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A Microcontroller based Car-Safety System: Implementing Drowsiness Detection and Eye Blink Detection in Parallel

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Abstract: ***This project presents a microcontroller based car-safety system implementing drowsiness detection and eye blink detection in parallel. The main motivation is to develop a system to keep the vehicle secure. User can't take care of ours while in running by less conscious .If we done all the vehicles with automated security system that provides high security to driver, also gives alarm. The function involves controlling accident due to unconscious through Eye blink. Eye blink sensor is fixed in vehicle where if user loses conscious indicate through alarm. The existing system is Driver drowsiness is recognized as an important factor in the vehicle accidents .The proposed system controls the required operation using various sensors and devices . Infrared transmitter is used to transmit the infrared rays in our eye. Hence, Infrared receiver receives the reflected infrared rays from the eye. The receiver output is said to be high if the eye is closed if not it is said to be low. It is used to know the eye closure or open point .The obtained output is fed into the logic circuit for indication.***
Keywords: Infrared sensor, Eye-blink detection, Microcontroller, Accident detection.

I. INTRODUCTION

Nowadays, people have become more liable to accident. So, we as an engineer need to take some action against this and to provide the desired solution. The purpose of this mode is to advance a system to detect fatigue symptoms in drivers and to control the speed of the vehicle. Automobile accidents are most common if the driving is derisory. It happens often if the driver is drowsy or he/she is alcoholic. Drowsiness is considered as an important aspect in the vehicle accidents. Advanced technologies offer some hope to avoid these situations.The project involves preventing accidents due to drowsiness in vehicles by using eye blink sensor. The IR transmitter transmits infrared rays into the eyes. The output is high, if the eye is in a closed position. This activates the corresponding pin in the microcontroller for intimation. It is established that the driving performance will be deteriorated with increased drowsiness resulting in crashes constituting more than 20% of all vehicle accidents .

II. BLOCK DIAGRAM

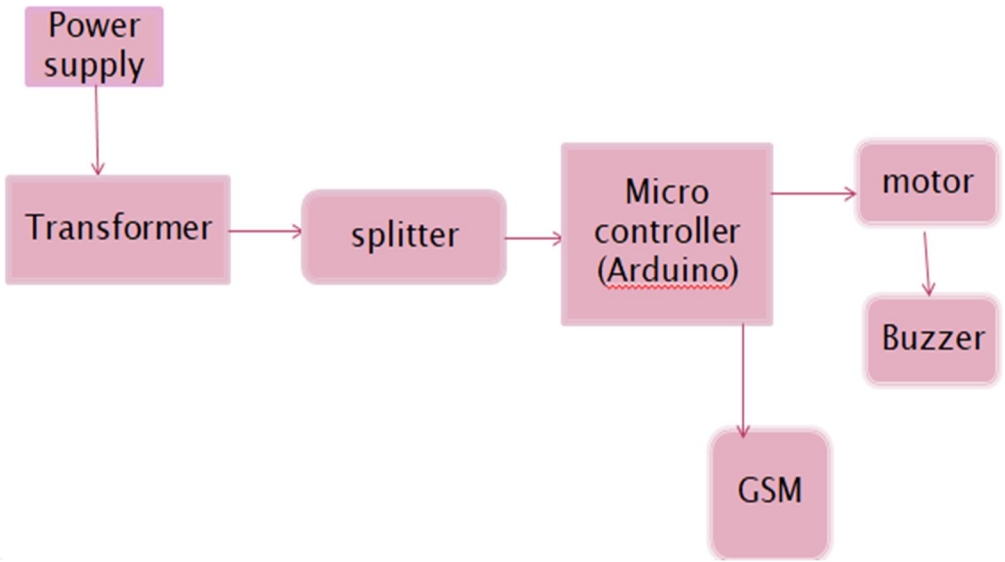

Fig 1: Proposed Method

III. HARDWARE COMPONENTS

A. Eye Blink Sensor

Connect regulated DC power supply of 5 Volts. Black wire is Ground, Next middle wire is Brown which is output and Red wire is positive supply. These wires are also marked on PCB. The sensor is powered by connecting two wires +5V and GND. When Eye is closed, LED is off and the output is at 0V. place Eyeblink sensor glass on the face and you can observe the LED blinking on each Eyeblink. The output obtained is then given to the controller for interfacing.

EYE BLINK OUTPUT

5V (High) → LED ON When Eye is close.

0V (Low) → LED OFF when Eye is open.

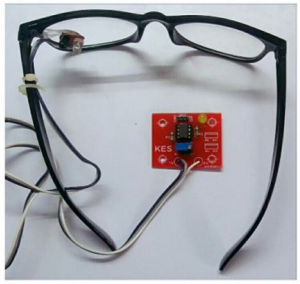

Fig 2: Eyeblink Sensor

B. Gas Sensor

A gas sensor is a device that senses a signal, physical condition and some chemicals by measuring certain electrical quantities. The concentration of gas can be identified by measuring the current discharge in the device. Operating parameters: Operating temperature, operating humidity

Fig 3: Gas Sensor

C. GSM Modem

Global system for mobile communication (GSM), a standard for digital cellular communication. It is used widely by mobile users in every part of the world. It digitizes and compresses data to send it via a digital link in a given time.

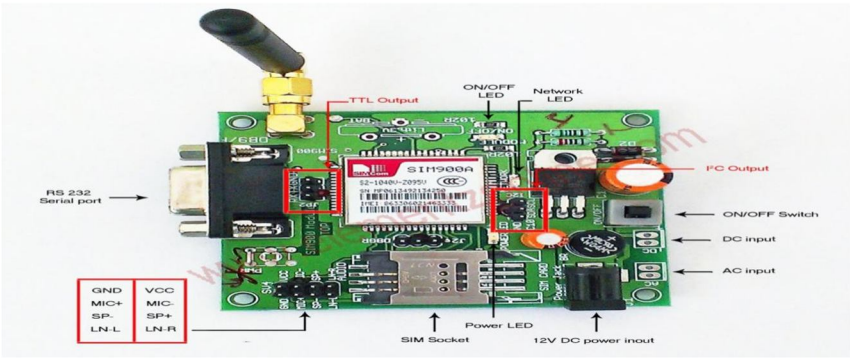

Fig 4: GSM Modem

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D. LCD Display

Liquid crystal displays have the properties of both liquids and crystals. They have a temperature range within which the molecules are almost as mobile but they are grouped together in certain order which is similar to a crystal.

Fig 5:Pin description of LCD Display

E. RS 232

At the pin out of RS232, we can see two pins. The two pins are, RTS (request to send) and **CTS**(clear to send). With DTE/DCE communication, we can say that RTS is an output on the DTE and input on the DCE**.** CTS ,which is the outcoming signal from the DCE**.**

F. UART

UARTs are used in combination with communication standards such as EIA, RS-232, RS-422 or RS-485.The universal designation indicates that the data format and transmission speeds are configurable. The signalling levels and methods are handled by a circuit driver which is external to the UART.

IV. WORKING

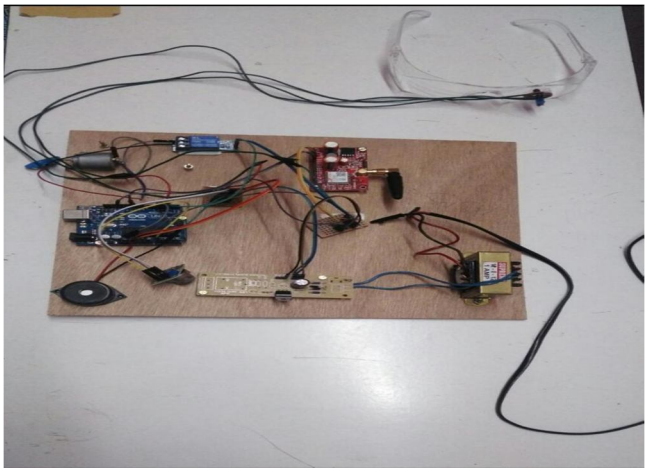

Fig 6: Experimental Setup

The project plan prevents accidents due to drowsiness in vehicles by using eyeblink sensor. The IR sensor transmits infrared rays into the eyes. The alarm which is present inside the vehicle alerts the driver and also the people in the vicinity of the vehicle. The output is high, if the eye is in a closed position. Then it activates the comparable pin in the microcontroller . Then, an alarm continues to ring until the driver takes action to control the vehicle.

V. ADVANTAGES

A. Provide secured point to point mode of communication
B. Detect motion in daytime and night time
C. Small in size
D. Response time faster
E. Intelligent and Safe Transportation
F. Drunken driving also prevented by using alcohol detector.
G. Safe parking with no damage or distraction .

VI. FUTURE SCOPES

The future accepts can be included Tracking the location where the accident happened and Detection of face can also be included. Based on the work completed thus far, researchers at GWU have identified and recommended the following areas for further research:

A. To validate the algorithm, test additional road conditions, and test a more diversified group of drivers, they have conduct additional simulator experiments.

B. Test the ANN technology on the road in an instrumented vehicle, and refine the Algorithm based on the road test data and Conduct study on warning systems incorporated with the detection system.

C. In future , we will incorporate motion capture and EEG facilities to our tentative setup. The motion capture will analyze the upper torso movements. In addition, the EEG will make available a ground-truth for sleepiness.

VII. CONCLUSION

The proposed system is used to completely monitor the driver using eye blink sensor and detects the condition of the driver to avoid unwanted accidents. It is possible, by continuously monitoring the eye blink of the driver and it can be implemented by using microcontroller which can efficiently work with pc. During the monitoring operation, the system can be able to decide between eye opening and closing . When the eyes have been closed for too long, a warning signal is given. In addition, during monitoring, the system is able to repeatedly detect any localizing error that might have occurred. In case of error, the system is able to recover and properly localize the eyes. The following conclusions were made as Image processing achieves highly accurate and reliable detection of drowsiness since it offers a non-invasive approach to detecting drowsiness without the annoyance and interference. The detection system developed around the principle of image processing judges alertness of the driver on the basis of continuous eye closures.

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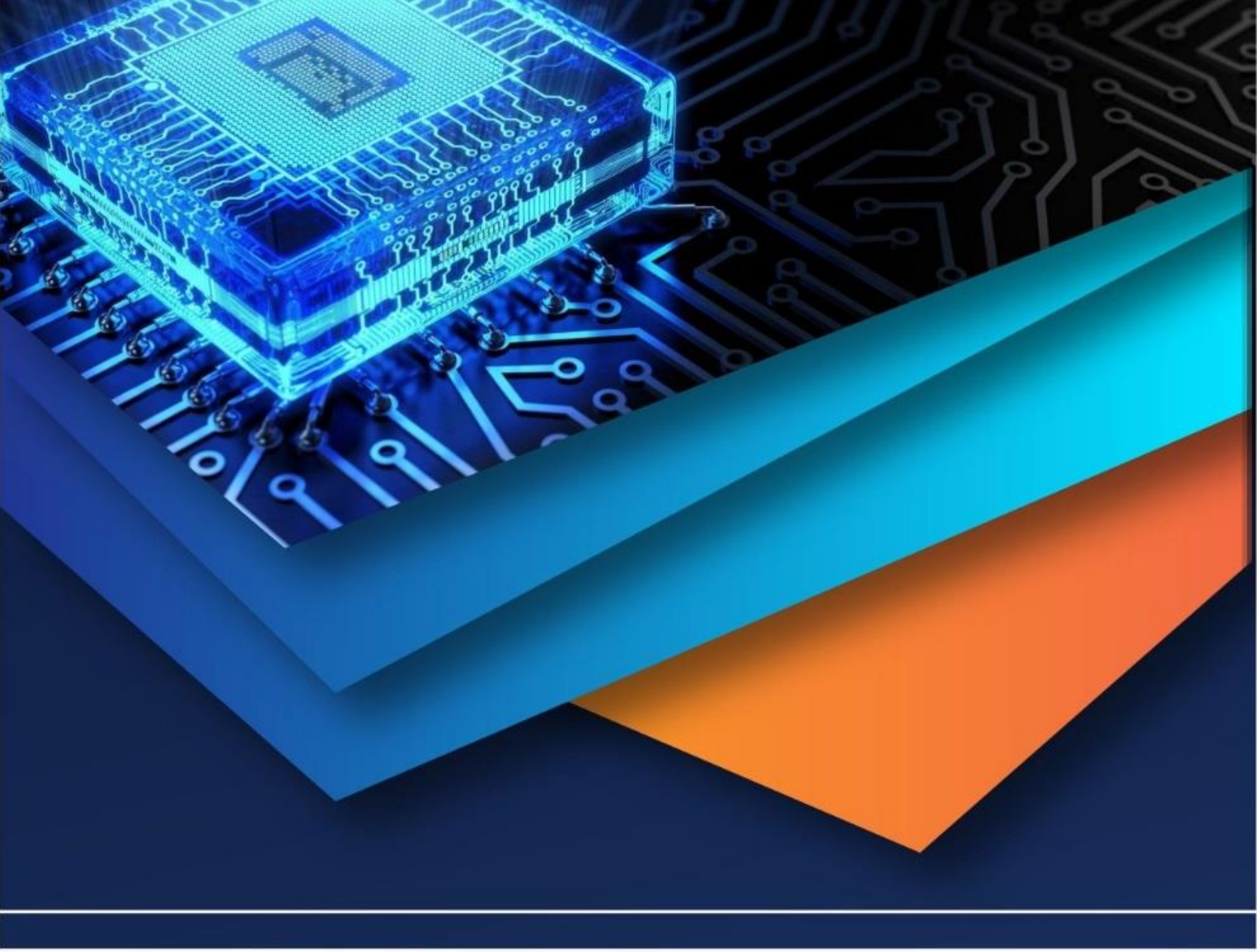

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