

Rain Sensing Automatic Car Wiper System

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Abstract: Today's car wipers are manual systems that work on the principle of manual switching. So here we propose an automatic wiper system that automatically switches ON detecting rain and stops when rain stops. This project brings forward this system to automate the wiper system having no need for manual intervention. For this purpose we use rain sensor along with microcontroller and driver IC to drive the wiper motor. This system uses rain sensor to detect rain, this signal is then processed by microcontroller to take the desired action. 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. The microcontroller now processes this data and drives the motor IC to perform required action. The motor driver IC now drives a servomotor to simulate as a car wiper.

Keywords: 8051 MC, Rain Drop Sensor, Servo Motor, Crystal Oscillator, Resistors, Capacitors, Transistors, Cables and Connectors, Diodes, PCB, LED's, Transformer/Adapter, Push Button

1. Introduction

The proposed car wiper system is automatic and intelligent. Automatic in the sense that the system detects rainfall and starts itself. Intelligent in the sense that the system calculates the intensity of rainfall and adjusts the speed of wiper motor accordingly – higher speed of rotation for higher rain fall and vice versa. In the current scenario, only luxury vehicles employ intelligent rain sensing windshield wiper systems. Our system is modeled 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. There are many instances of accidents occurring during heavy rainfall due to lack of proper vision. In many cases, these accidents were due to manual errors (for example: not increasing speed of wiper) from the driver. An automatic, intelligent system like ours remove any manual errors. Our system adjusts wiper speed according to the intensity of rainfall and hence improves the safety. The intelligent wiper system is proposed to design using mc, Rain Sensor module, Servo motor and a 16x2 LCD module. The rain sensor module senses rain fall and sends the information to 8051 microcontroller – which is an Atmega8 based micro controller board. MC processes the information collected from rain sensor and controls the output motor (servo motor) based on the processed information. The 16x2 LCD module is to display status messages to the driver – like intensity of rain fall, speed of wiper etc. The rain sensor is placed outside the

car/vehicle, ideally at the side corner of windshield. The servo motor is connected to the wiper blades. LCD module is kept inside the car nearby the driver's vision. All these 3 devices are connected together via mc – which is kept inside the car near to dc power source.

2. Block diagram

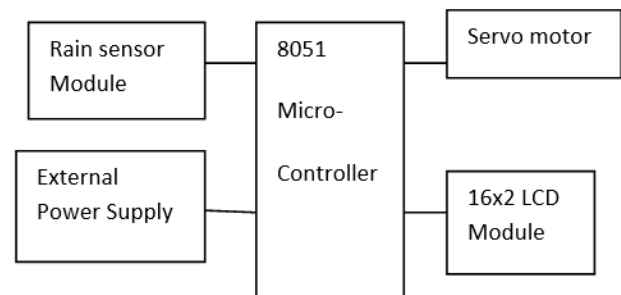


Fig. 1. Block diagram of rain sensing automatic car wiper system

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A. Rain sensor module

It allows to measure moisture via analog output pins and it provides a digital output when a threshold of moisture is exceeded. The module is based on the LM393 op amp. It includes the electronics module and a printed circuit board that “collects” the rain drops. As rain drops are collected on the circuit board, they create paths of parallel resistance that are measured via the op amp. The lower the resistance (or the more water), the lower the voltage output. Conversely, the less water, greater the output voltage on the analog pin. A completely dry board for example will cause the module to output five volts.

B. 8051 Micro-Controller

8051 microcontroller is designed by intel in 1981. It is an 8 bit microcontroller. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage, and two 16 bit timers of RAM storage, 2 16 bit timers. It consists of are four parallel 8 bit-ports, which are addressable as well as addressable as per the requirement.

C. LCD module

JHD162A is the LCD module used here. JHD162A is a 16x2 LCD module based on the HD44780 driver from Hitachi. The JHD162A has 16 pins and can be operated in 4-bit mode (using only 4 data lines) or 8-bit mode (using all 8 data lines). Here we are using the LCD module in 4-bit mode.

D. Servo motors

Servo motors have been around for a long time and are utilized in many applications. They are small in size but pack a big punch and are very energy-efficient. Servo motors are also used in industrial applications, robotics, in-line manufacturing, pharmaceuticals and food services. Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A servo motor can usually only turn 90° in either direction for a total of 180° movement. The motor's neutral position is defined as the position where the servo has the same amount of potential rotation in the both the clockwise or counter-clockwise

direction.

3. Conclusion

An intelligent car/vehicle wiper system which can sense rain and start itself. The wiper adjusts speed itself based on the intensity of rainfall.

4. Future scope

Automatic wipers are used in four wheeler vehicles both in front and rear mirrors. It can be implemented at house window for cleaning. A slight modification in it leads to a better cleaning system. Prevents glass shield or bars from getting corroded. Also it can be used in trains, aircrafts and watercrafts.

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