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ALERTNESS SYSTEM FOR DROWSY DRIVERS AND CARDIAC ATTACK DETECTION

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Abstract – This paper talks about a system that can detect and warn of driver drowsiness and cardiac attacks by using a system that is built into a car driver. The number of crashes is also going up, mostly because drivers aren't paying attention. This is because more people are driving cars. The design of sleepiness by watching how the driver's head moves to find out if they are falling asleep and their heart rate by using eye tracker technology. A buzzer lets the driver know if anything is wrong during discovery. This is done to make sure the safety of both the driver and the guests. The system is better than other sleepiness detection systems because it can detect tiredness and lower the number of car crashes. The system can also be set up without using database storage. After that, no wires, cameras, monitors, or other gadgets should be connected to or pointed at the car. The metal paper sheet is used to keep the frequency radiation from getting through.

Keywords- *Feeling sleepy, Heartbeat, Head movement detection, and R-peak detection.*

I.INTRODUCTION

II. When going long distances in boring situations, the driver often gets sleepy and mentally worn out [1]. Not getting enough sleep is another thing that can make you tired and drowsy, which can lead to car crashes and other problems [2]. So, it's important to keep an eye on how sleepy the driver is and wake him up when necessary.

III. OBJECTIVES OF THIS WORK

This project is to find drowsiness and cardiac attack detection problem is detecting by using an embedded system using a four stage processes.

- Stage I the Eye blink sensor is to find the drowsiness by using an IR sensor.
- Stage II Then the Vibration sensor is used to wake up at the drowsiness stage.
- Stage III Then finally the driver is continuously sleeping then the Pump is used to spray the water on the driver face.
- Stage IV Heart beat sensor is used for a purpose to detect the blood pressure range in BPM (Beats Per Minute).

IV. RELATED WORKS

First, we review out the systems for drowsiness detection based on PERCLOS. Subsequently, we review the approaches

which address the driver drowsiness issues using Smartphone-based solutions.

1) PERCLOS-Based Drowsiness Detection: The PERCLOS based frameworks follow the pipeline of the face and eye detection followed by the eye state classification. One of the earliest reports on drowsiness detection based on PERCLOS was the work at the Carnegie Mellon Driving Research Center by Grace *et al.* [5]. They have proposed a framework to compute PERCLOS for heavy vehicle drivers, using retinal reflection to classify the eye states. Ji*et al.* [6] have developed a drowsiness detection system using remotely located Charge-coupled-device (CCD) cameras and active infrared illuminators. They have claimed their system to be reasonably robust, reliable, and accurate as the use of active infrared helps in localizing the pupil center effectively through corneal reflections. The primary concern with these two implementations lies in the use of active infrared illumination, which irritates the eyes on prolonged exposure [7]. Hong and Qin [8] have computed PERCLOS after tracking the eyes using the CAMSHIFT algorithm, after face and eye detection using Haar classifier. They have defined a new complexity function based on which they classify the eye state. However, this function is highly dependent on illumination as it considers gray-level intensity only. Lang and Qi [9] have combined PERCLOS with average eyelid closure rates to gauge the drowsiness of the driver. The face and eye detection algorithms use skin color segmentation approach, which sometimes becomes person specific. Qing *et al.* [10] have computed PERCLOS using Haar-like features for face and eye detection, thereby classifying the eye states using an improved template matching. From the review, it becomes evident that there is still significant scope of research in this area. Combining multiple cues of drowsiness is a feasible solution to increase the robustness of such systems. The implementations can be made for generic by exploiting the sensors present in a Smartphone, to obtain an inexpensive solution for mass use. The review implies that most of the PERCLOS based methods use the Haar classifiers for face and eye detection. The differences lie in the manner of eye state classification. Moreover, these systems are built on specific embedded platforms, which limit their use to a larger group of users. With the advent of smart phones, recently the driver drowsiness detection problem has received a new light. There are very few approaches for detecting drowsiness using smart phones.

2) Smartphone-Based Drowsiness Detection: Lee and Chung [11] have developed a driver monitoring system in Android-based smart phones. The Smartphone receives sensory data from the camera as well as a photoplethysmograph sensor via a wireless sensor network. They have used a dynamic Bayesian network framework for the final fatigue state evaluation, where a warning alarm is provided if the fatigue level reaches a predefined threshold. Wan *et al.* [12] have developed a Smartphone-based portable attention level monitoring and alarming system based on real-time EEG processing on mobile platforms. A major Shortcoming of [12] is that the raw EEG signal will have a high level of motion artifact content during driving, which is hard to filter out online. Additionally, wearing EEG sensors while driving is a comfort issue, that may limit its practical implementation. You *et al.* [13] have developed an Android application named Car Safe that detects and alerts drivers to dangerous driving conditions. The drowsiness level is detected using the front camera, whereas the road conditions are tracked using the rear camera. They have achieved this using switching the primary and secondary cameras.

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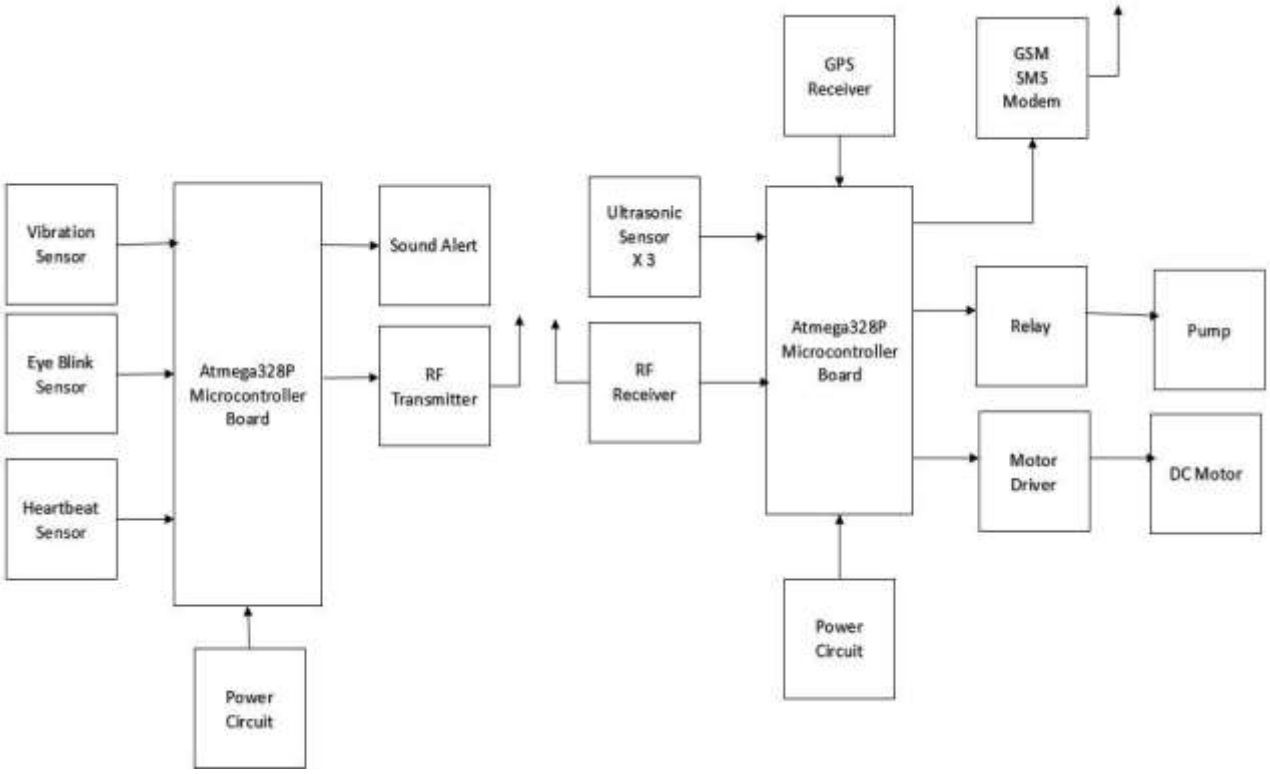
V. SYSTEM DESIGN

BLOCK DIAGRAM FOR DROWSINESS AND CARDIAC ATTACK DETECTION



The system design includes following blocks

1. Transmitter
2. Receiver

- Transmitter blocks contain vibration sensor modules, eye blink sensor and heart beat sensor.
- Receiver block contains ultrasonic sensor, GPS receiver and GSM modem.
- Atmega328p used as the controlling processor in transmitter and receiver blocks.

VI. PROPOSED WORK

The system uses a four-stage approach.

The First stage is the eye blink sensor is to find the drowsiness by using an IR sensor. The two different type of light is used, namely dark light and white light. The dark light is absorbing the signal and white light is reflecting the signal. The eye blink sensor is digital output of the signal is having and the eye close the output is 1 and the eye open is output is 0.

Then the Second stage is the vibration sensor is used to wake up at the drowsiness stage. This part is placed in driver cap. It is used to finding the driver is sleeping or not. The driver is sleeping then the buzzer is on. High buzzer is on and Low buzzer is off. Driver is sleeping after buzzer sound the vibration sensor is on.

The Third stage is the driver is sleeping after vibration sensor vibrating then the RF signal is sends to another microcontroller system. Finally, the driver is continuously sleeping then the pump is used to spray the water on the driver face.

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The Fourth stage is the Heart beat sensor is used for a purpose to detect the blood pressure range in BPM (Beats per Minute). The cardiac arrest is come the RF signal is sends to another microcontroller system. Then the manual driving is changed automatically. And the GPS is given to the location to the microcontroller system. And the microcontroller system is sharing the location to some mobile numbers by using a GSM SMS MODEM.

VII. HARDWARE DESCRIPTION

Atmega328p-It is a microcontroller boardused for the efficiency, speed and performance and accuracy. This microcontroller has 32 pins. In that 32 pins 14 pins analog and 6 pins are digital. This microcontroller has been reduced in size when compared to the Arduino UNO. The promini can runs at 8MHZ. at operates at 3.3v. It should be in compact size.

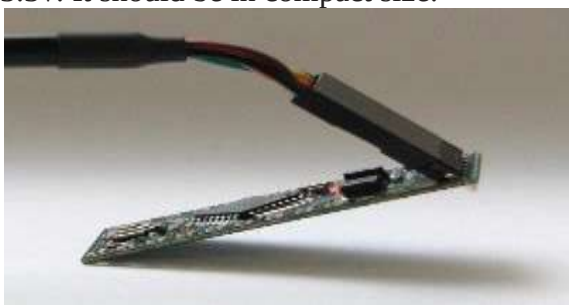

Figure.1: Atmega328p board

EYE BLINK SENSOR-It is having two lights. One is white light and another one is the black light. The two light is absorb and reflect the signal to the microcontroller. The digital output of the signal is to be provided.

Figure2. Eye blink sensor

VIBRATION SENSOR-It is only used for the purpose to vibrate the signal to the driver.

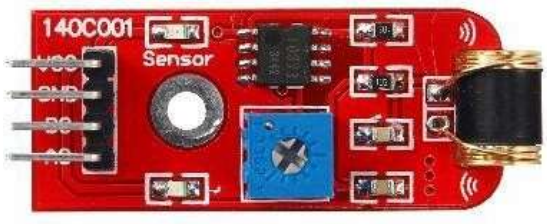

Figure.3: Vibration sensor

HEARTBEAT SENSOR-It is used to monitoring the blood flow of the driver. The blood flow speed is high then the indication it will be provided to the microcontroller system.

Figure.4: Heartbeat sensor

BUZZER-It is used to give the sound signal to all over the system.

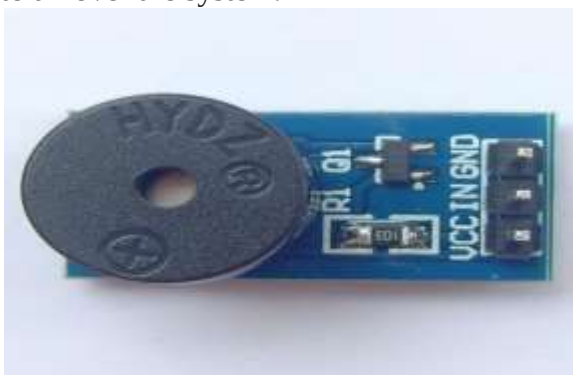

Figure.5. Buzzer

RF TRANSCEIVER-It is the work is to transmit and receive the radio frequency to the signal between the two different systems. The frequency range is 433MHZ.

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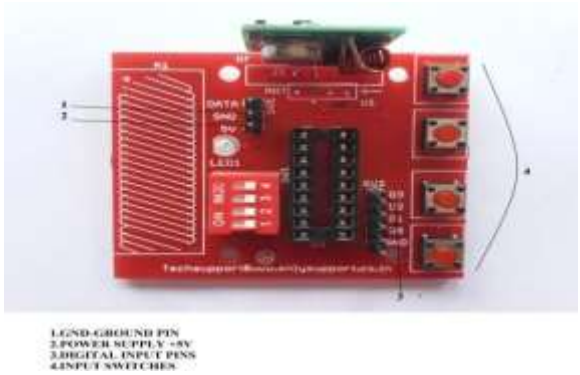

Figure.6: RF Transmitter

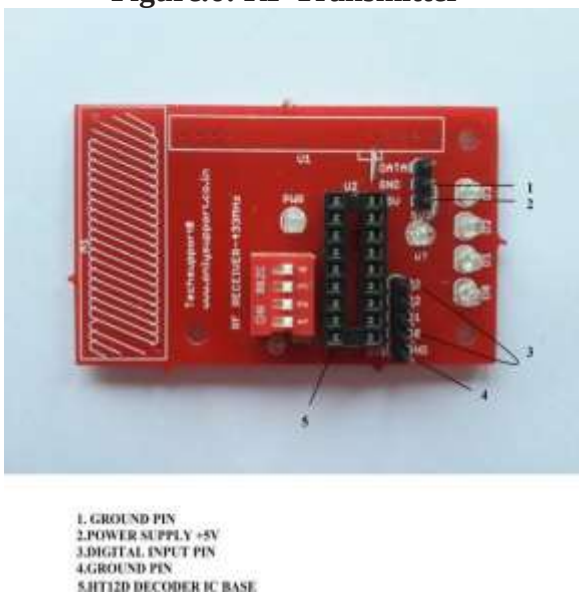

Figure.7: RF Receiver

POWER CIRCUIT-It is used to give the power supply to all over the blocks.

ULTRASONIC SENSOR-It is used to sense the object is there or not.

Figure.8: Ultrasonic sensor

GPS-It is given to the location to the microcontroller and the location is share to the particular number by using a GSM SMS modem. It is to send the location and message to the particular number.

Figure.9: GSM SMS Modem

PUMP-It is used to spray the water in driver is in drowsiness stage.

Figure.10: Pump

RELAY-It is used to run the pump motor. Because of the pump motor is needed low voltage and high current. So, the relay is given to the external power to the pump motor.

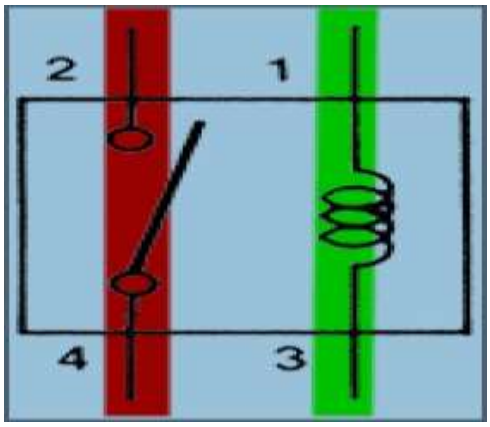

Figure.11: Relay

DC MOTOR-It is control the speed of a vehicle and reduces the speed.

VIII. CONCLUSION ANDFEATURE WORK

IX. This paper talks about a way to tell if a driver is falling asleep or having a heart attack and keep everyone safe.

X. and safe traveling. To tell if someone is sleepy, an eye blink monitor, a sound sensor, and a pump are used. The heart beat tracker checks the blood pressure. The old method used an acoustic monitor to find the direction. It then handled the driving and sent an SMS warning to a saved number. With this technology, we can drive safely and securely. Our example is useful because it shows a possible and good situation for public safety.

XI. REFERENCE

1 D. F. Dinges, "An overview of sleepiness and accidents," *J. Sleep Res.*, vol. 4, no. s2, pp. 4–14, Dec. 1995.

2 Y.-C. Lee, J. D. Lee, and L. N. Boyle, "Visual attention in driving: The effects of cognitive load and visual disruption," *Hum. Factors, J. Hum. Factors Ergonom. Soc.*, vol. 49, no. 4, pp. 721–733, 2007.

3 A. Dasgupta, A. George, S. L. Happy, and A. Routray, "A vision-based system for monitoring the loss of attention in automotive drivers," *IEEE Trans. Intell. Transp. Syst.*, vol. 14, no. 4, pp. 1825–1838, Dec. 2013.

4 L. S. Dhupati, S. Kar, A. Rajaguru, and A. Routray, "A novel drowsiness detection scheme based on speech analysis with validation using simultaneous EEG recordings," in *Proc. IEEE Int. Conf. Autom. Sci. Eng. (CASE)*, Aug. 2010, pp. 917–921.

5 R. Grace *et al.*, "A drowsy driver detection system for heavy vehicles," in *Proc. 17th DASC AIAA/IEEE/SAE Digit. Avionics Syst. Conf.*, vol. 2, Oct./Nov. 1998, pp. I36/1–I36/8.

6 Q. Ji, Z. Zhu, and P. Lan, "Real-time nonintrusive monitoring and prediction of driver fatigue," *IEEE Trans. Veh. Technol.*, vol. 53, no. 4, pp. 1052–1068, Jul. 2004.

7 S. M. Michaelson, "Human exposure to nonionizing radiant energy—Potential hazards and safety standards," *Proc. IEEE*, vol. 60, no. 4, pp. 389–421, Apr. 1972.

8 T. Hong and H. Qin, "Drivers drowsiness detection in embedded system," in *Proc. IEEE Int. Conf. Veh. Electron. Saf. (ICVES)*, Dec. 2007, pp. 1–5.

9 L. Lang and H. Qi, "The study of driver fatigue monitor algorithm combined PERCLOS and AECS," in *Proc. Int. Conf. Comput. Sci. Softw. Eng.*, vol. 1, Dec. 2008, pp. 349–352.

10 W. Qing, S. BingXi, X. Bin, and Z. Junjie, "A PERCLOS-based driver fatigue recognition application for smart vehicle space," in *Proc. 3rd Int. Symp. Inf. Process. (ISIP)*, Oct. 2010, pp. 437–441.

11 B.-G. Lee and W.-Y. Chung, "Driver alertness monitoring using fusion of facial features and bio-signals," *IEEE Sensors J.*, vol. 12, no. 7, pp. 2416–2422, Jul. 2012.

12 Z. Wan, J. He, and A. Voisine, "An attention level monitoring and alarming system for the driver fatigue in the pervasive environment," in *Brain and Health Informatics*. Springer, 2013, pp. 287–296.

13 C.-W. You *et al.*, "CarSafe app: Alerting drowsy and distracted drivers using dual cameras on smartphones," in *Proc. 11th Annu. Int. Conf.*