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Anti-Collision and Wiper Speed Control System for Abnormal Climatic Condition

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ABSTRACT:

In this project, we proposed a system that can enhance the safety of vehicles. That the solution can assist the driver in poor visibility conditions by warning about the impending obstacles and approaching vehicles that may lead to collision. Here use the long IR's (infrared proximity switches) to detect the obstacles and vehicles. Here also developed an automatic wiper speed control mechanism that gets activated in weather conditions such as heavy foggy and rain falling.

KEYWORDS:
long IR's, raindrop sensor, motor driver, DC motor, Buzzer, liquid crystal display.

1.INTRODUCTION:

There are numerous reasons for motor ve-hicle accidents and significant contributor is road traffic density, which increasing steadily every year. Accidents also results from instances of drunken driving, drivers falling asleep or using electronic gadgets or speeding during driving. During rain and fog, the situation becomes even worse and driving can become dangerous. We have come up with a solution to assist a driver in poor visibility situations induced by rain and fog. In our system has two modules a novel anti-collision system based on long IR's and wiper speed control system based on rain drop sensor.In this anti-collision system (long IR's) infrared proximity switches works by sending out beams of invisible infrared light, a photo detector on the proximity switch detects any reflection of this light. This reflection allows infrared proximity switches to determine whether there is an object nearby. In this wiper speed control system uses a rain drop sensors to detect the rain and fog falling densities.

The raindrop sensor gives output signal based on this signal speed of the wiper is control automatically.

BLOCK DIAGRAM:

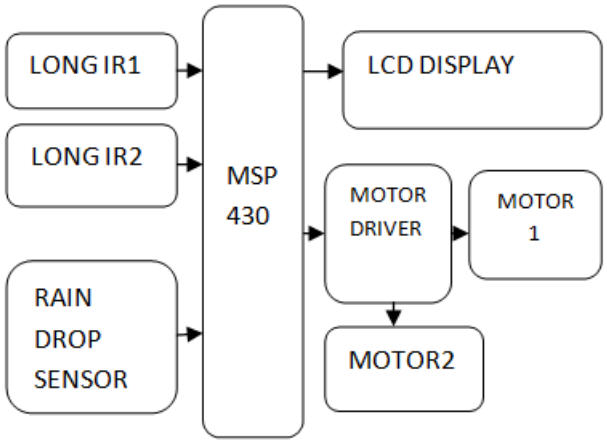

FIG: anti-collision and wiper speed control system for abnormal climatic condition.

2. HARDWARE DESCRIPTION OF ANTI-COLLISION AND WIPER SPEED CONTROL SYSTEM:

A. MSP430G2553 MICROCONTROLLER:

The MSP430G2553 microcontroller is heart of the system. it's is 16-bit ultra low power device it has 16KB of ROM,512 bytes of RAM and up to 16mhz cpu speed . it has 8-channels and 10-bit analog to digital converter, on chip comparator. Being pro-grammable in c language, capacitive touch enable inputs and outputs. In this UART is used for universal serial communication interface. The MSP430G2553 microcontroller is low cost and low power consumption. In this system the MSP430G2553 controller is used for controlling the all the interfaced device for specified functions.

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B.INFRARED PROXIMITY SWITCHMODULE (LONG IR'S):

Infrared proximity switch module is a reflection type photoelectric sensor. Which has the transmitting and receiving beam function, infrared proximity switch works by sending out beams of in visible infrared light. a photo detector on the proximity switch detects the any reflection of the light. This reflection allows infrared proximity switches to determine whether there is an object nearby. the trigger distance between 30-800mm by manual adjustment of the potentiometer in the sensor. The dimensions of this sensor are 18mm diameter and 45mm length. in this long IR;s the cable length is 180mm.

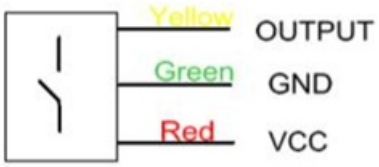

FIG: Infrared Proximity Switch Module

C.RAINDROP SENSOR:

The raindrop sensor is used to detect the drops of water on glass and activate the wiper .the raindrop sensor detection sensor is an easy- to-use and it's a low cost the rain drop sensor works thought series of exposed parallel traces on the board which produces the electric variation when drops or water volume changes. the output of analog signals from the rain drop sensor is converted in to digital value by using analog to digital converter IC or microcontroller. this read by the comparator and it activates the wiper. the simplest raindrop sensor is a small strip of 'Vero board', or even two strips of un-insulated wire wrapped on a piece of wood works just as well for experimentation purposes. the conductor become a resistor when a droplet of water bridges the gap between them ,things short out.

FIG: Rain Drop Sensor

D.LIQUID CRYSTAL DISPLAY:

In this project 16×2 LCD interface in 4-bit method . several electronic devices and projects require a message to de displayed in order to indicate their functioning. The 4-bit mode LCD interface requires four data lines and two or three control lines. In this tutorial, 16×2 LCD interface with microcontroller in 4-bit mode without using busy status flag. In 4-bit mode LCD interface, mcu sends the data or command byte in two 4-bit bus transfer to LCD as nibbles. A nibble is 4-bit data, which is half a byte. in this control signals (enable, R/w, RS) are connect to MSP430G2553 port1 pins. in this LCD is used to display the message to driver to get vehicle in safely. It's very easy to use for displaying the message.

E.BUZZER:

In this project buzzer gives the beep sound or alarm sound when every obstacle present in nearby vehicle. In this set of 8 switches are interface to D-flip-flop working as priority encoder. While number of switches pressed at a time. It takes the first switch pressed into consideration and generates a buzzer sound along with the indication of the switch pressed. This circuit includes 8 numbers of push buttons which are fed to a D-flip-flop. This flip-flop generates output signal which is fed to a transistor, making corresponding LED to switch ON and also gene-rates a buzzer sound.

F. L293D MOTOR DRIVER:

In this is not easy to moving motor simple connects to the brain circuit to the motor. in this case motor does not rotate. In this many way to give the strength signals to motor, in this by using the L293Dmotor driver to gives the strength signal to the motor for rotation purpose.

G. MOTOR:

A DC motor is design to run on DC electric power. Two examples of pure DC designs are Michael faraday's homopolar motor (which is uncommon) ,and bear in motor, which is (so far) a novelty. in this the DC motor s are used for to shows the wiper rotation speed considering density of drop s on raindrop sensor. it can also used has to shows the direction to driver for vehicle safety purpose.

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2.1 DESCRIPTION OF ANTI-COLLISION SYS-TEM:

The anti-collision system is mounted on the bonnet of the vehicle, a block diagram of the system is shown in above fig. an infrared proximity switch module (long IR's) is a reflection type photoelectric sensor which integrates transmitting and receiving infrared beams function. Infrared proximity switch work by sending out beams of invisible infrared light .a photo detector on the proximity switch detects any reflection of this light. These reflections allows infrared proximity switches to determine weather there is an object hear by .in this the output of the long IR's gives to the msp430 controller which will generates alarm signal and shows the direction on the LCD display to the driver for the vehicle safety .in this what are the direction shown in the LCD display observe on the motor rotation.The new innovation in the proposed solution is that the anti-collision system is developed using longIR's and it will suitable for all kind of weather conditions and will thus help to reduce accidents and decrease incidences of injuries and death due to road accidents.

2.2DESCRIPTION OF WIPER SPEED CONTROL SYSTEM:

During rainfall, the intensity of rain fall is erratic but the typical wiper system in a vehicle has only two or three speeds. The low costly vehicles don't have automatic wiper speed controlBut high costly vehicles has this automatic wiper speed control system .Our aim was to devise an affordable automatic wiper speed control system. In this we can using rain drop sensor module it is easy to use and low cost drop recognition sensor. The sensor works thought a series of exposed parallel traces on aboard which produces electrical variations when drops or water volume changes. Then the rain drop sensor sends the output of analog signal to the msp430 controller. This controller activates the wiper and controls the speed of wiper according to drop or water volume density. In this project wiper speed is observe on the motors in this we can use the motor driver it gives the buffer signals to rotate the wiper.

3. SOFT WARE IMPLEMENTATION:

A.MICRO SOFT ACCESS:

For secure and easy access of the database we use Microsoft access which is relational data base management system for Microsoft Corporation.

Microsoft access supported by visual basics for applications. An object-based programming language that can reference a variety of objects including DAO (data access object) .

B.IAR WORK BENCH:

IAR workbench kick start version provided by Texas instruments was used to develop the microcontroller programs as it was user friendly and has both simulation and debugger mode. This also makes the process of loading the programs to the controller faster and easier.

4. REUSLTS:

We developed a working prototype of the project and tested. A video of the project demonstration can be viewed at seen fig2 for a picture of the testing environment.

Figure-2: anti-collision and wiper speed control system.

5. CONCLUSION AND FEATURE WORK:

We have successful in implementing our idea of the anti-collision system and wiper speed control system using long IR's it will work in all weather conditions especially rain and foggy weathers. in the wiper speed control system, the rain drop sensor is very sensitive and can detects very small quantities of moisture. Thus, even in slight rain fall, the system will gets activated and save the driver from distraction and provide convenience and safety. In the anti-collision system, we can use long IR's which will have better sensing capability in rain and foggy conditions compare to ultra sonic sensor based anti-collision systems. Our anti-collision system is versatile and can also be used by blind people for navigation by making some minor adjustments. we can also Convert it into a system which will automatically apply braes on receiving a warning.

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Our wiper speed control systems run on every low voltage and the wiper runs on high voltage; thus we have made use of relays. However, it is better to use solid state devices in the feature. Extra safety modules such as an infrared camera can be added to the project, or a microwave based radar system can be created to assist the driver in poor visibility conditions. Such system may also find its application in the aviation industry.

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