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ADVANCED ACCIDENT PREVENTION SYSTEM AND THEFT CONTROL

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ABSTRACT:
As statistics says 95% of road accidents are caused by human error. There are several cases where the driver dies due to heart attack, drowsiness while driving and these cases have been increased every year due to people having less awareness about facts and statistics. To reduce/avoid road accidents we are proposing this system, it will protects the vehicle and person from accidents while driving.
Keywords: Raspberry pi3, Heart Beat Sensor, Ultrasonic Sensor, GSM, GPS, Accident Prevention.

I. INTRODUCTION

The existing accident prevention system can't detect the heart attack of driver while driving and this leads to accidents. In another case more accidents are happened because of drunk and drive. Nowadays car theft cases are increasing. In any unfortunate conditions an obstacle occurs suddenly in front of the car then accidents may occur. In this existing system, there is no safety to the drivers and vehicles. The existing system is having several drawbacks like non monitoring of driver health condition, drowsiness of driver and scanning the surrounding vehicles.

To reduce/avoid road accidents the proposed system will protects the vehicles and drivers from accidents while driving. The main aim of this system is to design a portable safety kit for the vehicles to protect and save the lives of drivers while driving. It will reduce /avoid the accidents due to heart attack by using health monitoring system.

In this proposed system the accidents are reduced by using advanced features are heart monitoring system, alcohol detection, drowsiness detection and opposite vehicle detection, and for vehicle security purpose we introduce finger print system. This system will reduce accidents, provides security for the vehicles provides safety for the drivers from accidents and the system is more accurate.

II. SYSTEM DESIGN

The proposed system contains various sensors like heart beat, ultrasonic, alcohol, finger print, GPS as input devices. The heart beat sensor to monitor the health condition of the driver, ultrasonic sensor is used to scan the surrounding vehicles, Alcohol sensor is used to sense the driver drunken state, finger print sensor is to authorizing and identifying the owner or driver, GPS is used to track the vehicle location. This system contains liquid crystal display, buzzer, GSM, and motor as output devices. The display is to display the information like heart beat, traffic status. Buzzer is to alert the driver in drowsiness state. GSM is used send the

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information to the control room / owner.

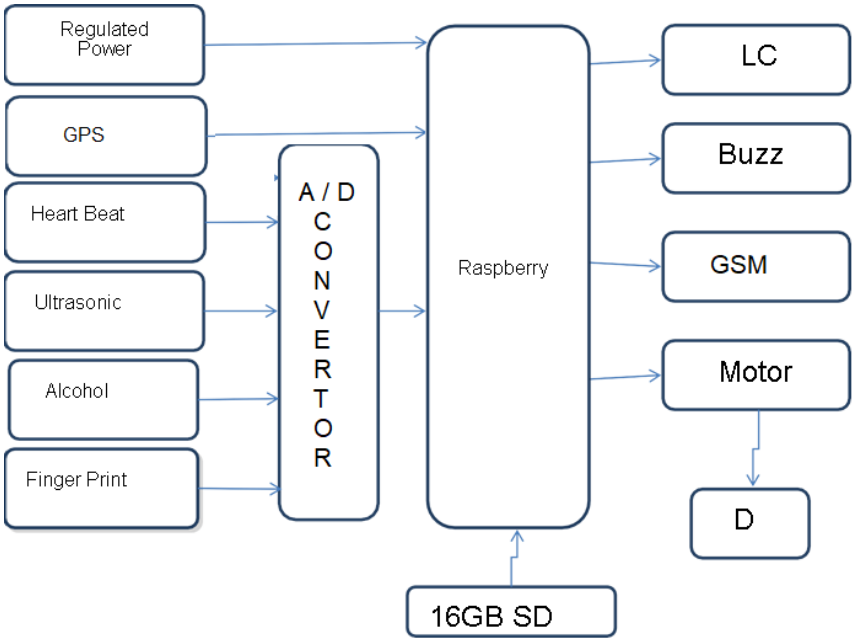

Fig. 1: Block Diagram of Proposed System design

As soon as driver enters into vehicle cabin he has to authorize himself using figure print sensor. Vehicle engine will start only after driver finger print verification. Driver health will be monitored continuously by using Heart Beat sensor. The drowsiness of the driver will be monitored by the Eye Blink Sensor. If driver sleeps the buzzer beeps loudly. All the surrounding vehicles are scanned by the ultrasonic sensor and alert the driver by beep sound. If the driver consumed the alcohol the vehicle engine will be automatically off. The vehicle can be tracked by using GPS Module. All the information will be displayed on the display.

Major Hardware Components:

Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer. Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features or abilities, at a low power consumption. Raspberry Pi Foundation officially provides Debian based Raspbian OS.

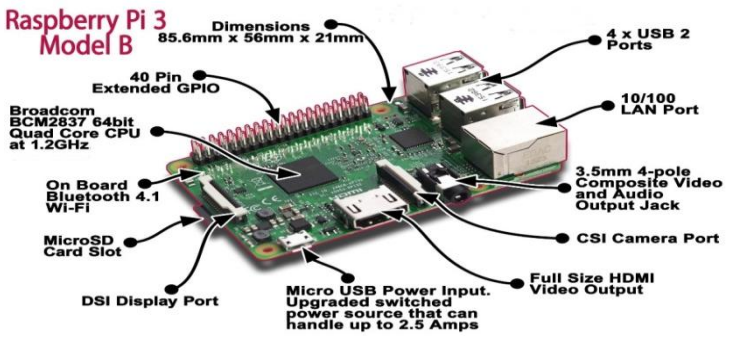

Fig. 2: Raspberry Pi 3

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GPS Module:

GPS Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. The Global Positioning System (GPS) is a space based radio-navigation system consisting of a constellation of satellites and a network of ground stations used for monitoring and control. GPS is operated and maintained by the Department of Defense (DOD). It is the receiver that collects data from the satellites and computes its location anywhere in the world based on information it gets from the satellites.

GSM Module:

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages. In most parts of the world, GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery.

Ultrasonic Sensor:

HC-SR04 Ultrasonic sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that Distance = Speed X Time.

The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module as shown in the picture below

Fig. 3: Ultrasonic sensor working

Now, to calculate the distance using the above formulae, we should know the Speed and time. Since we are using the Ultrasonic wave we know the universal speed of US wave at room conditions which is 330m/s. The circuitry inbuilt on the module will calculate the time taken for the US wave to come back and turns on the echo pin high for that same particular amount of time, this way we can also know the time taken. Now simply calculate the distance using a microcontroller or microprocessor.

Alcohol Sensor:

MQ-3 module is suitable for detecting Alcohol, Benzine, CH4, Hexane, LPG, CO. Sensitive material of MQ-3 gas sensor is SnO2, which with lower conductivity in clean air. When the

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target alcohol gas exist, the sensor's conductivity is higher along with the gas concentration rising. MQ-3 gas sensor has high senility to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor. This sensor provides an analog resistive output based on alcohol concentration. When the alcohol gas exist, the sensor's conductivity gets higher along with the gas concentration rising.

Heartbeat Sensor:

Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. The heartbeat sensor is based on the principle of photo plethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In the case of applications where the heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by the blood, the signal pulses are equivalent to the heartbeat pulses.

III. RESULTS

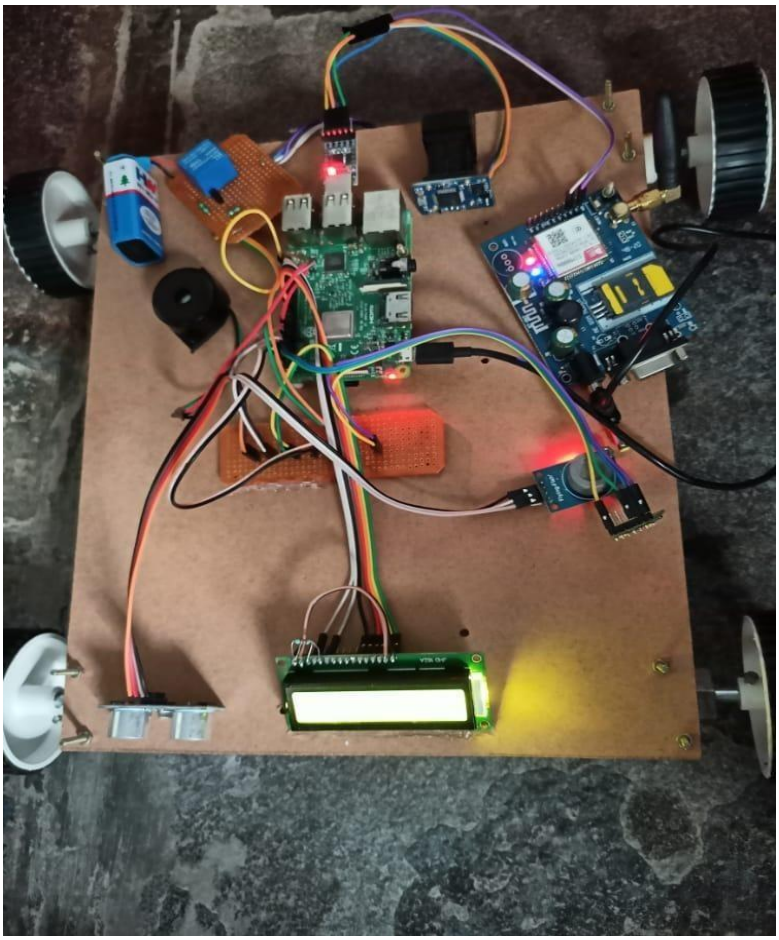

Fig. 4: Proposed system with all interfacing devices

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Fig. 5: Health Monitoring

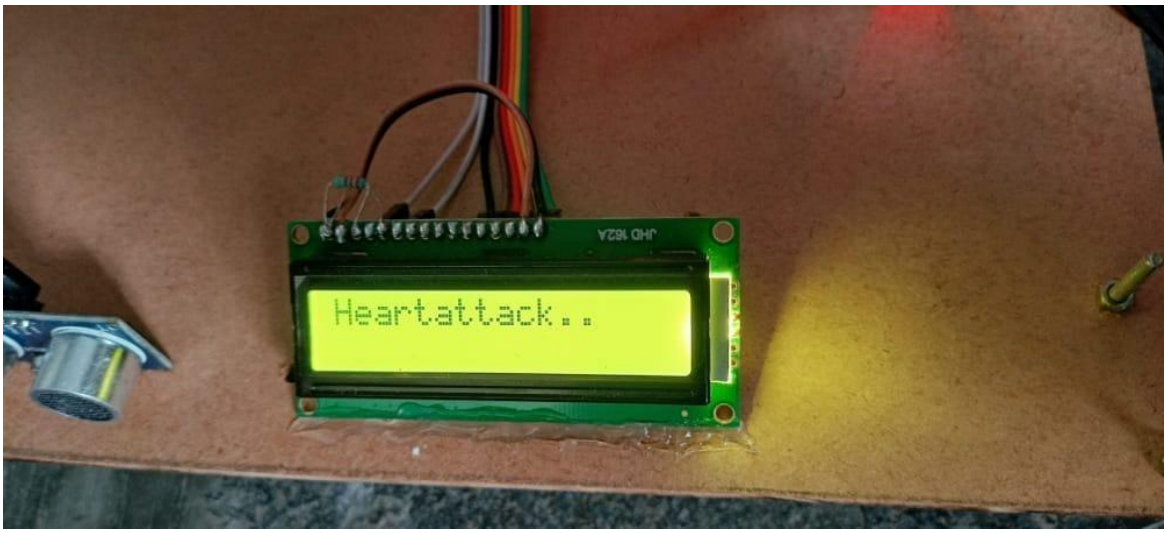

Fig. 6: Driver suffering with Heart Attack

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Fig. 7: Obstacle Found

Fig. 8: Driver Alcohol Consumed

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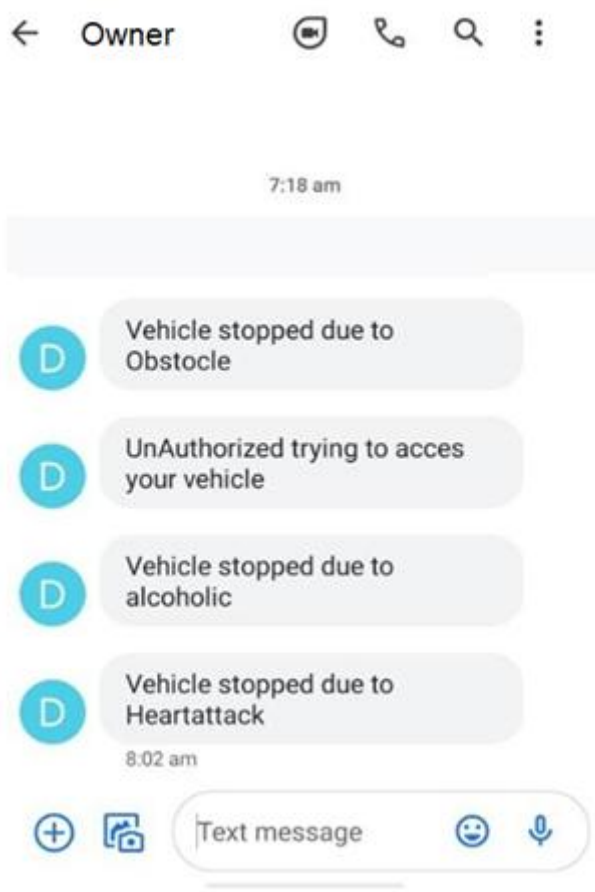

Fig. 9: Messaging the information through GSM Module to the Owner or Care taker

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