# Health Monitoring with Alcohol Detection and Ignition Control System using IoT

**G.Arun Francis, M.Wilson Wilfred, R.Sekar**

***Abstract:*** ***Accidents caused due to drunken drive are increasing tremendously in this modern world. According to National Crime Records Bureau (NCRB),1.5 percent of total 4.64 lakh road accidents were caused by driving under the influence of alcohol resulting in 6,295 injuries. In order to prevent accidents effectively the proposed system can be implemented. In this system, we monitor the level of alcohol consumption and heart beat rate. If the driver is identified with drunken drive, then the vehicle ignition system will stop which makes the drunken driver unable to move the vehicle resulting in accident prevention. And also, if there is any abnormal changes in heart beat rate, then the current status of the driver is send to their friends using IoT. Since practical implementation in Automobile is beyond the scope of this project, we are implementing the proposed system with a DC Motor. Node MCU acts as a controller in this system.***

***Keywords: Alcohol, Heart beat rate, IoT, Gas sensor, DC Motor, Ignition system, Node MCU.***

## I. INTRODUCTION

The carelessness and unconsciousness of the drunken drivers creates a huge problems to the people on road. In the modern era, Road Safety is considered to be one of the mostly concerned social issues. The habit of drunken driving causes damage to the surroundings and every person around him. The consumption of alcohol results in unconsciousness and fatigue while driving. The Government has taken many preventive measures to avoid drunken drive accidents. In order to minimise the DUI (Driving Under Influence of alcohol) related accidents, Supreme Court has ordered to shut down all the selling points on National and State Highways on Dec 15, 2016. But it's effective implementation is not possible due to many social political issues. However we can minimise the accidents by installing the proposed system inside the vehicle. This system continuously monitors the air exhaled by the driver with the help of MQ-3 sensor (alcohol sensor) and update these values in cloud through IoT. If any alcohol detection is found above the threshold value then the system stops the vehicle ignition system. This action is achieved by stopping the fuel supply to the ignition system. And also, the deaths due to cardiac arrest while driving is more. So, this system is constructed to monitor the heart beat rate of the driver.

Revised Manuscript Received on April 15, 2019.

**G.Arun Francis,** Assistant Professor, Department of Electronics and Communication Engineering, Karpagam College of Engineering, Tamil Nadu, India

**M.Wilson Wilfred,** Student, Department of Electronics and Communication Engineering, Karpagam College of Engineering, Tamil Nadu, India

**R.Sekar,** Student, Department of Electronics and Communication Engineering, Karpagam College of Engineering, Tamil Nadu, India

Heart beat rate monitoring sensor is used to monitor the driver's heart beat rate and these readings are stored in the cloud through IoT. If any abnormal heart beat rate is detected, then the system will send the driver's current status to their friends using IoT. The proposed system is highly efficient in monitoring the alcohol consumption level and heart beat rate of the driver. Since the sensor readings are stored in the cloud, it can be used in future.

## II. PROPOSED METHODOLOGY

In this system, mq3(alcohol) sensor is placed at helmet of the driver to detect the alcohol consumption level of driver and heart beat sensor is placed at the handle-bar of the motorbike to monitor the heart beat rate. The results obtained by the sensors are analog values and it is processed by the controller with the help of wifi through internet. The results obtained from sensors are constantly updated to cloud using IoT. When the resultant values obtained from alcohol sensors attains the threshold limit, then the system prevents the chances of accident by stopping the vehicle ignition system and stores the alcohol consumption values to the database of the vehicle user. The heart beat rate of the driver is also continuously monitored with the help of appropriate heart beat rate detection sensor and the data are updated in the database. In case of any abnormal detections in heart beat rate of the driver, then the current status of the person are informed to their relatives through IoT.

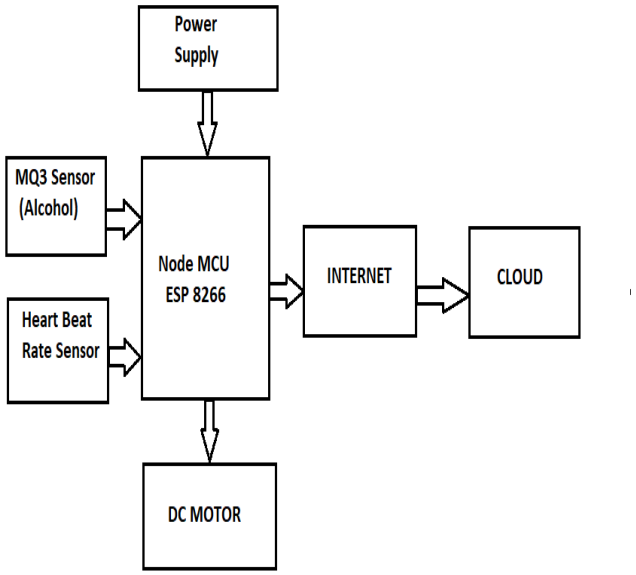


**Fig. 1 Block Diagram**


*Published By:*
*Blue Eyes Intelligence Engineering*
*& Sciences Publication*

The NodeMCU plays an important role in this system. It is connected with alcohol detection and heart beat rate sensors which helps to update the values to the database of the vehicle.

It has a built-in wifi module which is responsible for cloud updates when it is connected to the internet. The sensed values from sensors are continuously updated in the vehicle owner's cloud storage.

## III. FLOW CHART

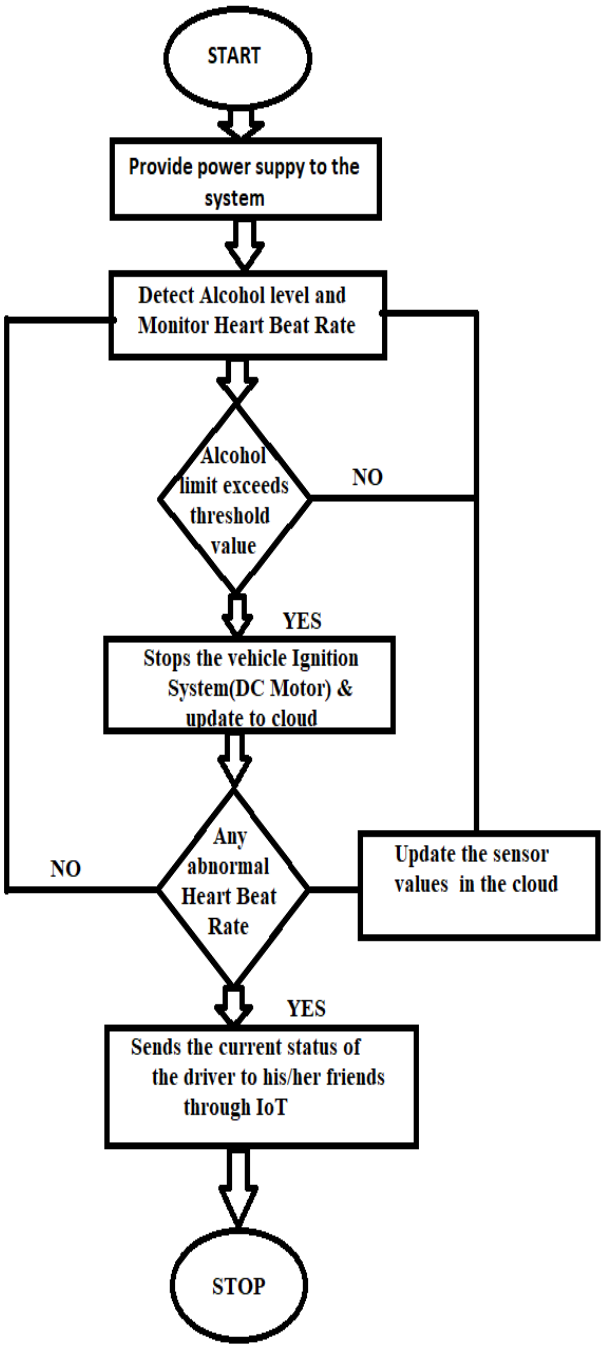


**Fig. 2 Flow chart**

## IV. ALCOHOL SENSOR

MQ-3 sensor detects the presence of alcohol consumed by the driver. It can sense the alcohol content ranging from 0.04 mg/L to 4 mg/L. It can operates at temperatures between -10'C to 50'C. It requires a minimum power supply of less than 150Ma to 5V.It consists of total 6 pins, but we use only 4 pins. The two pins A, H are used for heating purposes and the other two pins are used for ground and power.

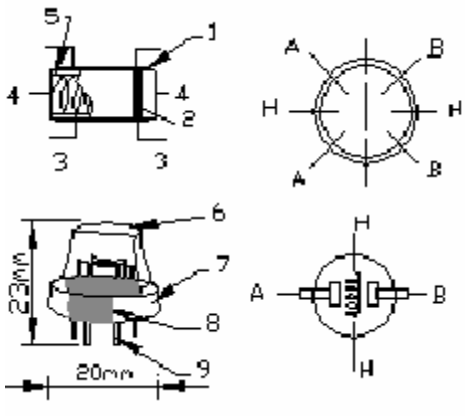


**Fig. 3 Structure & Configuration**

The air exhaled by the driver is monitored continuously with MQ-3 sensor and updated in the cloud. When the values detected from the sensor attains the threshold limit, then the vehicle ignition system will stop resulting in accident prevention.


**Fig. 4 MQ-3 Gas Sensor(Alcohol Sensor)**

## V. HEART BEAT MONITOR SENSOR

The heart beat rate of the driver is detected using a heart beat monitoring sensor. The sensor board consists of IR (Infra-red) transmitter and IR (Infra-red) receiver, which are placed in straight line to each other. It also has 3 pins (ground, power supply, output).In-order to measure the pulse rate, the finger is placed in-between the IR sensors. This sensor module is attached to the handle-bar of the motorbike. The variation in the IR sensor readings provides the appropriate heart beat rate of the driver. When an abnormal heart beat rate is detected, then the current health status of the driver comprising of his/her heart beat rate is send to their relatives through IoT.

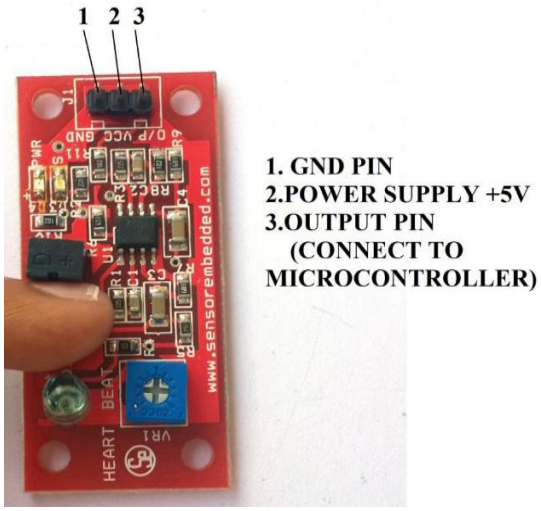


**Fig. 5 Heart Beat Rate Sensor**

## VI. DC MOTOR

When the driver is identified with drunken drive, then a signal is provided to the fuel blocker in the vehicle. The fuel supply to the vehicle engine is cut-off, which results the vehicle unable to move. By doing this, we can minimise and prevent accidents due to drunken and drive. Instead of vehicle engine, we have implemented the system with a DC Motor. A DC motor is a machine which converts electrical energy to mechanical energy. It works on the principle, when a conductor carrying current is placed in a magnetic field, it also experiences a magnetic force whose direction is provided by Fleming's Left Hand Rule.The current input to the DC Motor depends on the inputs read by the alcohol sensor. If the sensor reads the maximum threshold value, then the supply to the motor is cut-off.

**Fig. 6 DC Motor**

### NodeMCU

The NodeMCU- ESP8266 is a microcontroller with wifi capability. It is an open source IoT platform. This small board allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. NodeMCU refers to the default firmware. Lua is a scripting language used by this firmware. The operating system and processor used in it is XTOS and ESP8266. It has a memory of 128KB and storage of 4MB. The power for the controller is provided through USB.

**Fig. 7 NodeMCU**

### Internet of Things

The network of physical devices, home appliances embedded with electronics, sensors, software, actuator and network with proper internet, connect together to store, share, process data is called as Internet of Things (IoT). The applications for internet connected devices are extensive. IoT helps object to sense data and control it remotely.The system consisting of network connected embedded devices with minimum CPU, power resources and memory is responsible of collecting appropriate information from natural ecosystem to perform the proposed function.

**Fig. 8 Internet of Things**

## VII. CONCLUSION AND FUTURE SCOPE

In today's world, the accidents due to drunken drive and rash driving causes a great damage to the lives of common people. Even though, the government passes many bills and laws to minimise and control the accidents done under the influence of alcohol. But it is not effective. However, the proposed system could minimise and control the accidents made due to drunken and drive. This system continuously monitors the alcohol level consumed by the driver and when, it attains the maximum threshold value then the system stops the ignition system of the vehicle preventing the accidents. Moreover, it also monitors the heart beat rate of the driver frequently. The sensor readings are updated in the cloud from time to time through IoT. Even if the driver tries to escape after commiting the accident, the readings in the cloud will act as a major evidence for the police to punish the culprit.

In future, GPS and GSM can be added to this proposed system to send the geographical location of the drunken driver to the nearby police stations to take prior actions before any disaster happens to the lives of innocent people.

## REFERENCES


1. Keerthana K, Ramya G DRUNK DRIVING DETECTION USING CARIGNITION LOCKING 2018 International Journal of Pure and AppliedMathematics.
2. Tejaswini Patil, Aliya Tabassum AUTOMATIC ENGINE LOCKING SYSTEM ALCOHOL DETECTION FOR DRUNK & DRIVE WITH GSMNational Conference on Advances in Engineering and Applied Science.
3. Muthulakshmi.M, Santhiya.K, Prof.Dhivya.P- SMART HELMET SYSTEM USING ALCOHOL DETECTION FOR VEHICLE PROTECTION, IJIRTSE,ISSN: 2395-5619, Volume – 2.
4. Prof. Kulkarni P.H, Ms. Ravina Wafgaonkar, Mr. Gaurav Ahirrao ALCOHOL DETECTION AND AUTOMATIC DRUNK AND DRIVE AVOIDING SYSTEM International Journal of Engineering Research and ApplicationsApril 2014.
5. M.H. Mohamad, Mohd,AminBin Hasanuddin,"Vehicle Accident Prevention System Embedded with Alcohol Detector",IJRECE,Volume 1-Issue 4.
6. "Alcohol Detection and Accident Prevention of Vehicle", IJIERE, Volume-2, Issue-3, 2015.