

# Design and Fabrication of Windshield Motorized Car & Bus Wiper Mechanism

Mr. Yogesh Padkanthwar Mr. Sagar Meshram Mr. Amish Tirpude Mr.  
Whradaynath Barapatre Mr. Pratik Upase  
Mr. Rohit Fule Project Guided by Mr. Prof. Vidhyadhar Kshirsagar  
TGPCET College of Engineering And Technology Mohgaon Nagpur Maharashtra India

---

## Abstract

The automatic rain sensing car wiper system is used to detect rainfall and it is used to activate any automobile's rain wipers without driver interaction. The system was developed to avoid driving distractions and hence allow the drivers to focus on their primary task of driving. The distraction get rid with the development of this product is the manual adjustment of windshield wipers when driving in precipitation. The few seconds that a driver takes their attention off the road to adjust a knob while driving in poor weather conditions could potentially lead to car accidents. So to avoid this type of accidents automatic car wipers can be used. The automatic car wiper system uses a combination of impedance and Impedance sensor to detect rain and its intensity. The system contains a controller that takes in the input signals from the sensors and the sensor senses the water drop or moisture and then controls the operation of the windshield wipers based on those input signals. The prototype demonstration shows the basic operation of the system in standard conditions. Thus the system responds successfully to rain drops or simulations within the specified amount of time

**Keywords-** Rain sensor, Microcontroller, Arduino, Servo Motor.

---

Date of Submission: 15-05-2022

Date of Acceptance: 30-05-2022

---

## I. INTRODUCTION

The team has developed an autonomous windshield car wiper system for automobiles using impedance sensors, a controller, and signal conditioning circuitry. The sensors send an input signal to the controller which senses the rain drops and according to that it controls the wiper motor through interfacing with the automobile wiper control circuitry. The motivation of the system is to develop a reliable automatic windshield wiper system that is commercially available to a big market of automobile owners. Research was done on similar products in the market and articles from academic sources for the foundation of our design approach.

## II. RELATED WORK

For about twenty years, a significant number of researches have been conducted to automatize the windshield wiper systems. Primitive ideas of using ultrasonic vibrations to remove the raindrops from the windshield or using special coating that prevent raindrops to form in the windshield has been proven ineffective as drivers found those systems annoying and disturbing. Among other considered ideas, the idea of using optical rain sensor has proven to be somewhat effective. For this wiper system, an optical rain sensor was used, which detected the change in the reflection of light projected by another source to determine the presence of water in the windshield. This system has been produced by TRW Inc. and has been used in recent Cadillac cars manufactured by General Motors (GM). However, the method has also been proven less effective for certain circumstances. Renowned automotive companies such as Toyota Motor Corporation and Honda Motor Companies have launched their new vehicles equipped with rain sensing wipers. Additionally, other companies, for example Ford Motor Company and Volkswagen AG, are also bringing in rain-sensing wipers into the market. Specific information about the wiper system of those vehicles is not available, as those vehicles are not available in the market yet.

III. PROPOSED SYSTEM

A. Architecture diagram

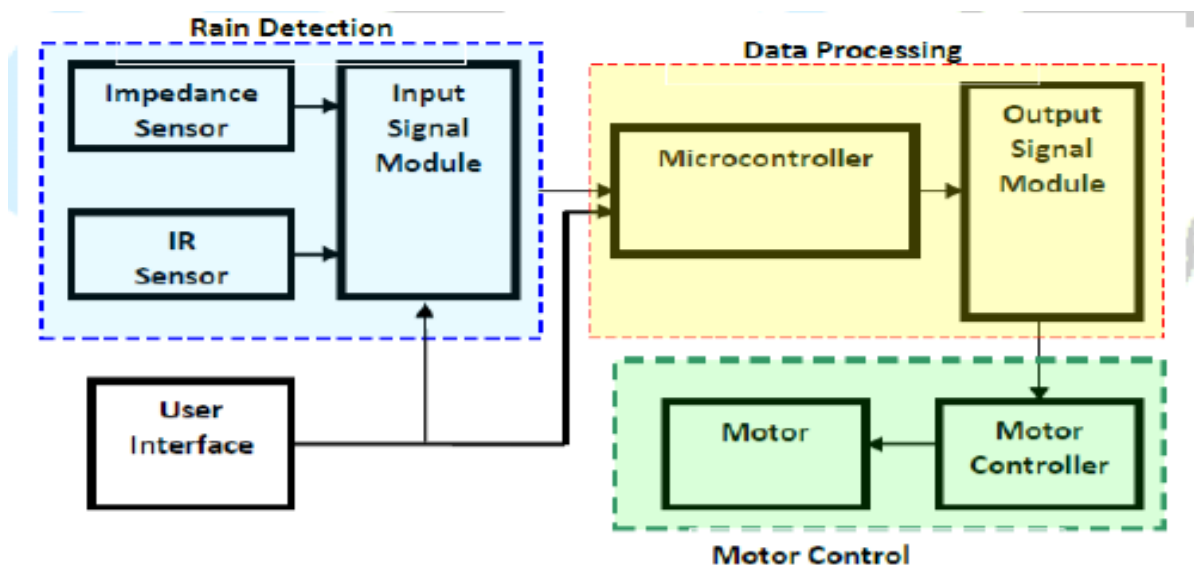


Fig. 1: Architecture diagram

The automatic rain sensor is placed on the front glass of the vehicle where it can detect rainfall. The rain sensor, servo motor and other required components achieve power from the battery. When the rain droplets fall on the rain sensor, the control board of the rain sensing unit will send the signal to the Arduino Uno module. The Arduino module determines the intensity of rain fall by controlling 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 then 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 in that case 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 driver to operate the wiper. So, the driver will concentrate on the driving. Due to this type of system there is a chance to reduce the car accidents.

B. Data Flow Diagram

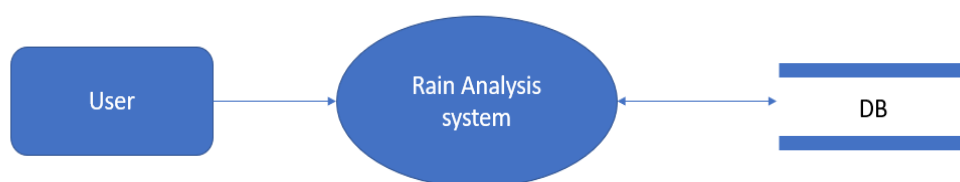


Fig. 2: Level 0 Data Flow Diagram

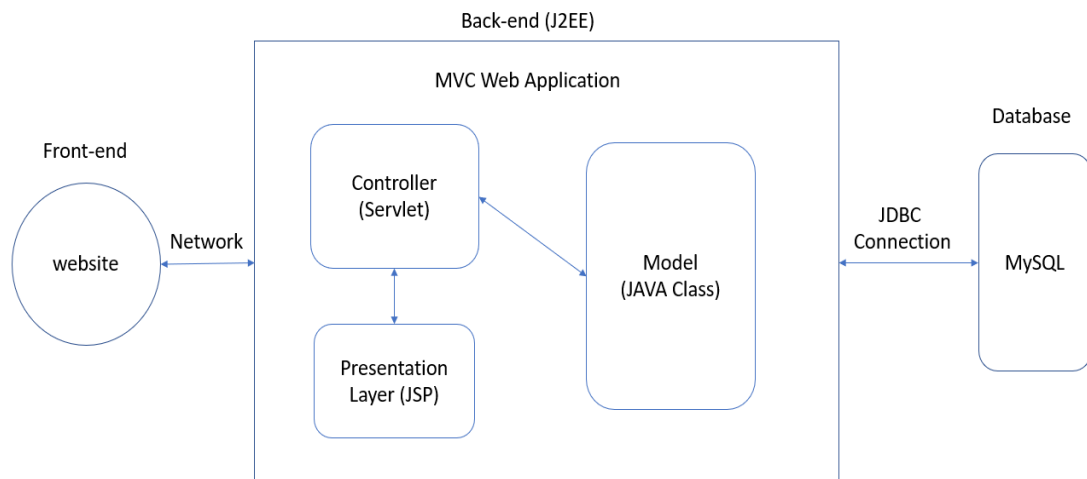


Fig. 3: Level 1 Data Flow Diagram

### C. Module Description

After careful analysis the system has been identified to have the following modules:

- 1) Hardware Module
- 2) Hardware to Software Interaction
- 3) Google Map

#### 1.) Hardware Module

In this module we have created hardware part a rain sensing module is used for measuring the intensity of rainfall. And a servo motor detects the rain drops and according to that the wiper shows the movements. An LCD module is also attached to the controller for displaying the rainfall intensity. By measuring the amount of rainfall, controller will adjust the speed of servo motor. Servo motor is controlled by generating PWM signal at its signal line.

#### 2.) Hardware to Software Interaction

In this module we will create a java program which will continuously read the value from hardware and will store in the database.

#### 3.) Google Maps

This module will show driver where it is raining in google map and according to that the driver will decide the route.

#### IV. OUTPUT AND RESULTS

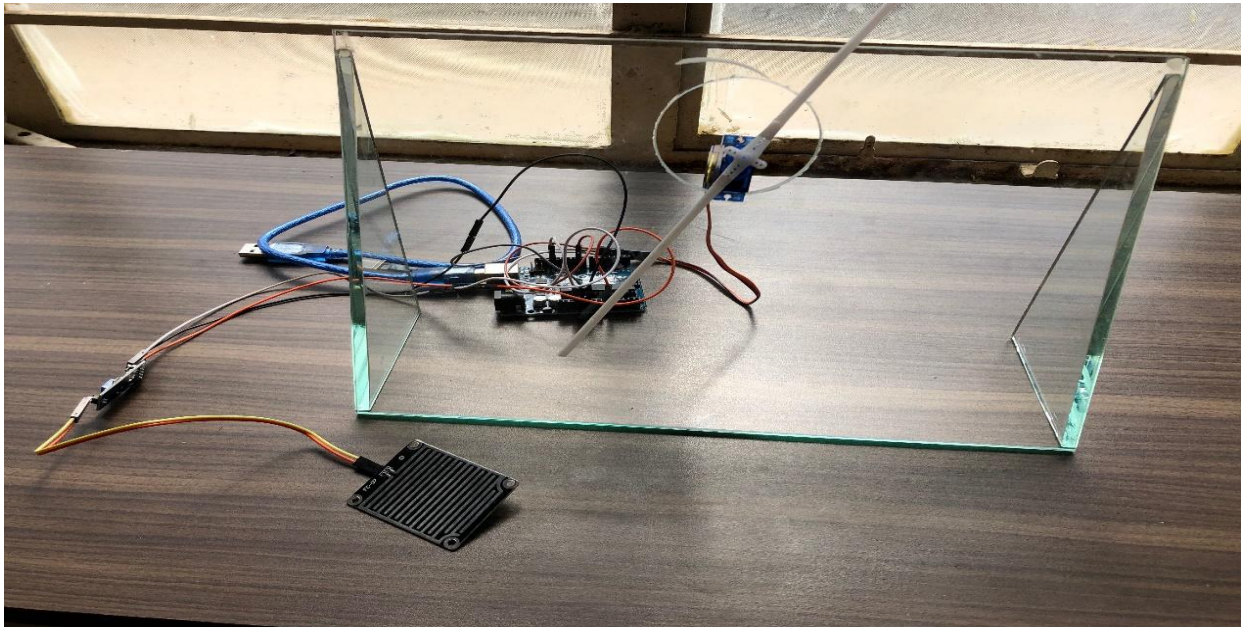


Fig. 4: Hardware Model

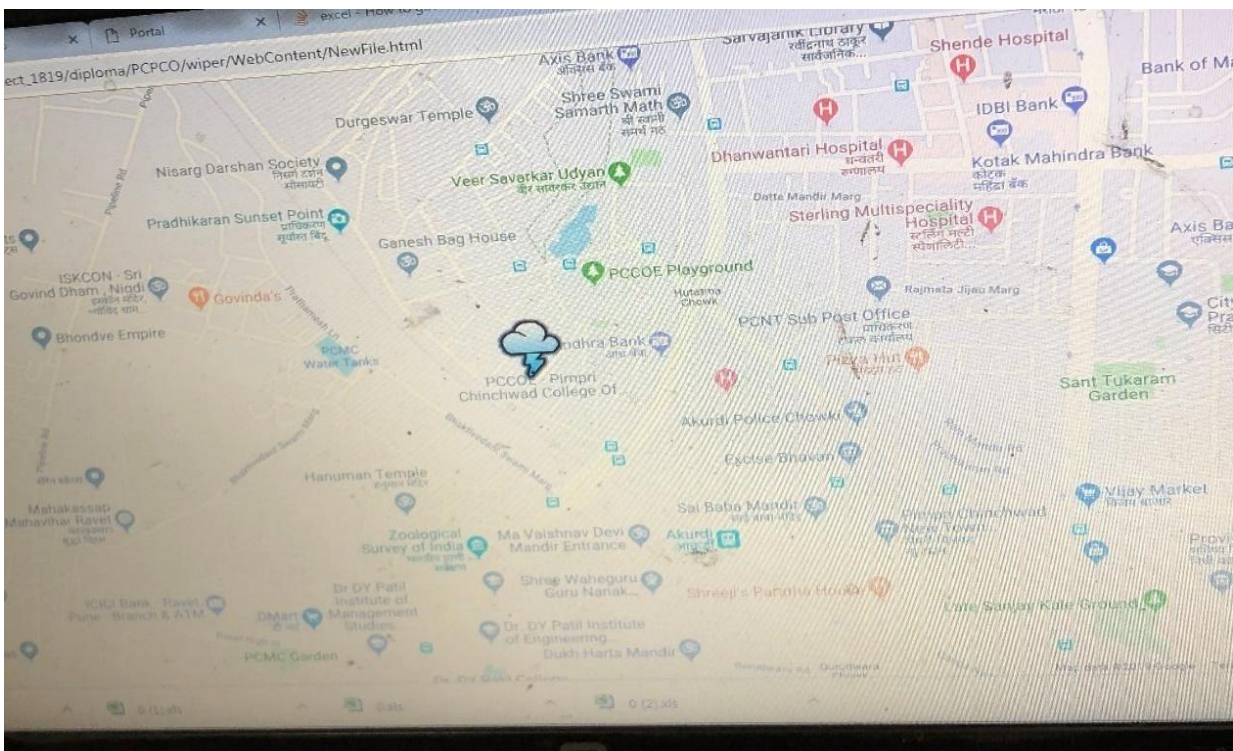


Fig. 5: Google map

#### V. FUTURE ENHANCEMENT

We will store water so that we can re-use it.

#### VI. CONCLUSION

The automatic rain sensing car wiper system will be designed, developed, and demonstrated to detect rain and activate the automobile windshield wipers based on the rain drops and its intensity. This project will be able to imitate the operation of the car wiper system as it is installed in an automobile. The team was able to successfully complete the project and adequately meet the proposal goal of automating the driver's response to rain within the specified amount of time of few milliseconds. In addition, the team would schedule project highlight differently taking into consideration parts of the project that were most remarkable and consequently

required the most effort to complete the system. The initial goals and objectives of the system were to expand upon existing automatic rain wiper technologies to make a more reliable yet economically priced system. As shown by the project demonstration.

## **VII. REFERENCES**

- [1]. NHTSA Data Sheet, 2001, Available HTTP:  
<http://www.nrd.nhtsa.dot.gov/departments/nrd-12/809-716/pages/longdesc.htm>
- [2]. "The Rain Tracker Makes Driving More Enjoyable," [Online Document], Available <http://www.raintracker.com/ProductInfo.htm>
- [3]. "TRW Automotive Electronics: Rain Sensor," 2007, [Online Document], Available [http://www.trw.com/images/rain\\_sensor.pdf](http://www.trw.com/images/rain_sensor.pdf)