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IOT-BASED DROWSINESS AND HEALTH MONITORING SYSTEM FOR ENHANCED SAFETY

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ABSTRACT : This paper presents a technique for detecting health measures as well as driving weariness. Driver weariness and bad health may, in certain circumstances, contribute to traffic accidents. Driver fatigue is a serious issue that contributes to a high incidence of traffic accidents. While the exact number of accidents caused by fatigue is unknown, scientific research suggests that it accounts for 20% of all accidents (rospa).The "IOT BASED DRIVER DROWSINESS AND HEALTH MONITORING SYSTEM" includes a USB camera for the Eye-Blink Monitoring System and an alarm that alerts the driver if he feels drowsy. The driver's current location can be determined using GPS technology. According to the suggested application architecture, the administrator will be able to manage system settings and alert family and friends in the event of an emergency. Temperature and heart rate sensors worn by the driver track his or her health. A sensor to detect alcohol in the driver's system is installed. When a driver exceeds a predetermined level of alcohol consumption, the vehicle's velocity slows. The engine ultimately quits, and the vehicle loses motion.

KEYWORDS: Eyes Detection, Health Monitoring, Alcohol Detection.

1.INTRODUCTION

This chapter collects information about the various causes of disasters. This proposed project seeks to provide a cost-effective solution that is compatible with a wide range of automotive types and has the potential to save lives.

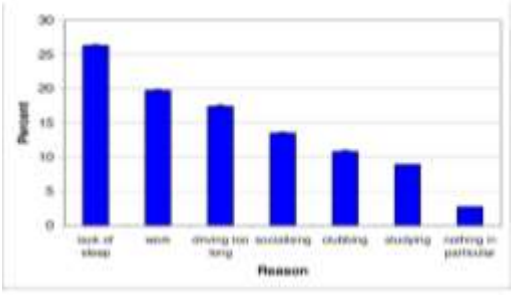

Fig 1 Reasons for car accidents

In India, drunk driving is a major issue. The dangers and often fatal consequences of driving whileinebriated
are cause for alarm. Drooling while driving is considered a risky combo known as "drowsy driving." This
happens commonly when a driver doesn't get enough rest, but it can also be caused by alcohol, medications, or
working shifts. Figure 1 shows the annual reported causes of accidents.

On the contrary, the number of occurrences involving intoxicated drivers has increased significantly. The
annual death toll from drunk driving accidents reaches 200. The chauffeur suffers financial loss, which is borne
by his passengers and other travelers. A 2016 study found that drunk driving killed 100 footsloggers, badly
injured 390 automobile occupants, and murdered forty children.

Block Diagram

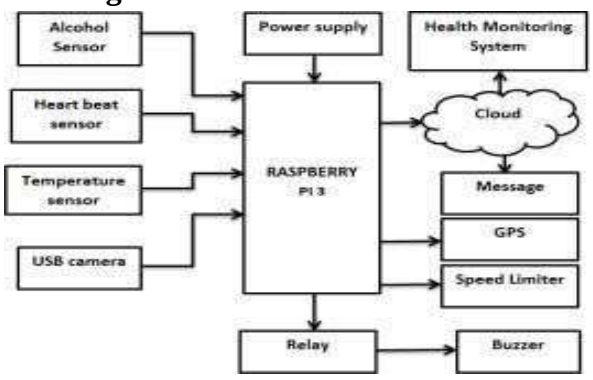

Fig 1.1 Block diagram of system

Figure 1.1 depicts a block design for the IoT-based driver tiredness detection and health monitoring system. Its architecture consists of a

Raspberry Pi 3, sensors, a USB camera, and an alarm. Sensors for pulse rate and temperature provide data to the Raspberry Pi 3.These sensors examine the driver's physiological indications [1]. The alcohol sensor detects the driver's alcohol consumption. As a result, a speed limiter is installed for regulating. When alcohol is present in a vehicle, acceleration decreases. Incorporating a USB camera allows for continual monitoring of the driver's eye position. If the motorist averts their sight for a period of time that exceeds a predetermined time limit, the buzzer will sound an auditory alert. This sound will serve to warn and keep the driver's attention. This helps to prevent the calamity. The server's health monitoring system receives data supplied by the driver. The GPS device monitors the motorist's location for emergency purposes. The motorist sends SMS updates to his family and acquaintances about his current condition. when a result, assistance for the motorist can be supplied when needed.

Design Requirements

Hardware

- Raspberry-pi 3
- USB Camera
- Temperature Sensor
- Heart Beat Sensor
- Alcohol Sensor(MQ-7)
- Buzzer

Software

- Python IDE
- Communication Protocol
- HTTP
- Open CV

Information of Raspberry pi 3

The Raspberry Pi 3 is a tiny computer that includes a CPU, USB ports, GPIO pins, and the ability to connect via DSI and CSI. [1.2] An illustration of the Raspberry Pi 3 configuration.

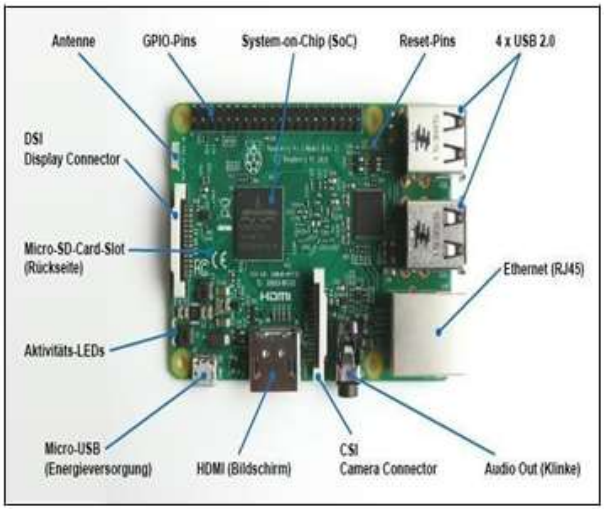

Fig 1.2 Raspberry pi 3

It was concluded that the Raspberry Pi 3 B, which was released in 2016, outperformed the Raspberry Pi 1 due to its quad-core processor. It outperforms the Raspberry Pi 2 by 80%.

Heartbeat Sensor

Pulse detection can be achieved by taking use of variations in optical power. The sensor measures the driver's pulse rate and activates when the driver places their finger on it; the data is then transferred to the Raspberry Pi. Figure 1.3 shows a rudimentary pulse sensor. It consists of three wires: ground, signal, and VCC. Heartbeat sensors are based on the photoplethysmography principle. Blood volume is determined by measuring fluctuations in light intensity.

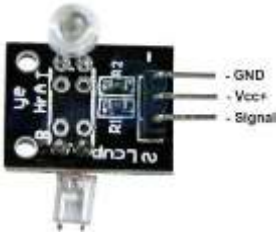

Fig 1.3 Heart beat sensor

Temperature Sensor

Figure 1.4 shows the wire layout for the DHT11 temperature sensor. It is made up of three wires: ground, data, and VCC. The DHT11 sensor can monitor both temperature and humidity. It provides excellent long-term dependability and stability. An NTC thermistor and a resistive element are provided. The needed supply voltage is +5 V. This sensor has an error range of +/-2 degrees Celsius from 0 to 50 degrees Celsius and 20 to 90% relative humidity.

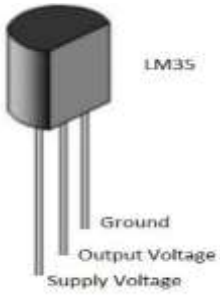

Fig.1.4 Temperature Sensor

Alcohol sensor (MQ7)

This sensor detects the presence of alcohol on someone's breath. It creates a strong emotional response due to its promptness. This easy semiconductor sensor detects alcohol fixation concentrations ranging from 0.05 to 10 mg/L. With this sensor, the yield can be calculated or simplified. It is essentially compact, making use of microcontrollers, Raspberry Pi, and Arduino sheets. Illustration 1.5 shows the MQ3 liquor sensor. Four VCC pins, a simple yield stick, and a computerized yield are included. Ground is also present.

Fig 1.5 MQ7 sensor

USB Camera

A USB camera can be connected to any operating system with relative ease. USB technology provides a data transfer rate of 480 megabits per second. Furthermore, a possible transmission rate of 5 GB/s is specified. EO has a large assortment of USB cameras. Sensors for EO USB cameras can be either CMOS or CCD. Figure 1.7 illustrates a USB camera.

Fig 1.6 USB camera

2.LITERATURE SURVEY

Contemporary research emphasizes the development of a remote access model for identifying driver weariness and monitoring health metri. Previous studies have looked into the causes of weariness. One article has the title "A Driver's Drowsiness Detection System Survey" . Ms. Shubhangi Kalyane and Ms. Parmindar Kaur devised an approach for detecting driver fatigue. The system monitors the motorist's eye movement and yawning.Real-Time Driver Drowsiness Detection System Based on Visual Information" was created by Kunika Chhaganbhai Patel, Shafiullah Atiullah Khan, and Vijaykumar Nandkumar Patil. This technology constantly monitors the vehicle and issues a warning if the driver looks to be sleeping.The title of this research article is "An Investigation into Driver Health Monitoring and Alcohol Control Systems". G.Arun Francis, M. Wilson Wilfred, and R. Sekar introduced a driver health monitoring system that uses an Internet of Things sensor to measure temperature and pulse rate.

3.EXPERIMENT RESULTS

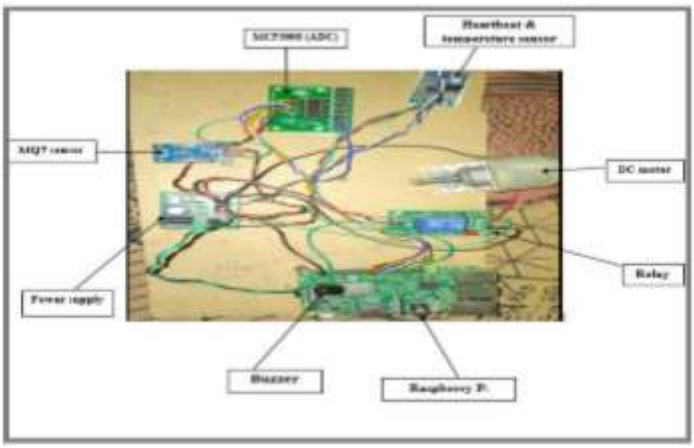

Fig 2.1 Hardware setup

The preceding result explains how our proposed system works. The proposed system is implemented with Python code and pre-integrated libraries. Figure 2.1 shows the hardware configuration. The Python tool allows you to select a region of interest (ROI) surrounding the eyeballs. Figure 2.2 shows how a rectangle or square box is used to represent the eyeballs. The technology can distinguish between open and closed pupils. Once drowsiness has been detected with a USB camera, the collected data is evaluated using an integrated Python package. If the driver falls asleep, a buzzer will sound to wake them up.

Fig 2.2 Drowsiness detection using eye ball position

The proposed device also continuously checks characteristics including the driver's heart rate and body temperature. Figure 2.3 shows a graphical depiction of the temperature data collected on that particular date.

4. CONCLUSION

Using the Internet of Things, this project creates a health surveillance and driver sleepiness detection system. Our research aims to assist in the identification of highly cost-effective solutions to problems encountered in daily life. If the driver becomes tired, the buzzer will sound to notify them. This device monitors the driver's status using a temperature and heart rate sensor. Using an alcohol sensor, the driver's level of intoxication is determined. When alcohol is detected in a car, the speed is decreased and eventually stopped. A doctor or the driver's buddies can use GPS to find him in an emergency. Consequently, the accident rate can be reduced. If our proposed remedy is economically viable, it will help save the lives of other motorists and passengers.

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