

AUTOMATIC RAIN OPERATED WIPER AND DIMMER FOR VEHICLE

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Abstract- This paper illustrates Automatic rain operated wipers and dimmer for vehicles. In modern days, the accidents are most common in vehicles. One of the reasons for these accidents is glare of light faced by the driver, coming from the opposite side of the vehicle. In rainy seasons for many vehicles, the wiper on the windshield has to be controlled manually by the driver. This causes distraction while driving. The main aim of the project is to prevent the distractions to the driver of a vehicle. The principle of conductivity is used for the working of wiper sensor. The programmed microcontroller is used to actuate the wiper motor. The principle of LDR is used so that when a high intense light falls on vehicle, the lower dimmer will be turned on and when low intense beam of light is detected then the upper dimmer is switched on.

Keywords- Microcontroller, Sensor, Wiper motor, LED's, LDR

I. INTRODUCTION:

All the four wheelers are equipped with the wipers. These wipers are used to wipe the water on the windshield during rainy seasons so as to obtain clear vision. The wipers invented previously used to oscillates at a slow speed. Sometimes this lead to the distraction to the driver's visibility. This led to the invention of different speed wiper motors. But still the wiper actuation is controlled by the driver . To provide tension free driving, automatic wipers were implemented. During night driving a lot of glare is experienced by the driver of the vehicle. He may sometimes face the Toxler Effect and this may lead to accident.

This paper thus explains a system which will provide ease of operation and look after the human comfort. The following are the existing methods used to design wiper operation.

II. HARDWARE DESCRIPTION:

1.Windshield and Conductive Sensor

Windshield is used for protection of driver from rain, dust. On the windshield the conductive sensor is placed. As the rain falls on the windshield it is detected by the sensor. As

i. CAPACITIVE METHOD: Capacitive method utilizes capacitive proximity sensing method. However this sensors are susceptible to stray electrical fields(3).

ii. PIEZO ELECTRIC METHOD:

This method uses a piezo crystal element. While Rain falls on the windscreen generates the sound waves at a certain frequency. These waves are transmitted through and across the windscreen. The Piezo crystal senses the sound waves, and also compares them with the other noises caused due to wind, dust, etc. this crystal responds only to the sound waves due to rain. Again this system is susceptible to false triggering.

iii.OPTICAL METHOD

Optical sensors utilize light and the principle of total internal refraction within the windshield. The optical sensor consists of a light source, a light detector and an optical assembly. The optical assembly consists of two lenses and a light guides. A beam of light is directed through the optical assembly to the windshields, the light is trapped within the glass due to total internal refraction. The light reflect from the outside surface of the glass back to the inside surface of the windshield glass until it is picked up by the second optical assembly. If rain falls on the windshield within the sensing area, light is directed by the water droplet in the other direction opposite to the optical assembly. This causes a corresponding reduction in the light intensity falling on the second optical assembly. The microprocessor is used to distinguish between different amounts of rain and to provide the best wiping method. So the Optical sensors are reliable and effective detectors of rain. By using the suitable rain sensing methods it is possible to develop the automatic wipers[3].

the conductivity before the rainfall and after the rainfall differ the conductive sensor senses this change in conductivity. This signal is further given to the control unit

2.PIC 16F877A

PIC is the abbreviation for Programmable Intelligent Controller. It is 40 pin IC and the family of PIC 16 provides high computational performance at economical price,

enhanced Flash program memory, reduced power consumption and extended instruction set. The output from the conductive sensor is given to PIC. The PIC requires 5V signal. The signal from PIC is further given to motor. To drive the motor, driver is used because motor requires voltage greater than the 5V, which is given by PIC as input to motor.

3.LDR

LDR is the abbreviation for Light Dependent Resistor. As the high intensity light falls on it its resistance changes. In LDR light intensity and the resistance are inversely proportional. Thus the resistance decreases as the high intense light is incident on it. Further the signal from LDR is given to transistor.

4.Transistor:

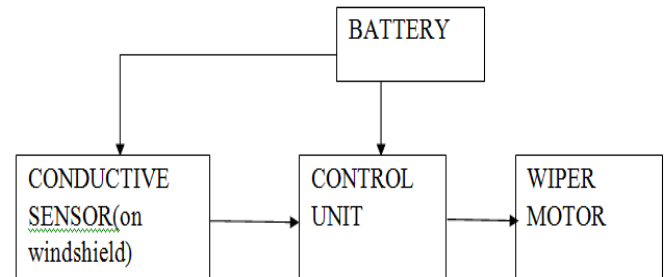
Here we have used BC547 Transistor .It is an npn transistor. The transistor is triggered when the bridge of LDR is unbalanced and thus transistor works in conduction mode. The transistor is used for switching purpose as well as amplifier.

5.LEDs:

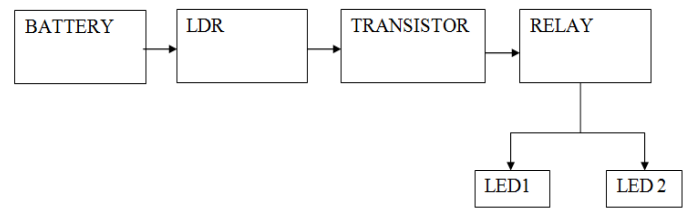
One LED is used for the operation of dimmer. When a high intense beam of light falls on LDR then the lower dimmer is switched on and thus a 'Lower dimmer On' message is displayed on display. Similarly when a low intense beam of light falls on LDR then the upper dimmer is switched on and thus a 'Upper dimmer On' message is displayed on display. In this circuit as the intensity increases or decreases accordingly the resistance of LDR decreases or increases. This causes an unbalance in the circuit. Thus the transistor is triggered and operates in conduction mode.

III) BLOCK DIAGRAM:

i. Wiper System:



ii. Dimmer system:



IV. WORKING OF THE SYSTEM:

The working of automatic rain operated wiper is based on conductive method. This method uses a conductive sensor, which consists of two sets of contacts separated by an insulating material or an insulator. When water falls on the sensor, the water conducts the signal and thus it completes the circuit. The signal is further send to the wiper motor(3).

The working of dimmer is based on the basic operation of dimmer is similar to the comparator circuit. The transistor's output is connected to the relay coil. Two LEDs are used in this circuit. The LED 1 represents the high beam bulb which is in normally closed condition with the relay. LED 2 represents the low beam bulb of the vehicle which is at the normally open terminal of the relay. Whenever a high-intense light falls on the LDR, it's resistance drops thus creating an unbalance in the potential divider and R1 and R2. This creates a trigger current which turns on the transistor BC 547. The transistor gets into conduction mode and switches the relay. Thus according to the light intensity the upper or dipper is switched ' ON/OFF'.

V. RESULT ANALYSIS:

Thus the manual operation of turning wiper on, off is replaced by automatic wipers. The less amount of glare of light is faced by the driver of vehicle. Automation in this system gives push to the smart car system concept. The idea of smart glass is to be used for accurate automation of this system. The nano conductive material can be used for smart glass of the wind shield of car.

VI. ADVANTAGES:

- 1.Reduces human effort by modifying the wind shield.
- 2.Makes the windshield free from wear adjustment.
- 3.Avoids the glare of light faced by the driver during night driving.
- 4.Reduces the accidents caused by 'Toxler Effect'.

VII. DISADVANTAGES:

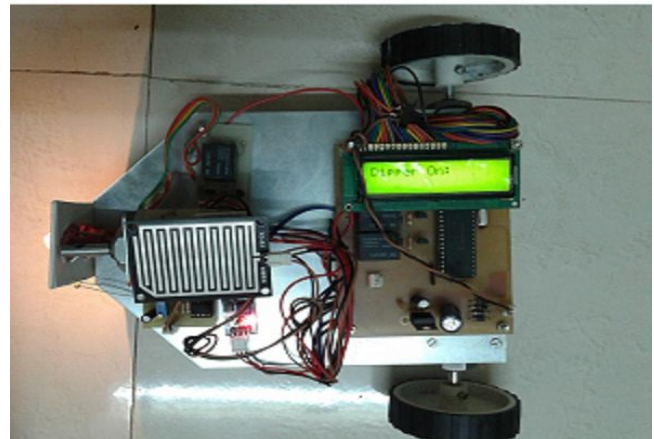
1. Dust particles and non-conductive particles accumulated on the surface of sensors cannot be detected by conductive sensors.

VIII. CONCLUSION:

The concept of Automatic Wipers with Mist Control has been implemented successfully. After the experimental setup the wiper motor was tested for all the following conditions drizzling, heavy rain, medium rain. The test have been conducted under mist on the wind shield. The mist has been removed successfully from the wind shield. By the uses of automatic wipers one can drive the commercial vehicles without any distractions to operate the wipe. Use of internal wipers ensures good visibility to the driver, which in turn prevents the accident.

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