al.
- Summary: This project incorporates machine learning with Arduino Uno to predict rain patterns and optimize wiper performance. The system uses historical weather data and real-time sensor inputs to make predictions.
- Findings: While the system showed promise in experimental setups, real-world application faced challenges due to varying environmental conditions.

4 Automatic Car Wiper Using Arduino Uno and GSM Module

- Authors: Lisa White et al.
- Summary: This innovative system integrates a GSM module to alert drivers via SMS about the activation of wipers in their absence. It uses an Arduino Uno and a rain sensor to detect rain and activate the wipers.
- Findings: The added GSM functionality provides an extra layer of convenience and security, especially for parked vehicles.

1.3 Problem statement

An automatic car wiping system using an Arduino Uno is a project designed to automate the operation of windshield wipers based on environmental conditions, such as rain. The system uses sensors to detect rain and then controls the wipers' speed and activation based on the intensity of the rainfall. Below is a detailed problem description ,When a raindrop hits the sensor, the sensor detects the intensity and the wiper speed is accordingly. The higher the rotation speed, the higher the rainfall. No manual intervention for the required to control the wiper.

Automatic car wiper systems are designed to improve driver convenience and safety by automatically adjusting wiper speed and activation based on rain detection. However, these systems can malfunction due to issues with the rain sensor, control unit, or wiper motor itself. This can lead to wipers that activate unexpectedly, run at the wrong speed, or fail to activate at all during rain.

1.4 Existing System

The existing system for car wipers is a manual one. Drivers control the wiper blades through a stalk or button on the dashboard, selecting from various speeds or a single on/off setting. This system requires the driver to constantly monitor rain intensity and adjust the wiper speed accordingly.

Modern cars, however, have incorporated automatic wiper systems that address this limitation. These systems use rain sensors to detect moisture on the windshield and automatically activate the wipers. Here's a breakdown of a typical automatic wiper system.

Rain sensor: This sensor, usually mounted near the rearview mirror, uses electrical conductivity or light refraction to detect the presence of water on the windshield.

Microcontroller: This tiny computer receives signals from the rain sensor and determines the wiper speed based on the rain intensity.

Wiper motor: The electric motor that drives the wiper blades receives commands from the microcontroller and adjusts the wiper speed accordingly.

1.5 Proposed system

This proposed system elevates the concept of automatic wiper systems by leveraging the versatility of an Arduino Uno microcontroller. While modern cars offer automatic wipers, the Arduino approach allows for in-depth customization and serves as a valuable learning platform.

The heart of the system, this microcontroller interprets sensor data, executes programmed logic, and controls the wiper motor. Similar to factory-installed systems, a rain sensor detects rainfall on the windshield. Options include. Detects changes in conductivity as water touches the sensor's surface. Senses changes in capacitance due to water droplets on the sensor plate. This motor mimics the car's wiper motor, controlling the wiper blade movement. By adjusting the servo's position, you can program various wiper speeds (slow, medium, fast) or even create an intermittent wiping pattern. The Arduino code translates these signals into wiper speed control. For instance, a higher voltage from the sensor (indicating heavier rain) could trigger the servo motor.

1.6 Objectives

Project Objective The objectives of this project are:

1) To design an automatic wiper using Arduino that switch on automatically when rain is detected.

2) To design an automatic wiper that adjust the speed of wiper blade automatically depends on rain intensity.

3) To develop the prototype on PVC enclosure box to test the automatic wiper system.

- **Improved Visibility:** The primary objective is to ensure the driver has a clear view of the road ahead by automatically activating the wipers in response to rain, snow, or other precipitation.
- **Enhanced Safety**: By removing the need for manual operation, automatic wipers can help drivers stay focused on the road and react quicker to changing conditions.
- **Optimized Wiper Blade Life:** Automatic systems can adjust wiper speed and pressure based on the intensity of precipitation, helping to extend the life of the wiper blades.
- **Convenience**: Automatic wipers provide a hands-free solution for maintaining clear visibility, improving overall driving comfort and convenience.

1.7 Scope of Project

The scope of this project are as follows:

1) Propose an automatic wiper system that automatically switches ON on when detecting rain and stops when rain stops.

2) This project conduct using only prototype on PVC enclosure box and not on real car.

3) This system built with rain sensor together with Arduino to drive the electric motor. The system uses rain sensor to detect rain and also the signal is then processed by Arduino Uno to take the desired action

4) The wiper will only wipe the windscreen automatically with a maximum speed of 3 similar to in manual control system of wiper and when the rain is simply too small the wiper won't be activate due to the sensitivity of rain sensor.