

# DESIGN AND IMPLEMENTATION OF RAIN SENSING AUTOMATIC CAR WIPER

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**ABSTRACT**-The traditional wiper system requires driver's attention to switch on the wiper system during rainfall. Whereas in traffic condition, driver should not be diverted by manual adjustment of switching the wiper system which may lead to accident. Probably 80% of accidents happen due to the distraction of driver. In this scenario we need to design an automatic wiping on the wind screen during rain so as to avoid distraction of driver. The existing automatic wiper system has false wiping just after the rainfall stops which can be overcome by using proposed wiper system. Always just after the rainfall a few droplets on the existing water sensor will be sustained until it is cleaned or inherently evaporated. These water drops make a connection between two grid lines to occur false wiping. The advantage of proposed automatic wiper system is compared with the water sensor of existing automatic wiper system after rainfall. The proposed system in this paper is more accurate and economically cheap which can be implemented in all low and middle level vehicles. In order to avoid critical situation this automatic wiper system provides variable wiping speed based on precipitation level. This automatic wiper system has low-cost water sensor, Atmega8 microcontroller, Arduino Uno, LCD module and wiper motor, power cable.

**KEYWORDS**-Arduino, Rain sensor, 12c lcd display, servo motor.

## I. INTRODUCTION

All automotive industries seek to provide low-cost system for all the applications including automatic wiper system in vehicle. In recent time automotive industries focusing on autonomous vehicle which means self-drive system on different applications. For this scenario, this paper offers low-cost wiper system with simple and effective concept of electro mechanical concept to wipe the windscreen automatically. Automatic wiping has been done during rainfall without human interrupt. Thus, an uninterrupted makes to avoid distraction of the drive and secure from accidents. Nowadays vehicles are more automated whereas the cost of the embedded

system used for different critical applications are too high. Basically, increase in technology will enhance the vehicle cost. This criterion makes to develop low-cost automatic wiper system. The wiper system has been implemented to forecast in all low-cost vehicles. In the current scenario, only luxury vehicles employ intelligent rain sensing wind shield Wiper systems. Our system is modelled to demonstrate how useful is an automatic wiper system that adjusts speed itself based on rainfall intensity. Such a system improves the safety of a ride. An automatic, intelligent system like ours removes any manual errors. Our system adjusts wiper speed according to the intensity of rainfall and hence improves the safety.

## II. RELATED WORK

In previous works, touch sensor is used to drive the wiper system automatically. The principle behind capacitive sensor is changed in capacitance when water or object fall on the dielectric or conductive material on the sensor and the controller to drive the wiper. This type of system has disadvantaged that sometime insects may fall on the touch sensor while driving the car on road side which leads to drive the wiper system during sunny weather. Capacitive rain Sensor system requires good maintenance at all time. This maintenance plays vital factor for the driver to clean windshield on every day.

An intelligent rain sensing uses bottle for rain water level measurement, but this system may not provide accurate reading to wipe and also it requires proper maintenance. In some case, vibration on the bottle may cause fault reading which may leads false wiping. Smart Wiper Control System uses infrared sensor which is implemented in the latest cars but it has few disadvantages. The One is space occupied on the screen is small and the second (main) drawback is need of clear

wiping on the windscreen, where the sensor is placed. Even a small water line on optical coverage area will lead to go on wipe.

Automatic wiper system using Image processing as well as is more cost and requires good maintenance, whereas this cannot be implemented in the low-cost vehicles. This system takes more time for data processing. Hence the response time is more compare to any other system as discussed earlier in this paper. Above systems cause inaccurate result after rainfall condition due to water droplets or waterline on the respective sensors.

### III. EXISTING METHOD

Today’s car wipers need human intervention to start the wiper and to control its speed. the driver needs to switch on the wiper when needed and need to adjust the speed of the wiper as required. This causes inconvenience to the driver during rainfall. In the current scenario, only luxury vehicles employ intelligent rain-sensing windshield wiper systems.

### IV. PROPOSED SYSTEM

There are many automatic wiping systems installed in vehicle but the driver has to concentrate in driving and with traffic getting increased, things get difficult. It’s not safe as driver get distracted when they needed to switch it on or off. Manual switching consumes more energy than automatic switching. This switching has less accuracy than the proposed system.

Description of the Proposed System:

To design the entire system, the components needed are:

Component	Specification
Microcontroller	Arduino Uno
Rain sensor	LM393 Module
Motor	servo motor
LCD Module	I2C LCD
Others	connectors, power cable.

The intelligent wiper system is proposed to design using Arduino, Rain Sensor module, Servo motor. The rain sensor module senses rain falls and sends the information to Arduino –which is an Atmega8 based micro controller board. Arduino processes the information collected from rain sensor and controls the output motor (servo motor) based on the processed

information. The rain sensor is placed outside the car/vehicle, ideally at the side corner of windshield. The servo motor is connected to the wiper.

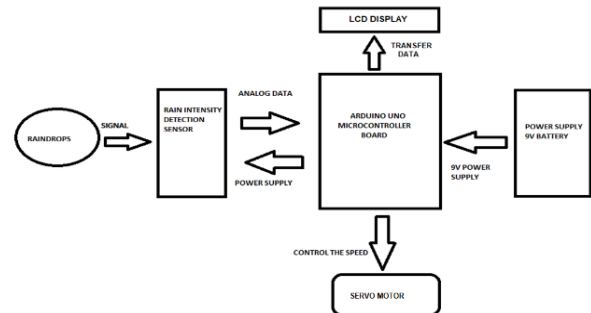


Fig. 4.1 Block diagram

### V. EXPERIMENTAL RESULTS

The rain sensing wiper system is constructed using Rain Sensor, Servo motor, LCD module, and Arduino. Whenever the droplets of the rain on the rain sensor, it senses the rainfall and sends Arduino the necessary information for the process to carry on. Arduino is a microcontroller board which is generally an Atmega8. The information sent by the rain sensor is processed by the Arduino and controls the servo motor based on the information processed. The LCD module is to display the information about the speed of the wiper and intensity of the rain. The rain sensor, which senses the rainfall is placed at the side corner of the windshield outside the car.

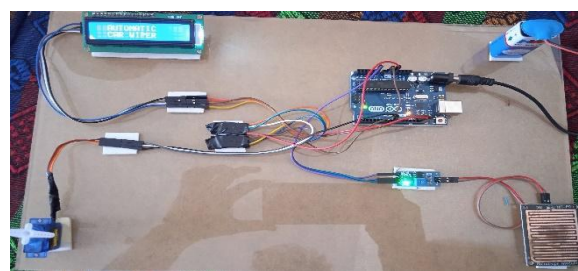


Fig. 5 Experimental Results

The wiper blades are connected with the servo motor and are powered by it. LCD module is kept inside the car nearby the driver’s vision. The rain sensor, LCD module, and the servo motor are connected with Arduino, which is present in the car connected to a dc source. The speed of the servo motor is increased whenever the intensity rises from low to high. There are three different speeds for the Low, Medium and High intensity of the rainfall. When the intensity of the rainfall increases, the rotation speed of the

wiper will decrease automatically. Accordingly, the LCD module displays the information. The LCD module displays the intensity of rainfall ranging from NIL to low, medium, high. When there is no rainfall, the LCD display will show the intensity of rainfall as NIL. When the rain begins, the rain sensor senses the rain automatically and sends a signal to the LCD and displays the intensity of the rainfall ranging from low to high. When the intensity of the rainfall changes, the rain sensor senses the intensity and sends a signal to the servo motor and the servo motor will increase the speed of rotation accordingly.

## VI. CONCLUSION

An automatic wiper control system was built which is modified version of intermittent wiper system. This system improves driven level of comfort. It needs more for the drivers who work at night and traffic prone areas, where drivers have to give maximum concentration on the break and clutches. The wiper controlling task during the rainfall is eliminated with this implementation. This system contains high precision and high accuracy.

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