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Automatic Rain Sensing Wiper using Arduino

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Abstract: ***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. In this framework we proposed a weather recognized method to construction an automatic rain sensing wiper on the wind screen during rain so as to avoid frenzy of driver. In this project we used Arduino along with a rain sensor, an LCD 16x2 module, and a servo motor. the rainfalls is measured via water rain sensor is present in automatic wiper system to collect information via sensor the wiper will start rotating then dispatch to Arduino. our method exhibited good identification ability of raindrops and encouraging results for rainfall discernment . In order to keep away from condemning situation this automatic wiper system provides changeable wiping speed formed on precipitation intensity. The state of the art in this paper was not only money-making but also highly dispatch and more accurate and economically inexpensive which can be implemented in all low and middle intensity vehicles.***

Keywords: Servo motor, Rain sensor, Arduino uno atmega328, LCD module, wiper.

I. INTRODUCTION

As a human beings we can not control the atmospheric phenomena like rain, humidity. Take some devices which work against environment hazard. But they are work manually. In this project we making automatic rain sensing device that works automatically using with Arduino UNO. This Automatic rain sensing wiper consisting of a connection between hardware and software. In this paper we try to make a new intelligent system which are work automatically. This system contains high precision, this system is useful in home applications like cleaning the windows, glasses and it enlighten the person in the house that it is raining. So that people can take care of their things like clothes, food, grains and products. Operation of this wiper in the existing models is yet manual. But in this project, we will make the wiper work automatically. This model includes two arms that swing back and forth at one end over the glass. The arms are covered with long rubber blades. While one end of the arms is attached, and the other and pivots. When this blade rotates back and forth over the glass, it removes the water from the top of the glass. The main aim in this project is to cultivate an automatic rain sensing wiper to automatically detect rapidly. The purpose of this system to give better view without involving the efforts of driver. Thus limiting the distraction Arduino UNO board, a rain sensing module, a servo motor and a LCD are the main set of necessities applied in the structure of the system. In this setup, the Arduino UNO adjust the speed of the servo motor according to the signal given by the rain sensing module. Arduino Uno has the processing and controlling unit of this system which receive the signal from rain sensor module and processes the data. The mobile phone can be used as a controller from anywhere in the world if the GSM network is available and to receive the alert messages. The rain sensor continuously send the humidity value of rain drop to arduino. If the humidity exceeds a certain value, send an alarm message to the mobile. The project is upbuild using Arduino, Rain sensor, Servo motor and LCD Module which display the intensity of rainfall. Adjust the speed of the wiper is made according to intensity of rainfall which improves and ensures the safety. This scheme is a small step towards the comfortability and to save our time.

A. Related Work

In previously worked, the model that have remained before this, the touch sensor was used to run the wiper this sensor was used to run the wiper .This sensor are based on principle ,When water falls on the sensor dielectric material or conductive material than the capacitive sensor changed their capacitance and controller are drive the wiper. The system also has several disadvantage which can sometimes lead to bugs on the touch sensor while driving the car on the on the road side, causing the wiper system not run in summary weather .Thus capacitive rain always requires good maintenance. It is very important for the driver to clean the wind shield daily basis.

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Capacitive rain sensor do not provide an accurate reading for wiper because these sensor uses bottle for measuring the level of water and also it required suitable maintenance. Sometimes vibrating the bottle can give an incorrect reading. Smart wiper system uses infrared sensor which are used in latest car but it has some disadvantages first one is the rain sensor is space engaged the screen is succinct. And second one is where the sensor is located there always need for cleaning on the windscreen. Even a single drop of water is fall on windscreen will be wiped. Automatic wiper systems are require more maintenance and it is more expensive because of this, these rain sensor can not be used in low cost vehicles. For data processing this system takes more time its response time would have been higher than that of any other system. The above system gives wrong result after the rainfall condition due to water droplets on the sensor.

B. Advance System

Various automatic wiping system installed in vehicle but the driver has to concentrate in driving and with traffic getting increased, things get not sufficient. It's not highly safe as driver get distracted when they required to switch it on or off. Physical switching consumes more energy than automatic switching. This switching has not so much as perfection than the put forwarded system. Designation of the advance System To over all system which needed various components.

Component	**Specification**
Microcontroller	Arduino Uno
Rain sensor	FC-37 Module
Motor	servo motor, 5 volt
LCD Module	JHD162A
Others	connectors, power cable.

The intelligent wiper system is creating by the use of Arduino uno, Rain sensor Module, Servo motor and LCD Module. The rain sensor module senses the rain and send the information to the Arduino. Here we used ATmega328 single chip and 20 pin based micro controller created by Atmel. And Arduino IDE programming used in this. Arduino uno collected the information through the rain sensor and based on the output of rain sensor, control the servo motor. The rain sensor is established outside the car and the servo motor is attached to the wiper. Also LCD module are connected through the arduino and 9 volt battery. All these devices are connected to the Arduino uno. This arduino is placed inside the car near to the DC power source. The speed of the servo motor varies with the intensity of the rainfall. Rain intensity is displaying on the LCD Module according to signal strength of the rainfall.

II. DETAILS OF COMPONENTS

A. Rain Sensor

A rain detection system can easily be made by connecting Arduino with rain sensor. Rain sensor is device which detect the raindrops on it. An Arduino board will sense the output of the rain sensor and perform the action such a system can be used in many different areas such as in the automobile sector, in agriculture and to remove water from solar panels and house hold areas. The rain sensor module construct with two boards. Once there is a rain board and second is the control board. the rain board module consists of two copper tracks they are designed in such a way so that it provides high resistance to the supply voltage even under arid condition. This rain sensor provides high resistance for supply voltage, and this module runs on 5 volt. As increase the intensity of water on the rain sensor, its resistance decreasing gradually. As the resistance decreases, its output voltage with respect of the moisture also decreases. The rain sensor module consist of two pins which are used to connect the driver circuit. The driver circuit module control the sensitivity of water and converts the analog output to the digital output. If the analog value is greater than the threshold value then the output of driver IC module is digital. The rain sensor as shown below it have four pins which are connected through the ardunio uno board namely VCC, GND, D0, A0, and two other pins. The rain sensor module detects the rainfall and uses a driver IC to control the sensitivity and to convert analog value to digital value. In Summary season, being dry on the rain board module, it provides high resistance to the supply voltage. The voltage appears as 5 volts at the output of the rain board module. During the rainy season, the rain water causes an increase in the moisture on the rain board resulting in decrease in the given resistance to the supply. As the resistance decreases and the output voltage also decreases. Rain falls on the rain board whom is provided by two LED lights. In which one is designing for power supply and other is designing for the rainfall the second LED on the control board will flicker only when the raindrops collided with the rain. Rain board is adaptable to make for the board on it. At any moment the raindrops all on the board and LED will blow and send the signal to the arduino uno regarding the intensity of the rainfall.

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Fig. 1 : Rain Sensor

B. Arduino UNO

Arduino is open source microcontroller Arduino can use easily it is a type of software which allowed to write the coades for command of hardware. Arduino can sense the input such as sensing fingers on the sensor. In arduino uno, c and c++ languages are used to programming. Arduino uno is basically based on the ATmeaga328 by Atmel. Arduino uno pinout has including 14 digital pins, 6 analog pins, icsp header, USB connection. The versatility of the pinout provides various options such as driving the motor, reading sensor, LED and more. It can get the pro power by USB or 9 volt battery it accept the voltage between 7 and 20 votes in the project arduino software is used for processing. There are 3 ways to give power to an Arduino Uno board:-

1) *Barrel Jack:* Barrel jack or DC power jack are used to gives the power of Arduino uno board. The barrel jack is connected through the wall adapter. The board can be powered from 5 to 20 volt.
2) *Vin Pin:* An external power source gives the power to Arduino uno board using this pin. The voltage should be within the range of 7 to 12 volts.
3) *USB Cable:* When computer is connected it provides 5 volts at 500 milli ampere.
4) *Arduino uno Analog Pin:* Arduino uno consists of 6 analog pins which are convert analog signal. These pins work as analog inputs but can also function as digital input or digital output and use it through the operation Arduino uno pins A0-A5 are capable to read analog signal.
5) *Arduino UNO Digital Pins:* Pins from 0 to 13 of Arduino uno works as digital Input and digital output pins. Pin 13 of arduino uno is connected to led module. In arduino uno – pins 3,5,6,9,10,11 have Pulse Width Modulation capability each pin provide 20 Ma so absolute maximum current from all the pins is 200 milliampere.

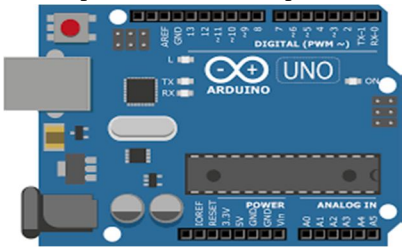


Fig. 2 : Arduino Uno

C. Servo Motor

Servo motor is an electrical element electrical element which motion or turn around an object with the help of electricity it is an electrical element that has a more precession and higher accuracy .It has high rotation capacity it can rotate in necessary angle this is a type of motor which carry through servo mechanism. The servo motor are used for the purpose of highly efficiency, light weights and servo motor are normally used in Kg/cm . Servo motor are used in automobiles for rotation purpose.



Fig. 3: Servo Motor

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D. Working

As the outcome of rainfall the rain sensor have a water path which outcome into the exchange in resistance. So, the sensor react as the changeable register resistance board .The association rain strength and resistance has been set on to in inversely proportional to each other .The increases in number of rain drops into outcome in to decrease in the resistance of the detector .The sensor later pass on the , the signal is received by using of microcontroller which find out the strength and transfer the signal to Servo motor in the form of pulse width modulation of action mechanism of wiper is later active in agreement observing with the strength of the rain falling . The sensor is draw in this way such it's size does not reduce the driver's view. The sensor is totally not liable the operator .The sensor is absolutely resistant to environmental impact analysis and component so may come in connection with the sensor .Consequently the sensor does not send incorrect alarms if equivalent an incident to happen.

All the time a resolve we herewith a try to describe the resolve of the rain sensor. Assume, the resistance in resting sensor in 1000 kilo ohm In a light rainfall , the height of the water path inner the rain sensor is small as the strength of the rainfall is low . The resistance of the sensor drops down and then get range between 900 to 400 kilo ohm . When rainfall rise then run drops in the sensor rise and resistance fall down between 300 to 400 kilo ohm.

As the rainfall's intensity increases, the resistance decreases. The decrease in resistance is taken in as a signal through which the Arduino Uno microcontroller determines the intensity of the rain. The signal is transmitted to the servo motor which then operates the working and movement of the wiper blades. As the intensity increases, the speed of the wipers increases.

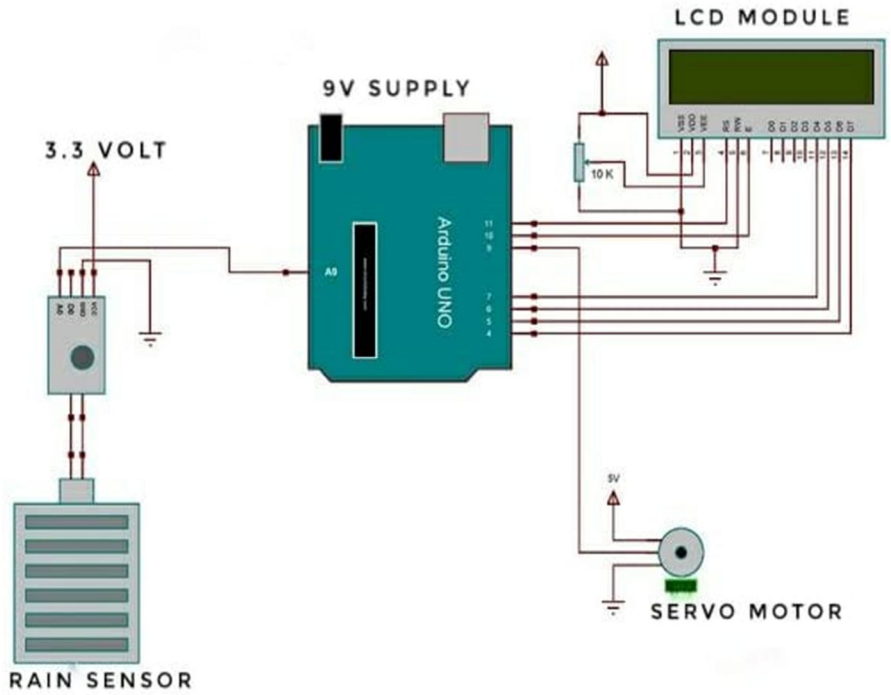


Fig. 4: Rain sensing wiper using Arduino

III. CONCLUSION

The automatic wiper system was start out to sense the rain drops and rub the glass by operating the wind screen wipers . By using the automatic wiper system using Arduino, the determine to drivers' response to control the wiper is automatic which have to work night shift and driven in the areas susceptible to vehicles drivers concentration on the breaker and clutches. The wiper manage the rainfall remove with performance. This system carry high accuracy, high precision. This system will also be useful in home implementation like cleaning the window glass and it familiar the rainfall and also notifies people in house. So that the people and takes of something like clothes food grains and products .The some point for require of additional implementation. which is act as future scope.

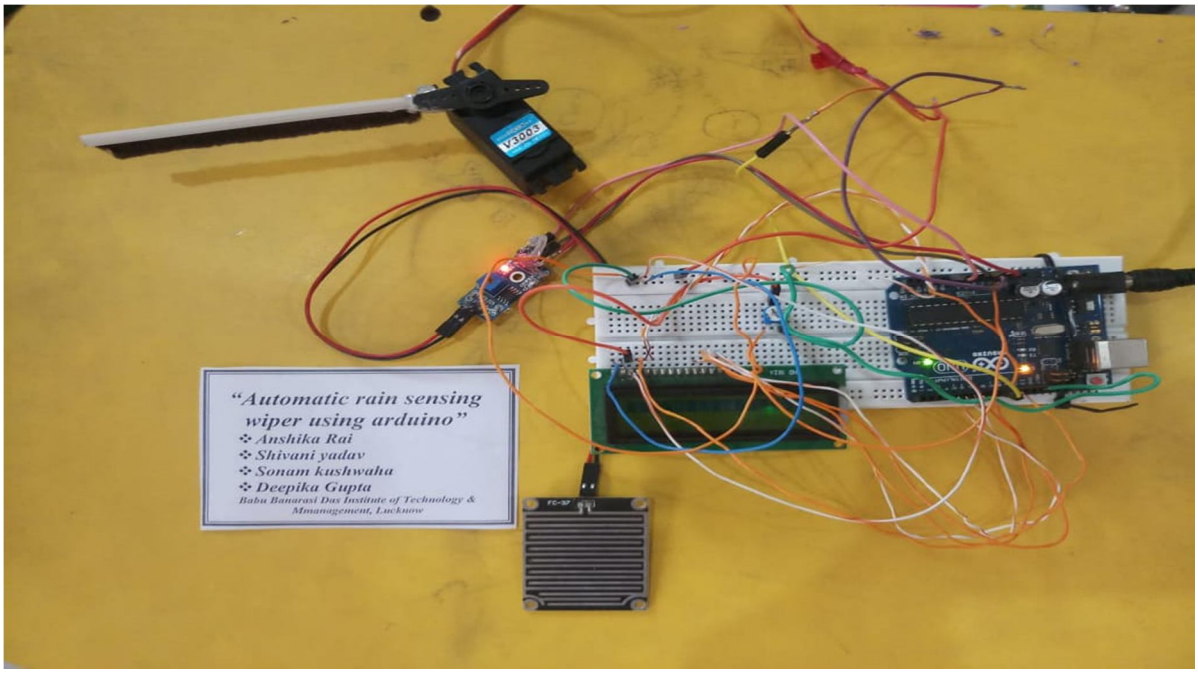
1)Use of micro controller allow the wiper rotate through 180 degree rotate than 360 degree.

2) The use for better speed control mechanism.

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IV. RESULT

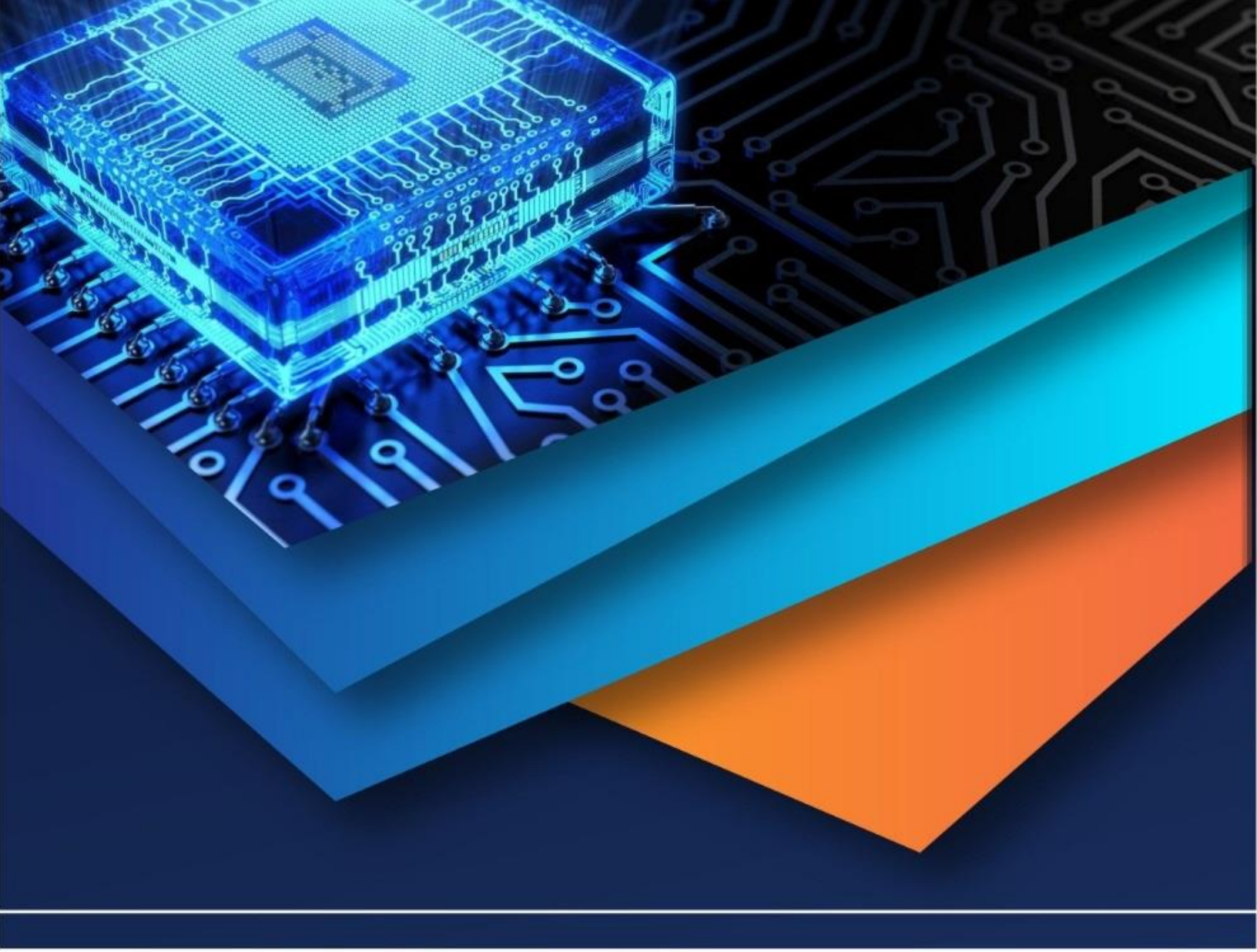
The LCD component show the strength of the rainfall from zero, to little, medium , high when no raindrop lie in rain sensor ,it sense the raindrop and send the message of the Arduino UNO. Arduino Uno require information for the operation continue. Arduino Uno is a microcontroller board which is normally Atmega8 . LCD component The show the details regarding the rate of the wiper. When rain start , rain sensor sense the rain automatically , sensor send the signal to the LCD and display the strength of rainfall.



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