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Driver Health Monitoring System

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Abstract: All over the world, most of the road accidents are occurred by driving and some rash driving due to health issues. The main concept of this paper is to prevent the road accident so to prevent the road accident we are using smart glasses and some IOT based small user-friendly devices. The eye blink sensors present in smart glass are used to check the driver is sleepy or not with the help of the eyeball movement of the driver, if the driver is sleepy means it will trigger the alarm to conscious the driver. The IOT health monitoring system keeps a check on the blood pressure, glucose and pulse rate of the driver and in case of any problem found it will send a message alert to the respective hospital. In this process, the message or SMS will send to the relative or doctor and the message will also send to the local police to prevent the accident. The alcohol detector is also used which is attached to the steering of the vehicle and it is notified to the respective place.
Keywords: Safe Driving, IOT Sensors, Smart glasses, accidents.

I. INTRODUCTION

Everyday road accidents are happening all over the world according to the statistics (20 – 40) percentage of road accidents are happening due to drunk driving, rash driving etc., If the driver drunk or sick means he/she will be unconscious they will not able to control themselves in that situation if they drive the car means it can affect them and others also. Some of the drivers will be over speed after they drunk. Some aged drivers might also get sick. So There are many modules to prevent these road accidents. In this paper we are using eye blink sensors in smart glasses, alcohol detection sensors and some health care sensors. The eye blink sensors are used in the smart glass which will check the pupil dilation movement of the driver while he/she driving the car whether a driver is sleepy or not.

The alcohol detecting sensors are fixed in the steering of the car so that it can detect the driver is consuming alcohol or not, if the driver consumes the alcohol means car will not start itself if the driver consumes the alcohol while driving means it will detect by using alcohol detection sensor and it will slow down the car and it will also send the SMS to the local police. The over speed controller is used to check the driver whether he/she is driving over the speed limit & it will reduce the speed of the car and maintain the normal speed limits. The heart rate sensor and BP sensor are used to keep track of the driver's health.

In case of any health issues a message alert is sent to the nearby local hospital and police station. This all process is happening through the IOT sensors. The smart glass can also be linked with smart watch or to the IOT band for the reduction of accidents.

II. RELATED WORKS

According to Thyagaraju G.S [1] major of the accident happens due to the drowsiness of the driver This is used to check abnormal driving of other surrounding vehicles by using the embedded sensor. In this paper S.V.Altafetn[2] the drunken & drive can be identified by the alcohol sensor but it can't identify the drowsiness & over speeding. According to the author T.Venkat et al[3] in this process, they are using dc motors, GSM modules, GPS modules, MQ3 alcohol sensor to prevent an accident but it can't identify the over speeding &they are not using the eye blink sensors. The Digital certificates can be used by the client to produce its identity to the server. The author proposes a certificated- based authentication scheme which is faster and secured than many other existing schemes. In this paper, unregistered vehicle cannot obtain the traffic information as it is not registered with primary key and network provides the priority for the emergency vehicle.

In VANET, sensor hubs have battery power constrains-ts which leads to decreased life time of sensor hub. To resolve these issues, primary key is maintained for every registered vehicle and also relay node checks the speed of every vehicle. in this paper they are using breath sensors to identify the driver whether he is drunk or not they will also send the SMS to the particular persons they are also using GPS & GSM modules but they are not using eye blink sensor for the drowsiness detection. in this process they are using self-powered IRIS scanner to detect the drowsiness of the driver & if the driver gets sleepy the alarm will be triggered so that the driver will be conscious will driving. According to the author Vijay Savania, in this paper they are using alcohol detecting sensor to detect the driver is drunk or not and if the driver is drunk it will send the SMS to the relatives in every five minutes but it will not stop the car or it will not trigger the alarm also.

According to author M. Kousikan1, in these papers, the author is using IR rays & IR sensor to detect the alcohol with the help of the ethanol & this IR rays & IR sensor used to cut off the fuel supply to the engine. The author conveys-ralph OyiniMbouna , in this paper they are using eye index & pupil activity by this they will check the eye is closed or open and it will check whether the driver is sleepy or not & it also gives alert to wake the driver from sleep it will also check head position of the driver whether driver is sleepy or not. According to the author Hang-Bong Kang, in this paper author use eye related measurements, yawning detection and facial expression by this process they will identify whether the driver is sleepy or not.

[1 The author conveys Minoru Sakairi , in this paper author used breath sensors to check the driver is drunk or not the author is also using water cluster detecting behind the steering wheel to identify the driver is consumes alcohol or not.

[13]. According to author T.ShyamRamanath et al , in this paper the author is using alcohol sensor in the steering wheel so that the sensor can identify whether the driver is drunk is not if the driver is drunk means it will stop the fuel supply to the engine it will also send the message to the relative of the driver current location.

III.   MOTIVATION

The main aim & the motivation of this project is used to prevent from drunk and drive accident so that we are using alcohol sensors Apart from alcohol sensors, we also include eye blink sensors and over speed controller sensors.

These alcohol sensors will identify the driver is drunk or not and the over speed controller sensor will check the car speed & if the car crosses the speed limit(40km/h) the over speed controller sensors will reduce the speed of the vehicle. It will also send the SMS to the police in case of drunk & drive. Majority of driver driven road accidents are caused due to drowsiness of the driver. The proposed system is based on eye closure count of the driver.

By monitoring the eye, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. The speed of the vehicle can be controlled by controlling fuel injection to solenoid valve. The increase in number of traffic accidents is a serious threat to the society. The exhaustion of driver is one of the main reasons for causing road accidents. The driver is unable to take sudden decision while they are sleepy and his ability of vehicle control and natural reflex reduces due to drowsiness.

This kind of accidents can be easily prevented by driver health monitoring system. The system detects the present state of the driver. The hardware fitted in front of the driver will monitor the rate of opening and closing of eye through eye blink sensors. It will examine each frame and if it goes beyond a critical value the system is indicate fatigue state and alert.

IV.   PROPOSED SYSTEM

The major cause of road accidents is happening due to the drunken drive & rash driving. To overcome these problems, we go for efficient method. In this process, we are using different modules based on IOT sensors. We are also using eye blink sensors, alcohol detection sensors and over speed controller sensors, all these sensors are connected with the mobile app to send the SMS or message to driver relative and the local police using IOT. The eye blink sensors are connected to the steering of the car. It will check the eyeball movement of the driver & clarify whether the driver is sleeping or not. If the eye blinks two seconds it knows the driver is not sleepy if the eyes of the driver are closed for 5 seconds the eye blink sensors will identify that the driver is sleeping and then the sensors will trigger the alarm to make the driver conscious and the alarm will not stop until the driver became conscious.

The IR transmitter is used to transmit the infrared rays in our eye. The IR receiver is used to receive the reflected infrared rays of eye. If the eye is closed means the output of IR receiver is high otherwise the IR receiver output is low. This to know the eye is closing or opening position. Alcohol detector detects the content of alcohol in the breath and thus it attempts to clamp down alcoholics. This system uses microcontroller, LCD display, alcohol detector, GSM and buzzer. The output of the sensor is directly proportional to the content of alcohol consumed. This output is given to logic circuit to indicate the alarm. This project involves controlling accident due to unconscious through Eye blink & alcohol detector. Here one eye blink sensor and alcohol detector is fixed in vehicle where if anybody loses conscious and indicate through alarm, LCD and GSM. The circuit has an alcohol sensor. This sensor measures the content of alcohol from the breath of drunken people. Output of the sensor is directly proportional to the alcohol content. When the alcohol molecules in the air meet the electrode that is between alumina and tin dioxide in the sensor, ethanol burns into acetic acid then more current is produced. So, the more alcohol molecules more will be the current produced. Output of the sensor is then fed to the microcontroller for comparison. The output of the sensors is in the analog nature which should be converted into digital format.

This is done by the analog to digital converter of the micro controller unit. The microcontroller controls the entire circuit. The LCD displays the message, GSM sends message and buzzer produces alarm. The working conditions and various constraints were properly studied before carrying outfurther steps.
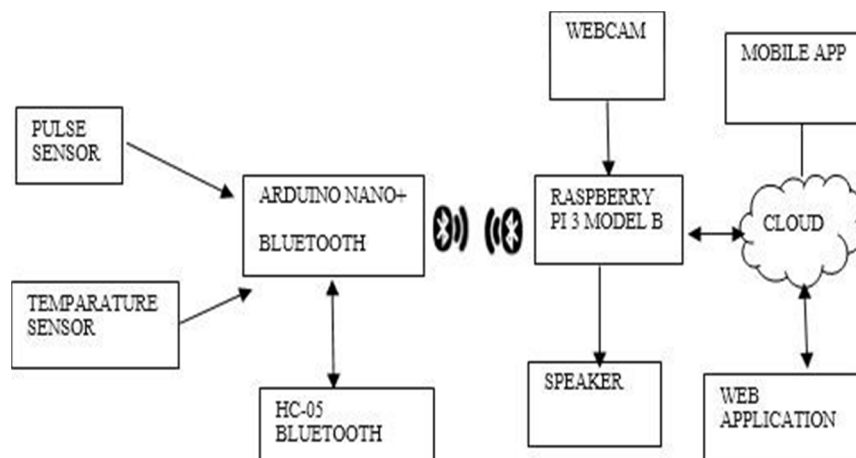
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Figure (1) Block Diagram

V. DESIGN REQUIREMENTS

This system design requires Some Hardware and Software Components those are mentioned below

1) Hardware
Smart glass
Arduino Nano
Bluetooth (HC-05)
Pulse Sensor
Temperature Sensor (LM35)
BP sensor
Alcohol detection sensor

2) Software
Python Arduino IDE

3) Communication Protocol
HTTP
Bluetooth

A. IoT Cloud Platform

IoT technology is an environment that transfers data through Internet in real time to attach sensor to object. Until now, devices connected to Internet needs some adjustment by humans to exchange data, But IoT enables to exchange data between humans and objects and among objects connected with Cloud and big data technology without the adjustment. Low Power Wide Area Network (LPWAN) technology was suggested to transfer object's data efficiently. It is a mobile radio communication network and a low power broadband convergence network for devices of IoT.

B. Pulse Sensor

Heartbeat Sensor fitting and-play heartrate sensor for Arduino. It can used by understudies, craftsmen, creators, and engineers who need live heart-rate information into their activities. It can be utilized by understudies, craftsmen, competitors, producers, and diversion and versatile designers who need to effortlessly fuse lives heart-rate information into their tasks. Heartbeat Sensor includes intensification and clamor cancelation hardware to the equipment. It's discernibly speedier and less demanding to get solid heartbeat readings. Heartbeat Sensor works used 3V or 5V Arduino. The sensor cuts onto a fingertip or ear cartilage and attachments directly into Arduino with some jumper links.

Figure (2) Temperature Sensor

C. Temperature Sensor

Temperature sensor is a device which senses variations in temperature across it. Which is designed specifically to measure the hotness or coldness of an object.

The LM 35 is an integrated circuit (IC) sensor that can be used to measure temperature. It gives the readings in centigrade (degree Celsius). since its output voltage is linearly proportional to temperature.
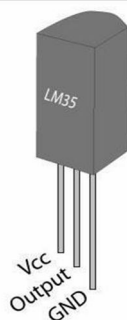

Figure (3) Temperature Sensor

D. Alcohol Detecting Sensors

The alcohol detection sensors are also connected to the steering of the car these sensors will identify whether the driver is drunk or not. The uniqueness of these sensors is it will identify only the driver is drunk or not it will not check the rest of the persons in the car, because the sensor will be fixed in the steering of the car so the capacity of the sensor is up to 5-10 cm to identify the alcohol consumption of the driver alone it will also send the SMS to their driver relatives and the local police
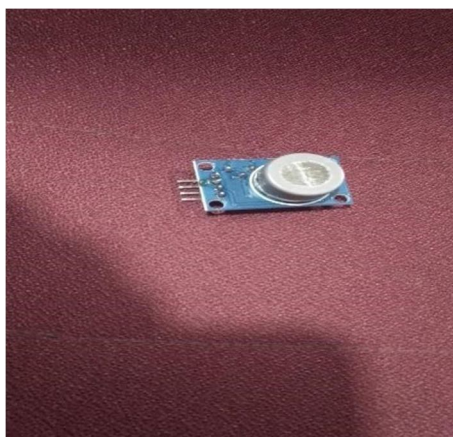

Figure (4) alcohol detecting sensors

E. Over Speed Controller

The over speed sensors are used detect the speed of the car this sensor will check the speed limit and if the driver cross the speed limit it will reduce the speed and comes to the normal speed limit this sensors will be cutoff the fuel to the engine when the driver cross the speed limit and it will reduce the speed of the car these sensors will also send the SMS and message to the driver's relative and it will also send the local police.

Figure(5) Over speed controller

F. Eye Blink Sensor

The eye blink sensor, over speed controller sensor and alcohol detection sensors are connected to the mobile app using IoT. This app connects with the device and monitor the driver and the car. Using GPS (Global Positioning System) the app sends the information to the registered mobile number with the latitude and longitude detail of the particular vehicle. These emergency numbers are registered in the app. The SMS will be sent to the number using server connected to the system.

Figure (6) eye blink sensor

G. Smart Glasses

Smart spectacles or smart glasses are wearable smart glasses that add information alongside to what user sees. Alternatively, smart glasses are sometimes defined as wearable computer glasses that are able to change their optical properties at run time. Smart sunglasses which are programmed to change tint by electronic means these are an Example of the latter type of smart glasses. Superimposing information onto a field of view is achieved through an optical head mounted display (OHMD) or embedded wireless glasses with transparent heads-up display (HUD) or augmented reality (AR) overlay. These systems have the capability to reflect projected digital images as well as allow the user to see through it or see better with it. While early models can perform basic tasks, such as serving as a front-end display for a remote system, as in the case of smart glasses utilizing cellular technology or Wi-Fi, modern smart glasses are effectively wearable computers which can run self-contained mobile apps. Some are hands free and can communicate with the Internet via natural language voice commands, while others use touch buttons. Like other computers, smart glasses may collect information from internal or external sensors. It may control or retrieve data from other instruments or computers. It may support wireless technologies like Bluetooth, WIFI, and GPS. A small number of models run a mobile operating system and function as portable media players to send audio and video files to the user via a Bluetooth or Wi-Fi headset. Some smart glasses models also feature full lifelogging and activity tracker capability. Smart glasses devices may also have features found on a smartphone

Figure (7): Smart Glass

H. Arduino Nano

The Arduino Nano is the preferred board for many projects requiring a small and easy to use microcontroller board. The small footprint and low price, make the Nano Every particularly suited for wearable inventions, low-cost robotics, electronic musical instruments, and general use to control smaller parts of larger projects. The Arduino Nano Every is an evolution of the traditional Arduino Nano board but features a lot more powerful processor, the ATMega4809. This will allow you to make larger programs than with the Arduino Uno (it has 50% more program memory), and with a lot more variables (the RAM is 200% bigger).

Figure (8) Arduino Nano

I. Blood Pressure Sensor

The Blood Pressure Sensor is a noninvasive sensor designed to measure human blood pressure. It measures systolic, diastolic and mean arterial pressure utilizing the oscillometric method. Pulse rate is also reported. ORDER CODE: BPS-BTA. Blood Pressure Sensor quantity.
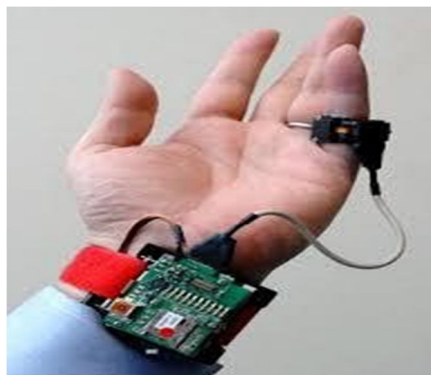

Figure (9) Blood Pressure Sensor

VI.   IMPLEMENTATION

The user/driver will be connected to the server of IoT sensors which has the different modules like over speed controller, alcohol detector & eye blink sensors. This can identify the drunken driving & prevent the accident Step 1: initiate the application and check for the liquor consumption limit by the driver.

1) *Step a:* Set the maximum speed.
2) *Step b:* If the car crosses the speed limit it will reduce the speed of the car by using over speed controller sensors & it will maintain the speed limit of the car
3) *Step c:* It will also check the driver is consumes alcohol or not by using alcohol sensors & eye blink sensors.

VII.   APPLICATION

A. The prime purpose is to provide safety measures
B. It is used for Automatic parking.
C. It can be used in wireless technology.
D. The eye blink module of this project can be separately used for RFID detection in global industries.
E. It can be used in image processing application by replacing sensor by camera module.

VIII. ADVANTAGES

A. Intelligent Transportation

B. Accidents due to drowsiness can be avoided.

C. Drunken driving also prevented by using alcohol detector.

D. Spectacle are used to detect the eye movement and closure, it's free from reflection & easy to use.

IX. CONCLUSION

In this work, it clearly shows how to prevent the drunk & drive accident & it is also prevented from the rash driving accident or else with health issues. This method will prevent from the lots of accident because it will check the driver is drunk or not by using alcohol sensors it will also check whether the driver is getting sleepy or not by using eye blink sensor. The main components of the system consists of an eye blink sensor for driver blink acquisition and an adaptive speed controller to control the speed of vehicle. Advanced technology offers some hope avoid these up to some extent. This project involves measure and controls through alcohol sensor and eye blink using IR sensor.

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