Automatic rain sensing wiper

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ABSTRACT

Over the past two decades, the automotive industries have aggressively researched ways to exploit modern computing and electronic advances in the development of safety, reliability and entertainment technologies for vehicles with drivers exposed to an ever increasing number of distractions, automatic rain-sensing wiper systems become an even more appealing feature. So here we propose an automatic wiper system that automatically switches ON while detecting rain and stops when the rain stops. Our project brings forward this system to automate the wiper system having no need for manual intervention. For this purpose, we use a rain sensor along with the microcontroller and driver IC to drive the wiper motor. Our system uses a rain sensor to detect rain, this signal is then processed by the microcontroller to take the desired action.

Keywords— IoT, Rain sensor

1. HARDWARE USED
   - AT mega Family Microcontroller
   - Transformer
   - Regulator
   - Rain Sensor
   - Servo Motor

2. SOFTWARE USED
   - AVR studio
   - MC Programming Language: Embedded C

3. EXISTING SYSTEM
   3.1 Capacitive rain sensing system
   The existing system detects rain based on its effect on the resistance and capacitance. Sensors based on these methods are integrated with the windshield and are potentially less expensive and less conspicuous. The capacitive sensing method relies on the relatively large dielectric constant of water as it affects the capacitance between conductive electrodes.

   In these capacitive sensors, the full thickness of the glass windshield separates water drops from capacitive plates. This change in capacitance due to rain and its range is very small. Hence, the sensor is less effective in distinguishing between different rainfall intensities. Further, the capacitive sensors are affected by human touch, giving a false output. Also, the dielectric constant changes with temperature causing errors...

   3.2 Disadvantages of existing system
   - The range of the output of presently available capacitive and resistive sensors is small. Hence they cannot effectively distinguish between different rain intensities. Further, the response of these sensors is dependent on temperature.
   - Varying rainwater drop sizes and their frequency for the same amount of rain can cause inconsistent responses in some systems.
• The sensors under certain situations are unable to differentiate between rainwater and other small objects present on the glass, thereby affecting the functioning of the automated wiper system.

4. PROPOSED SYSTEM

The main objective is to provide a low-cost solution for automatic control of wiper motor speed depending on the intensity of the rain. It is effective for both low rainfall as well as during extremely heavy downpour. Also, the environmental factors such as impurities, the presence of foreign bodies in the rainwater, dirt on the windshield and smog do not affect the system performance. The rain sensor works on the principle of using water for completing its circuit, so when rain falls on it’s circuit gets completed and sends out a signal to the microcontroller. In this system, the LED circuit is used to display the intensity of the rainfall. The microcontroller now processes this data and drives the motor IC to perform the required action. The motor driver IC now drives a servomotor to simulate as a car wiper.

4.1 Advantages of proposed system

• A cost-effective, compact, efficient, reliable automatic wiper controller is designed, implemented. The developed wiper controller overcomes the drawbacks of presently known capacitive sensing systems.
• The cost of the system is found to be significantly lower than presently known equally precise systems. The wiper controller has compact dimensions and thus can be easily installed on the vehicle windshield.
• The rain sensor used is demonstrated to have a wide range of output as compared to previously developed systems.
• Because of its predefined geometry, as the rain intensity increases, there is a change in the servo motor speed. Further, an embedded system using micro-controller is designed and implemented to control the wiper motor speed in accordance with rain intensity.

5. BLOCK DIAGRAM

![Block Diagram](image)

Fig. 1: Block diagram

6. MODULES

• Enabling mechanical capabilities: This module includes assembling the parts and ensuring the mechanical maneuverability.
• Enabling connectivity: This module includes the process of securing the connections inside the moving mechanical components.
• Enabling IT functionalities” This module includes the process getting input from the sensors and producing the desired output mechanism with the help of software systems.
• Source code: Embedded C language is used.
7. CONCLUSION

From this project, we conclude that this method of using wipers is technologically feasible and reduces the manpower and latency involved in the usage of manual wipers.

8. REFERENCES