Smart Vehicle Using Arduino

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Abstract: Safety and driver comfort are the essential goals of new trends in automobile industry. An automatic wiper controller helps not only in increasing safety by reducing distractions but also increases the overall comfort. Such an automatic control is available, however it has limitations of high cost and low efficiency. In this Paper, we aim to provide an automatic wiper controller, based on resistive rain sensor which is cost effective, efficient and has a wide range of output. A complete windshield controlling system has been developed to increase human comfort and flexibility. The wiper has been controlled by a water level sensor which regulates the wiper motor through sensing the level of water or rain. A dust sensor has been integrated to spill some water in the windscreen and then wipe it. It senses when a certain level of dust get accumulated in the screen. The sun visor which is mounted inside the car to shade the driver's eye from sun would be easier to control by a servo motor.

I. INTRODUCTION

In recent years researchers are trying to develop automobile industry more and more for safety, reliability, flexibility and entertainment by modern computing and electronics. Consumers are expecting their car to be voice controlled, auto driven and GPS assisted visual directions for driving. The manual adjustment of the wiper and windscreen washing spray distracts driver's attention, which may be a direct cause of accident. This Paper is up to minimize the drivers work by setting up automatic control system for windshield mountings, which are wiper and sun visor. According to the statistic data of Automobile Association, there are about ten to thirteen percent of the death of drivers were caused by tired driving. Besides, some data also show that more than 45 percent of highway traffic accidents would occur because of the driver's fatigue or loss of attention and doze when they drive for a long time. Otherwise, the eyes can act as an important information transfer when all kinds of outside information into mind, at the same they can also show the inner spirit state.

II. PROBLEM STATEMENT

The resistive sensors in the existing systems are not optimized by using an equivalent model. The optical sensors under certain situations are unable to differentiate between rain water and other small objects present on the glass, there by affecting the functioning of the automated wiper system. The systems that are able to provide precise response required for wiper control operation are not cost effective. The solar energy is too expensive to generate and inconsistent availability, have prevented it from becoming a more utilized energy source. The anti-sleeping alarm sensors existing systems are not automatic hence it's required to implement automatic and low noise safety sensor.

III. METHODOLOGY

Automotive vehicle is mounted with a windscreen at its front. It serves its purpose as the switch gets on manually by the driver which is situated alongside the steering wheel. Its function is to keep the windscreen clean from raindrops, snow, dust etc. This Paper aims to develop an automatic control system for the wiper where the driver won't have to turn ON the switch manually. Anti-sleeping system will alarm, when driver is dozing and his concentration is distracted from driving. Solar energy is a renewable source of energy is used to charge the battery. A control system has been developed which contains water sensor, dust sensor, light sensor, relay switches, wiper motor, servo motor and Arduino microcontroller ATMEGA328.
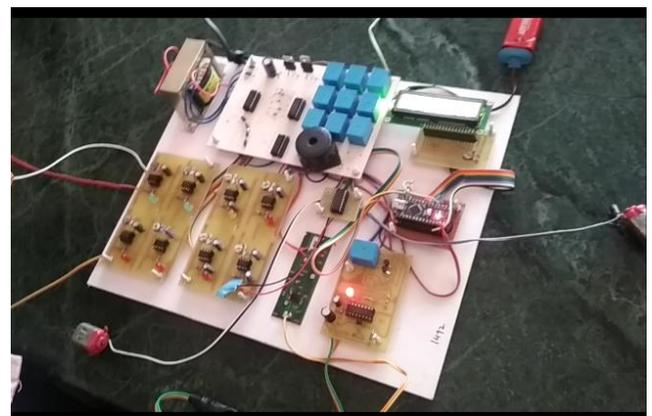

Figure 1: Experimental setup of the developed system
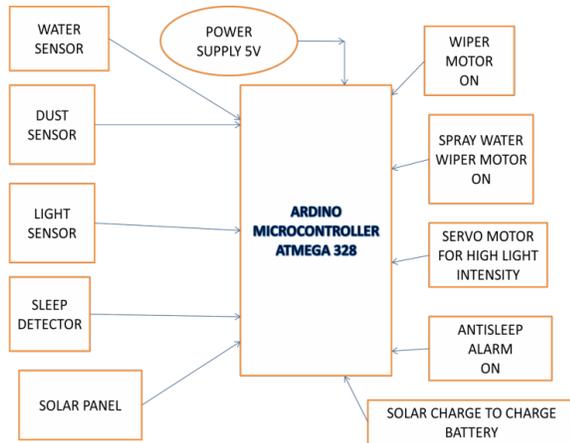
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IV SYSTEM IMPLEMENTATION

Figure 2: Experimental setup of the developed system

As water sensor can detect the quantity of water from exposed surface, it can be read as analog input to regulate the speed of wiper motor. Other sensors output are connected as analog inputs in order to control the speed of the motors and are connected to the Arduino by digital pins. Three LEDs are used to indicate the sensor activity, Corresponding LED indicate the different cases of activity, a 5mm blue LED is used for water sensor and red one is used for Dust sensor. If any of these i,e water, dust, high intensity light beam are detected then corresponding LED will turn ON. The main purpose of these LED is to notify when the sensors detect water, dust or high intensity light beam. The program is dumped to the Arduino using Flash Magic to run the system. Figure 3 shows the program flow chart, here the sensors are used as the decision variable for the program.
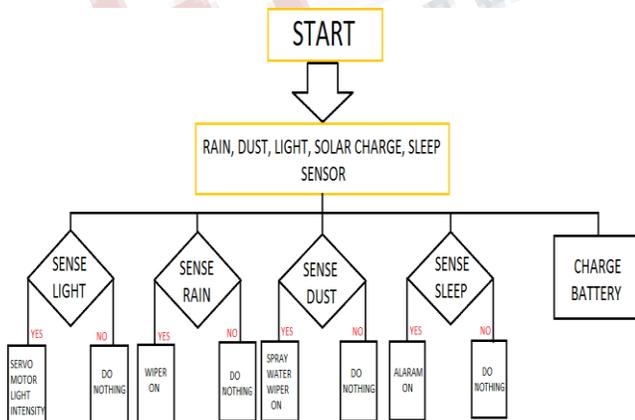

Figure 3: Experimental setup of the developed system

V ADVANTAGES

As solar energy is renewable source of energy & creates no Pollution, Maintenance of solar cells also does not require much effort. Proposed Smart Vehicle System reduces manual cleaning of windscreen and improves the driver's level of comfort to an extent. It is capable of distinguishing rain & dust, by automatically operating sensors and clears the wind screen. Reduces the risk of accidents. Cost of maintenance is less, the developed wiper controller overcomes the drawback of capacitive, optical, conductive and vision based sensing systems.

VI CONCLUSION

A cost effective, efficient, reliable and robust automatic wiper controller is designed, Implemented and tested. The wiper controller is compact and thus can be easily installed on vehicle wind-shield. This system have different output indications as compared to previously developed systems. This Paper propose improved version of intermittent wiper system and manual sun visor. This system reduces manual cleaning of windscreen and improves the driver's level of comfort and aid drivers specifically during night time. Reduces drivers effort in traffic prone areas where they are required to concentrate on brake and clutch. The automation of wiping and dust cleaning of windshield during rain will provide them much ease and help them concentrate on the basic ABC (accelerator, brake and clutch) of driving.

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