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Rain Sensing Automation Wiper

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ABSTRACT: Using the wipers is a manual operation that must be switched on remove rain and debris from the screen. It requires not only the driver's attention, but also causes some discomfort to the driver and acts as a distraction that increases risk of accidents. To provide the driver with comfort and significantly reduce the risk of accidents, an automatic rain sensor has become essential. Although such a device is available in the market, its high cost and other such limitations made it less popular in the automotive industry. Purpose The purpose of this work was to provide another such model to the market that limits costs while maintaining costs efficiency the main components are a rain sensor, a microcontroller and a controller integrated circuit (IC). Used in the construction and problem-free operation of the proposed device. Falling water is fast and is precisely detected by the rain sensor, which then sends a signal to another component, i.e. the microcontroller which in turn activates the driver IC to turn on the required movement of the wipers with servo motor. This device transforms cumbersome manual operation into smooth automatic operation.

KEYWORDS- Automatic rain sensor, Rain sensor, Automatic windshield wiper.

I. INTRODUCTION

The windshield wiper is an important component in vehicles. It plays an important role in cars. It offers the driver good visibility during the rainy season. The windshield wiper helps clean the windshield and ensures good visibility through it. This helps to reduce accidents in fog and rainy season. In the years 1910- 1920, vacuum cleaners were used in cars after the invention of the electric wiper and it is used in the years 1920-1930. And after 1940, intermittent wipers were invented and used until 1980. A manual wiper requires the driver to pay attention to the on/off button and also adjust the wiper speed because it takes the driver's attention away from the road and increases the chance of an accident. So automation is needed to reduce or prevent accidents in motor vehicles. So that the driver can concentrate on the road. Automation is most needed in a car for safety reasons, because it reduces the work of the driver so that he can concentrate more on the road while driving. Therefore, automatic wipers are necessary in vehicles, it increases the safety of the driver and passengers. It also improves visibility on the road and reduces driver effort. To prevent drivers from interfering with the wiper motor control, we designed this automatic rain sensor and wiper speed according to rainy conditions. This system consists of: Rain detection mechanism, processing and control unit, output controllers, etc. This system works automatically, its wipers turn ON when it detects rain and OFF when it stops raining.

II. LITERATURE SURVEY

Semi-Automatic Rain Wiper System: Tapan S Kulkarni, This study deals with simple and easy design of Semi-Automatic Rain Wiper. It is partial because it is being introduced in cars for the first time. This system is developed using 8051 microprocessor. This article found that they use a cup sensor that is reasonably priced. Here, the sensor device is basically used in a conical cup with a tray on top to collect as much water as possible. This tabletop model of a semi-automatic wiper system has successfully operated in three different levels of rain intensity and is very inexpensive to be applied to tourist class vehicles.

Automatic Wiper System: Shantanu Dharmadhikari: This article presents an automatic wiper system that is used to remove raindrops and activate car wipers without driver intervention. This system has been developed to reduce the effort of the driver so that he can concentrate on the main task of driving. The goal of the project is to develop an automatic windshield wiper system that automates the process where the driver reacts to the rain manually using the windshield. By reducing the need for drivers to adjust the wiper speed while driving, the number of distracted driving accidents can be slightly reduced. The demonstration is able to simulate the operation of the system as if it were installed in the car.

Automatic wiper control with optical rain sensor: Hidedki Kajioka, Automatic wiper that detects raindrops with an

optical rain sensor and controls the wiping interval. This automatic wiper is implemented by combining an existing wiper with a rain sensor and controller. A powerful control circuit is attached so that the sensitivity of the sensor does not decrease when the intensity of the incoming light decreases due to contamination. The controller is a four-bit microprocessor that processes the sensor signals and controls the wipers to the driver interface. The rain sensor detects raindrops by detecting a small change in light intensity. They developed optical automatic wiper limit control, which is an improved version of the intermittent wiper system.

Design and development of FUZZY logic for intelligent automatic wiper system: Mr. Anil. G. Bansode, Automatic wipers play a key role in ensuring driver safety during rain. A manual wiper system forces the driver to constantly focus on adjusting the wiper speed. This manual wiper adjustment distracts the driver. The proposed system has the ability to automatically change the speed of the wiper when the rain sensitivity changes, but it cannot measure the intensity of the rain. Therefore, Mat lab 7.0FUZZY Logical toolbox is used to solve the problem. Fuzzy grouping is used to analyze the behavior of the system after sensor output voltage readings are taken at different rain positions.

Smart Rain Sensor with Automatic Wiper System: Sonali B. Madanka. Over the past two decades, the automotive industry has aggressively explored ways to incorporate advanced computing and electronics into vehicle safety, reliability and entertainment technology. As drivers encounter more and more distractions, automatic rain-sensing wipers are becoming an even more attractive feature as they aim to minimize the amount of time the driver has to take their hands off the wheel. Most manual systems offer intermittent and variable speed operation. However, the manual wiper system requires the driver to constantly focus on adjusting the wiper speed. The speed of manual wipers varies continuously depending on time and driving speed. Because manually adjusting the front wiper distracts the driver's attention, which can be the direct cause of an accident. An automatic wiper control system was developed here, which is an improved version of the intermittent wiper system. This wiper system reduces labor-intensive wiper usage and improves driver comfort.

Anti-fog automatic wipers: Ashik K.P. This paper shows anti-fog automatic wipers. Commercial vehicles are the most common type of accidents these days. One of the causes of these accidents is the formation of fog inside the vehicle caused by heavy rain. For commercial vehicles during the rainy season • the driver has to operate the wiper himself, which disturbs his concentration on driving. Even if the rain lasts longer (e.g. about 15 minutes), fog on the windshield also makes it difficult for the driver to see and drive.

Smart Wiper Control System: N. M. Z. Hashim, Wiper is an important item used to remove raindrops or water from the windshield of a vehicle. The previous system activated the wiper manually. Therefore, this system is proposed to solve these problems. The goal of this project is to update the old car system with an automatic wiper system, improve the system with a sensor with an actuator and build a basic program that fully works with the system. Most cars have two wipers on the windshield, one on the rear window and one on each headlight. The windshield wiper system worked well depending on the water conditions outside the car. This project contributed to the design of an automatic wiper system for future research in this area.

Rain sensor for wipers: Scott A Vandam. This invention generally relates to a car rain sensing system that controls the speed of the windshield wiper during the rainy season to remove raindrops from the windshield. This invention is directed to a rain sensor system that automatically controls the operation of front wipers in rainy conditions. A manual wiper system does not guarantee safety, so automation is needed.

III. METHODOLOGY

In this article, we propose an automatic car wiper that automatically starts when it rains and stops when it rains stops. In this document, no physical human intervention is required to operate the front wiper of the car. In this article we will use a service motor, rain sensor Arduino and LCD module to control the wiper system. When it rains, the rain sensor detects it rain intensity and sends the data to Arduino. The data collected by the rain sensor is processed Arduino and send the processed data to the servo motor to perform the desired action. The rain sensor consists of a digital analog output pins from which rainfall intensity is calculated. Responsible for the data sent to the microcontroller controls the wiper speed and is based on the intensity of the rain. The LCD screen shows the intensity of the rain.

IV. BLOCK DIAGRAM

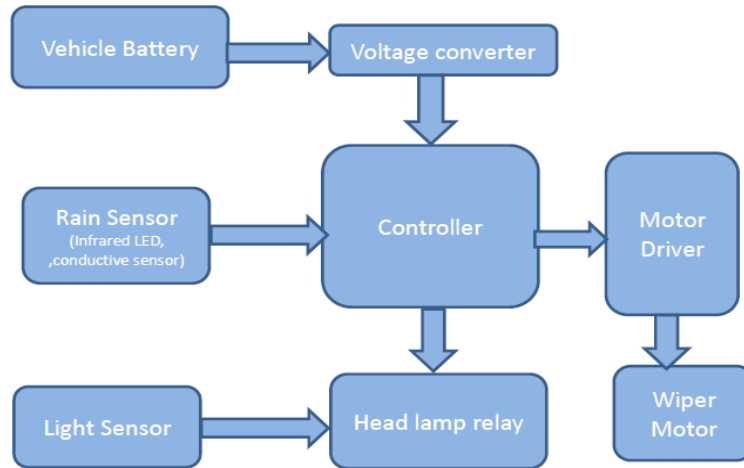


Figure1: Block Diagram

Rain sensor: The rain sensor module is a simple tool for rain detection (Gupta et al.). It can be used as a switch when a raindrop falls through the rain table and to measure the intensity of the rain. Sensitivity adjustable with a potentiometer. The raindrop sensor is a nickel-plated plate in the form of lines. It works according to the principle of Ohm's law. If there is not a drop of rain on the ship. The resistance is high, so we get a high voltage according to $V=IR$. When a drop of water is present, it reduces the resistance because water conducts electricity and the presence of water connects the nickel wires in parallel, reducing the resistance and reducing the voltage drop.



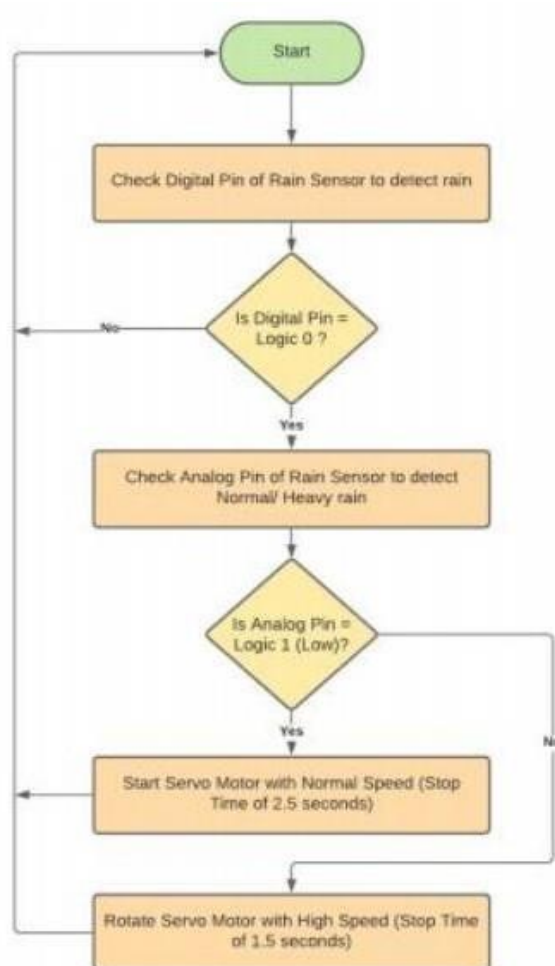
Figure2: Rain Sensor Module

Servo motor:

- Servo motors are self-contained mechanical devices that control machines very precisely.
- Adjust angular movement from 0° to 180° and 0° to 90°. The servo motor can be moved to the desired angular position by sending pulse width modulated (Holtz, 1992) signals to the control wire



V. FLOW CHART



WORKING PRINCIPLE OF SYSTEM

- When it rains, rain sensors have a water column or current column, which leads to a change in resistance. Thus, the sensor acts as a variable resistance plate. The relationship between rainfall intensity and drag was found to be inversely proportional to each other. An increase in the number of raindrops leads to a decrease in the resistance of the sensor. After that, the sensor sends a signal, the signal is received by the microcontroller, which determines the intensity and sends the signal to the servo motor as a pulse width modulation, and then the wiper operation mode is turned on. According to the intensity of the rain Relegation.
- The sensor is designed so that its size does not impair the driver's visibility. The sensor is completely immune to environmental particles and elements that may come into contact with the sensor. Thus, the sensor will not send false alarms if such an event were to occur.
- With a functional example, we will try to explain the operation of the rain sensor. Assume the remaining sensor resistance is 1000 K Ω . In light rain, the height of the water column inside the rain sensor is small because the intensity of the rain is low. The resistance of the sensor drops and now increases, for example, to the range of 900-400 K Ω . As the rain increases, the accumulation of raindrops and accumulation on the sensor increases, causing the resistance to drop to 300-100 K Ω . As the intensity of the rain increases, the resistance decreases. The decrease in resistance is received as a signal by which the microcontroller determines the intensity of the rain. The signal is transmitted to the servomotor, which then controls the operation and movement of the wipers. As the intensity increases, the speed of the wipers increases.
- The controller then controls the wiper motor speed

VI. CONCLUSION

- This system is also useful for domestic use, such as cleaning windowpanes.
- The automatic wiper control system is a modified version of the intermittent wiper system.
- This system improves driver comfort. This is especially needed by drivers who have to work night shifts and drive in traffic jams, where drivers have to concentrate as much as possible on the brakes and clutches.
- With this implementation, the task of checking the wipers during rain disappears.
- Thanks to the automatically operating wiper, the driver can see the road without obstacles.
- It provides good visibility and increases the safety of the driver and passengers

VII. FUTURE SCOPE

- Use the rain intensity sensor switch in the ON position to warn the driver of the vehicle. Front and rear lights.
- Turn on the front and rear lights using the light sensor in night conditions and tunnels.
- It can be further integrated with EMS-ECU to limit vehicle speed and engine torque in heavy rain.
- This system is also useful for domestic use, such as cleaning windowpanes.

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