RAIN SENSING AUTOMATIC CAR WIPER

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ABSTRACT

Generally, working of a car wiper is based on the manual switching. In this mechanism, the driver has to switch ON the power button to energize the wiper. It is difficult for the driver to concentrate simultaneously on the driving and on the wiper. Though it is not much difficulty in normal conditions but it is very difficult in raining conditions and snowing conditions. To eliminate this difficulty an automatic wiper system with rain sensing technology is implemented. In this automatic wiper system, a rain sensor, a microcontroller and a driver integrated circuit (IC) is used to convert the manual operation into automatic operation. When water falls on the rain board of the rain sensor, the sensor sends the signal to the microcontroller regarding the data and then the microcontroller processes the data and energizes the driver IC to make the required motion. By taking the signal from the microcontroller the driver IC drives the servo motor of the wiper to clean the car glass. With these modifications, automatic cleaning of the car glass can be done without the involvement of the driver.

Keywords: - Servo motor, Rain sensor, Driver Integrated circuit (IC) and Microcontroller.

I. INTRODUCTION

Automation and IOT technologies have taken the comfort of the human life to high level. The implementation of new technologies in the present technology changes the effort of the operator and reduces the risks in the working areas. Also these implementations have high flexibility, reliability and accuracy. Due to these advantages the demand of these technologies are increasing day by day. Generally, the word automation itself describes that no need to involve in the working process. i.e., with the implementation of this technology the human need not to involve in the procedure. The main theme in this project is to fabricate automatic rain sensing car wiper which detects the rainfall and snowfall automatically and energizes the wiper to clean the glass. An Arduino UNO board, a rain sensing module, a servo motor and a LCD module is used for constructing the automatic wiper system. In this setup, the microcontroller adjusts the speed of the servo motor according to the signal given by the rain sensing module. The rain sensing module sends the data according to the intensity of the rain or snowfall in the form of signals. The intensity of the rain or snowfall is resembled as pulse width modulation (PWM) to control the servo motor at its signal line.

II. LITERATURE SURVEY

SHANTANU DHARMADHIKARI[1]:

The proposed system which has the capacity of removing the raindrops and this system can activate the windshield wiper without the contribution of driver. This system was anticipated to develop an automatic windshield wiper system that automates the process of manual switching ON the windshield wiper. With the implementation of this system, the driver can focus on the driving. So, with this the modal there is a possibility to reduce the accidents by decreasing the drivers’ tasks in driving.
Hidedki KajoKA[2];

An optical sensor is used in this proposed model to sense the rain drops and also to control wiper interval. In this model the author achieved the automation by implementing rain sensor and controller. The author used the power control circuit to save the sensor from the deteriorating condition when the intensity of the incident light is low. The rain sensor is used to detect the variation of the light intensity and by this detection the rain sensor sends the signal to the 4 bit microcontroller. The microcontroller energizes the wind shield wiper to remove the rain drops on the glass. This system increases the drivers’ level of comfort and decreases the wiper tasks.

III. OBJECTIVES

The following are the objectives of the project:-

- To automate the wiper mechanism and working in automobiles.
- To reduce the driver’s tasks and allow driver to concentrate on driving.
- To reduce the operations of the wiper.

IV. METHODOLOGY

This system is built for reducing the driver’s difficulty of doing many tasks at a time. The driver has to do many tasks simultaneously to drive vehicle in safe. It is not possible to concentrate on many things at a time and it is highly impossible to concentrate on the roads, gears, clutch and braking system at a time. Particularly in raining conditions it is too difficult for the drivers to drive the vehicle with this multiple tasks. There is a requirement of reducing the driver’s tasks by implementing the automation technology. To meet this requirement the automatic wiper system with rain sensing module is created and fabricated. The following will explain the different components used in this setup.

IV.0. COMPONENTS AND DESCRIPTION

IV.a. RAIN SENSOR

Rain sensors are electrically isolated and are available as printed circuit boards. These have zigzag pattern of conductive path for conducting the rain fall or water fall. This rain sensor module can be used as switch for detecting the rain fall and the usage is very simple. With this module finding of the rain fall intensity is also easy. This rain sensor unit contains rain board and control board. Rain board is set in order to fall rain on it and control board is equipped with two LED lights. In which one is for indicating the power supply and another one is for indicating the rain fall. The second LED light on the control board will blink only when the rain drops collided with the rain board. Rain board is adjusted to make fall the rain drops on it. Whenever the rain drops fall on the rain board, the LED indicator will blink and sends the signal to the microcontroller regarding the intensity of the rain fall.

Fig. 1: - rain sensor module
IV.b. ARDUINO UNO

The Arduino UNO is nothing but the microcontroller based on the ATmega328. 14 digital input/output pins, 6 analog inputs, 16MHz ceramic resonator, a USB connection, a Power jack, an ICSP header and a reset button is contained by the Arduino uno. It is fabricated with requirements to support the microcontroller. It can be connected with the computer with a USB or to the power with AC-to–DC adapter. A battery may be used for starting this. This is equipped with Atmega16U2 programmed as a USB to serial converters. This serial converter differ the Arduino from preceding boards which are equipped with FTDI USB-to-driver chip.

![Fig. 2. Arduino UNO board](image)

IV.c. SERVO MOTOR

It is an electrical component which can be used to move or rotate an object with high precession and high accuracy. Servo motor is the best option to rotate an object at some required angles. It is simply created from a straight forward motor that runs through a servo mechanism. If the motor is employed is dc powered then it's referred to as a dc servo motor, and if it's an ac powered motor then it's referred to as an ac servo motor. We are able to get a really high force servo motor in little and light-weight weight packages. Due to these advantages several applications sort of a toy automobile, RC helicopters, and planes, robotics, machine etc. Servo motors are articulated in kg/cm (kilogram per centimeter) most hobby servo motors are articulated in 3kg/cm or 6kg/cm or 12kg/cm. This kg/cm tells you ways a lot of weight your servo motor will carry at a specific distance, for instance, a 6kg/cm servo motor ought to be ready to carry 6kg if the load is suspended 1cm far from the shaft of the motor, the bigger the gap the lesser the burden carrying capability. The position of a servo motor is determined by an electrical pulse and its electronic equipment is placed beside the motor.

![Fig. 3. Servo motor diagram.](image)
V. WORKING PRINCIPLE

The rain sensor is placed on the vehicle front glass. The rain sensor, servo motor and other required components get power from the battery. When the rain droplets fall on the rain board, the control board of the rain sensing unit sends the signal to the Arduino uno module. The Arduino module estimates the intensity of rain fall by manipulating the signal given by the rain sensor module and then gives signal to the servo motor according to the rain fall. The servo motor takes the signal in the form of pulse width modulation and rotates the wiper in accordance with the signal given by the Arduino module. The wiper rotates as fast as the intensity of the rain fall. If the rain fall intensity is low the wiper will rotate slowly and if the rain fall intensity is high then wiper will rotate speedily. This system avoids the interaction of the vehicle operator to operate the wiper. So, operator will concentrate on the driving. Due to this there is a chance to reduce the accidents.

VI. EXPERIMENTAL SETUP

All the components which are explained above are arranged on the plank board. These components are fixed with plastic glue on the plank board. The connections are made with at most care. The setup is tested by dropping water drops on the rain board. When the water drop fell on the rain board the LED light blinked in the LED indicator and then microcontroller give signal to the wiper actuator. The wiper actuated and rotated according to the signal given by the microcontroller.
VII. CONCLUSION AND FUTURE SCOPE

An automatic wiper control system was built which is the modified version of the intermittent wiper system. This system improves the driver’s level of comfort. Its need is more for the drivers who work at night and traffic prone areas where drivers has to give maximum concentration on the brakes and clutches. The wiper controlling task during the rainfall is eliminated with this implementation. This system contains high precision, high accuracy. This system also useful in home applications like cleaning the window glasses and it intimates the rainfall and also notify people in the house. So that people can take care of things like clothes, food grains and products. The following points explain the requirement of additional implementations; these points will act as future scope.

- Use of micro controller enables the wiper rotate through 180° rather than 360°.
- The usage of better speed control mechanisms will guide wiper more effectively and reduce the consumption of battery power.

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