Smart Vehicle Alcohol Detection System

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Abstract

This project presents the design and implementation of an Alcohol Detection with Engine Locking for cars using the Ultrasonic Sensor and Arduino UNO as the MCU (Master Control Unit). The system will continuously monitor the level of alcohol concentration in the alcohol detection sensor and thus turn off the engine of the vehicle if the alcohol concentration is above the threshold level. The model will also send the message of the whereabouts of the vehicle through SIM900A. The project provides an efficient solution to control accidents due to drunkdriving.

Keywords: -Arduino UNO, MQ-3 Sensor, SIM900A, DC Motor

Introduction

As we know, road accidents are increasing and have become a major problem in cities. This is due to the maximum usage of vehicles like cars, bike accidents are increased, and also due to drivers over speeding nature which is very risky. Also, the reason lies in the unavailability of advanced techniques, the rate of accidents is being painstaking to decrease.To reduce the country's accident rate, a proper, effective, standard solution is required. Currently, there are no advanced. This project presents the design and implementation of an Alcohol Detection System. The system will continuously monitor the level of alcohol concentration using the MQ3 sensor. It will turn off the engine of the vehicle if the Alcohol concentration is above the threshold value. The model will also send a messageregarding the whereabouts of the car through SIM900A. The project provides an efficient solution to control accidents due to drunk driving. This system can be installed in Two- Wheelers, Four-Wheelers LCVSs, HCVs, etc.

Literature Survey

[1] Dai, Jiangpeng, Jin Teng, Mobile phone based drunk driving detection". This system requires a mobile phone. It should be installed in the vehicle with orientation. A program should be installed in that phone it compares the sensor readings with the real-time driving test cases. If drunk driving is present, the phone will automatically alert the driver or send the alert message to the police/family.

[2] Bhuta, Pratiksha, Karan Desai, and Archita Keni Proposed "Alcohol Detection

and Vehicle Controlling". Arduino is used in this system. An alcohol detector and GPS module, GSM module are connected to the Arduino board. When the alcohol level in the driver's body crosses a particular limit vehicle ignition ill off and the GPS module finds out the location and alert will be sent to the police and family using the GSM module.

[3] Gupta, Abhishek, Shriram Ojha, Vikash Kumar, Vikrant Singh, This system was mainly used for preventing accidents that are occurring due to drunken driving. An alcohol detector was connected to the PCB (Printed Circuit Board). When alcohol level crosses a permissible limit ignition of the vehicle is stopped. This system should be installed inside the vehicle.

[4] Phalak, Piyush Vinay, Shashank Kowekar, and Shruti Joshi, This system needed an Androidphone with some sensors and programs installed on the Android phone. This program matches the current sensor readings with the values that are already present in the system. If any match is found then an alert message will be sent along with the location.

[5] Sarkar, Dwipjoy, and Atanu Chowdhury[5], According to this system DUI (Driving under the Influence) of alcohol is the major cause of accidents. So they proposed a system to find the driver's condition based on real driving test cases. A specially designed hardware consisting of sensors and mobile is installed in the vehicle. A program is installed in hardware and mobile phone. When a person is driving the vehicle sensor readings are compared to the real-time test case values. If there is any presence of DUI or alcohol alert message will be sent.

[6] Savania, Vijay, Hardik Agravata, and Dhrumil Patela[6], This system used an embedded system. This system consists of a 5-megapixel camera with International Journal of Pure and Applied Mathematics Volume 118 No. 20 2018, 4303-4307 ISSN: 1314-3395 (on-line version) URL: http://www.ijpam.eu Special Issue ijpam.EU 4303 embedded system board Raspberry. Raspberry Pi is interfaced with another Arduino board which is used for some tasks like alarm notifications and ignition lock. It performs these tasks if and only if it is a message from raspberry pi about the presence of alcohol.

[7] Deshmukh, S. V., D. P. Radake, and K. N. Hande, In this an alcohol sensor is placed in thevehicle to detect the alcohol. If the alcohol gases are detected then for every 5 minutes a message is sent to their relatives. In this, an arm7 microcontroller is used and it is connected toGSM and GPS. The GPS is used to track the location of the vehicle and a message will be sent using the GSM module.

[8] Albert Mayan J, Kuldeep Anand D.S, Neha Sadhvi[8], System consists of sensors that are directly faced towards driver's face. This system monitors the driver's eyes to check whether thedriver is sleeping or not by an eye blink sensor and detects their pulse from fingers by using LED and LDR. Analyze the sensor readings and find the fatigue level.

Objective

- To detect the alcohol level of the driving person.
- To turn off the engine in case of alcohol consumption.
- To alert the vehicle owner about the driver's alcohol consumption.
- To reduce Drink and Drive cases.
- To save the lives of the people.

Existing System

An alcohol breathalyzer used by traffic police is a handheld device that measures a person's blood alcohol concentration (BAC) by analyzing their breath.

Alcohol breathalyzers used by traffic police are portable and can be used at the roadside to quickly test drivers suspected of driving under the influence of alcohol. The devices are calibrated to meet specific standards to ensure accuracy, but they can still produce false readings if not used properly or if certain factors, such as environmental conditions, affect the results.

Gaps Found

- Alcohol breathalyzers can only detect the driver's alcohol level at the time of testing and do not provide continuous monitoring.

- Do not provide any preventative measures to stop drunk driving from happening.

- Alcohol breathalyzers need to be regularly calibrated and maintained to ensure that they produce accurate readings. If the device is not calibrated properly, it may produce false readings that can lead to wrongful arrests or convictions.

Proposed System

The block diagram of the proposed system is shown in Figure. It consists of a switch which is used to start the system. It is analogous to starting the car engine. The MQ-3 alcohol sensor is used to detect the presence of alcohol that crosses the specified threshold value. The value is then sent to the Arduino and if the specified value is surpassed, then it forwards to the web page. The DC motor is used to signify the car ignition system which is cut off in caseof alcohol consumption.
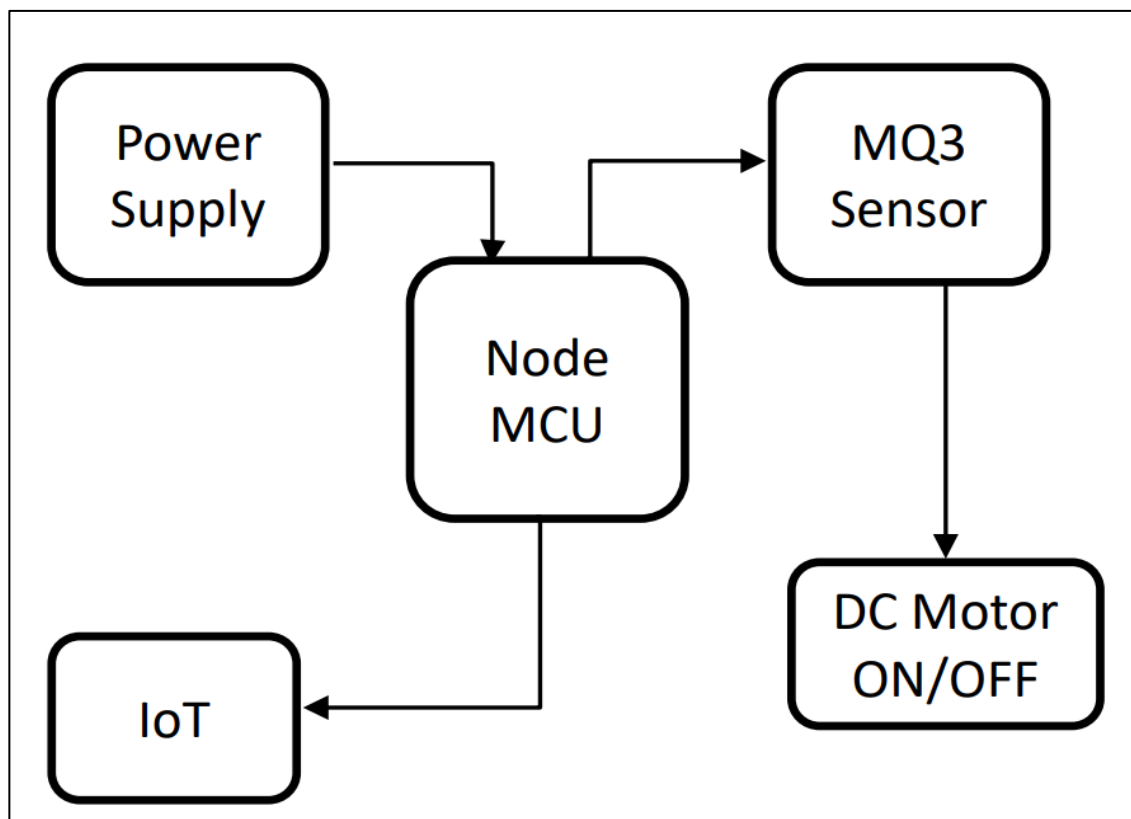
Methodology

Activity diagrams show the sequences of states that an object goes through, the events that cause a transition from one state to another and the actions that result in an activity diagram.
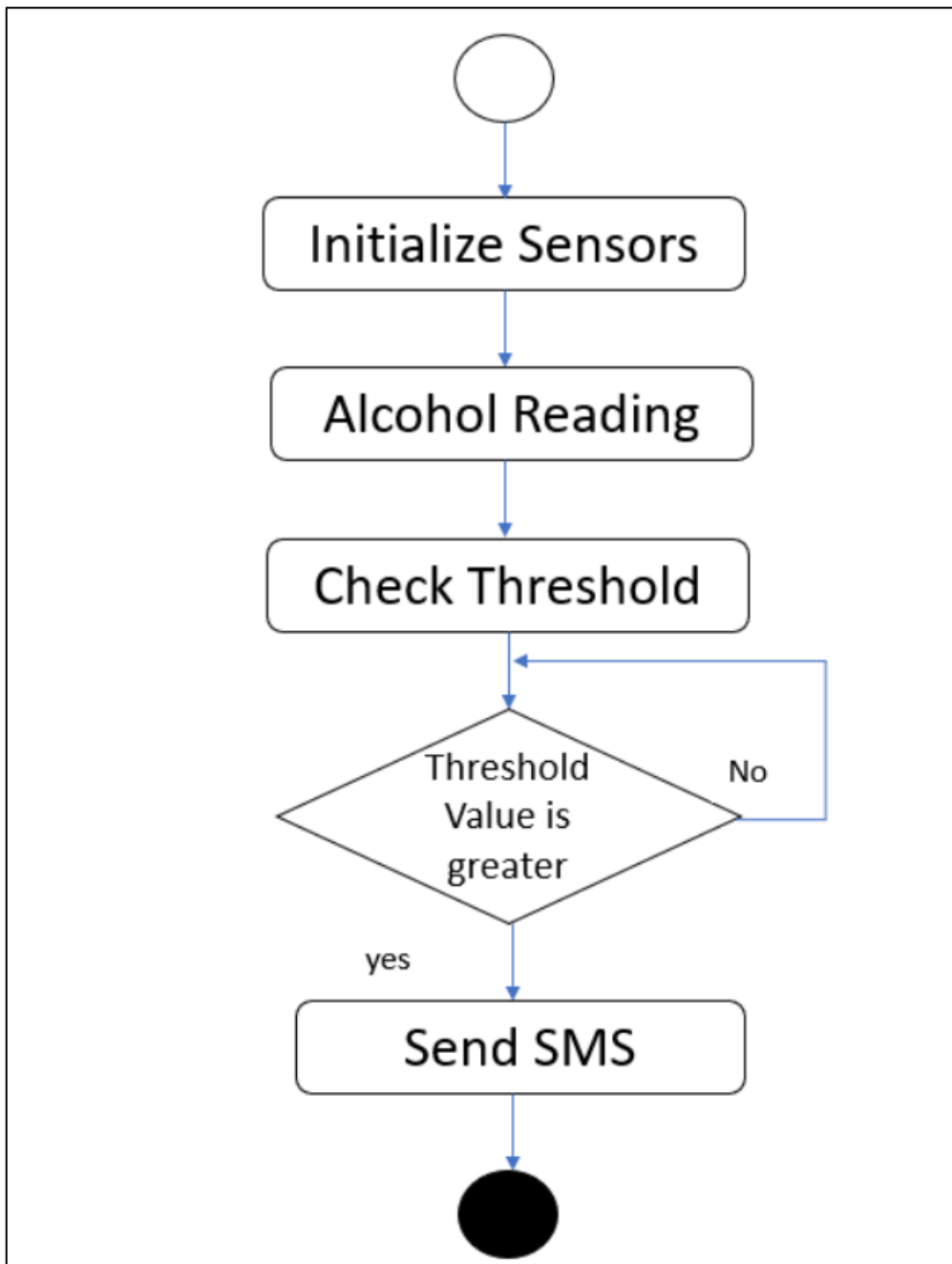
Hardware Implementation

(a) GSM - A GSM modem or GSM module is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify themselves to the network. GSM modems typically provide TTL-level serial interfaces to their host. They are usually used as part of an embedded system.

(b) NodeMCU - It has ESP-12-based serial WiFi integrated on board to provide GPIO, PWM, ADC, I2C, and 1-WIRE resources at your fingertips, built-in USB-TTL serial with super reliable industrial strength CH340 for superior stability on all supported platforms. This module is one of the cheapest available wifi-modules in the market. V3 or Version 3 is the latest version of this module. Modern Internet development tools such as Node.js can take advantage of the NodeMCU with the built-in API to put your idea on the fast track immediately. NodeMCU is built based on the mature ESP8266 technology to take advantage of the abundant resources available on the web.

(c) MQ3 Sensor The analog gas sensor – MQ3 is used in gas leakage detecting equipment in consumer and industry markets, this sensor is suitable for detecting LPG i-butane, propane, methane, alcohol, hydrogen, and smoke. It has a high sensitivity and fast response time. And the sensitivity can be adjusted by the potentiometer.
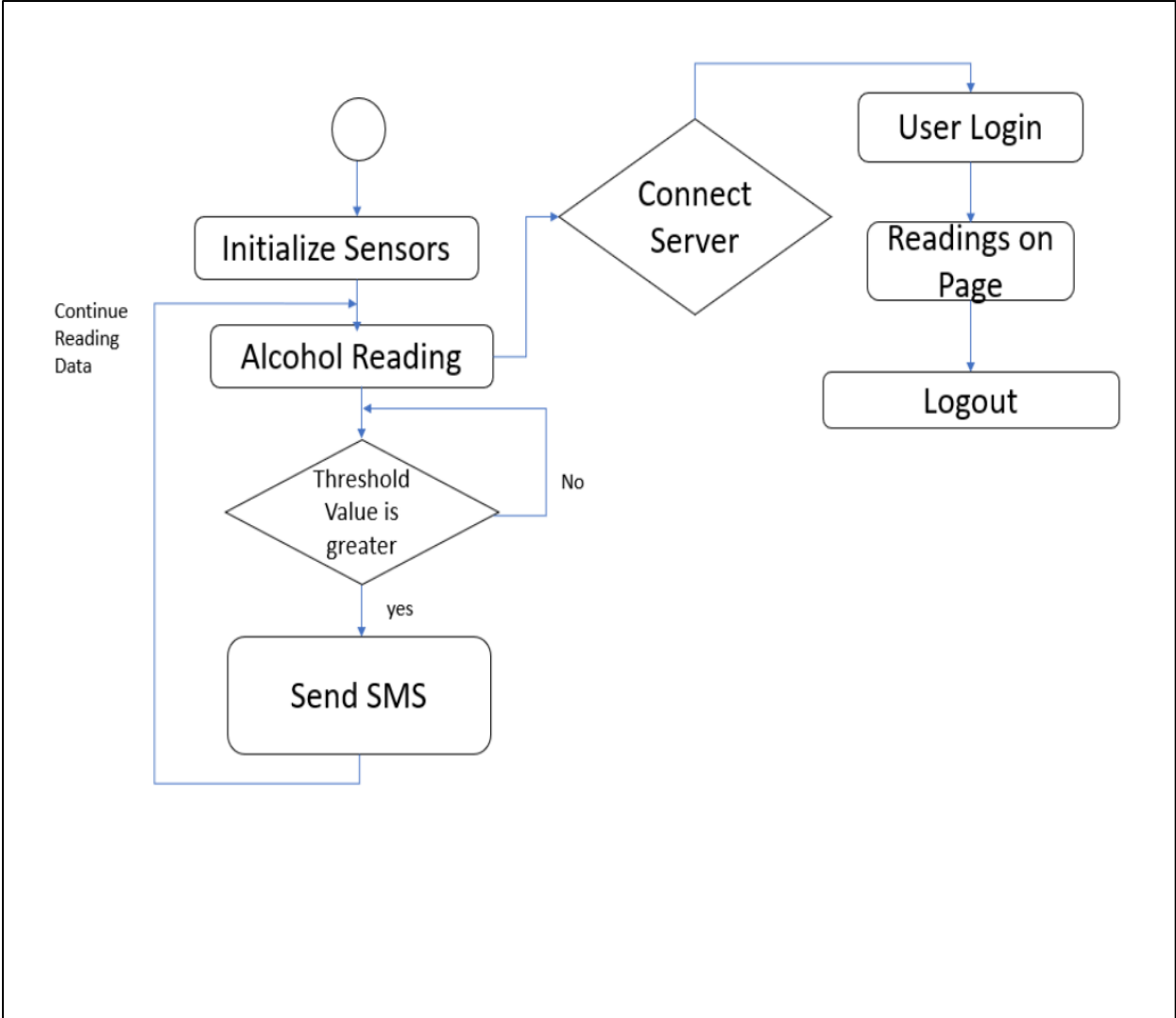

(D) Relay - A relay is an electrically operated switch. It consists of a set of input terminals for single or multiple control signals and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.
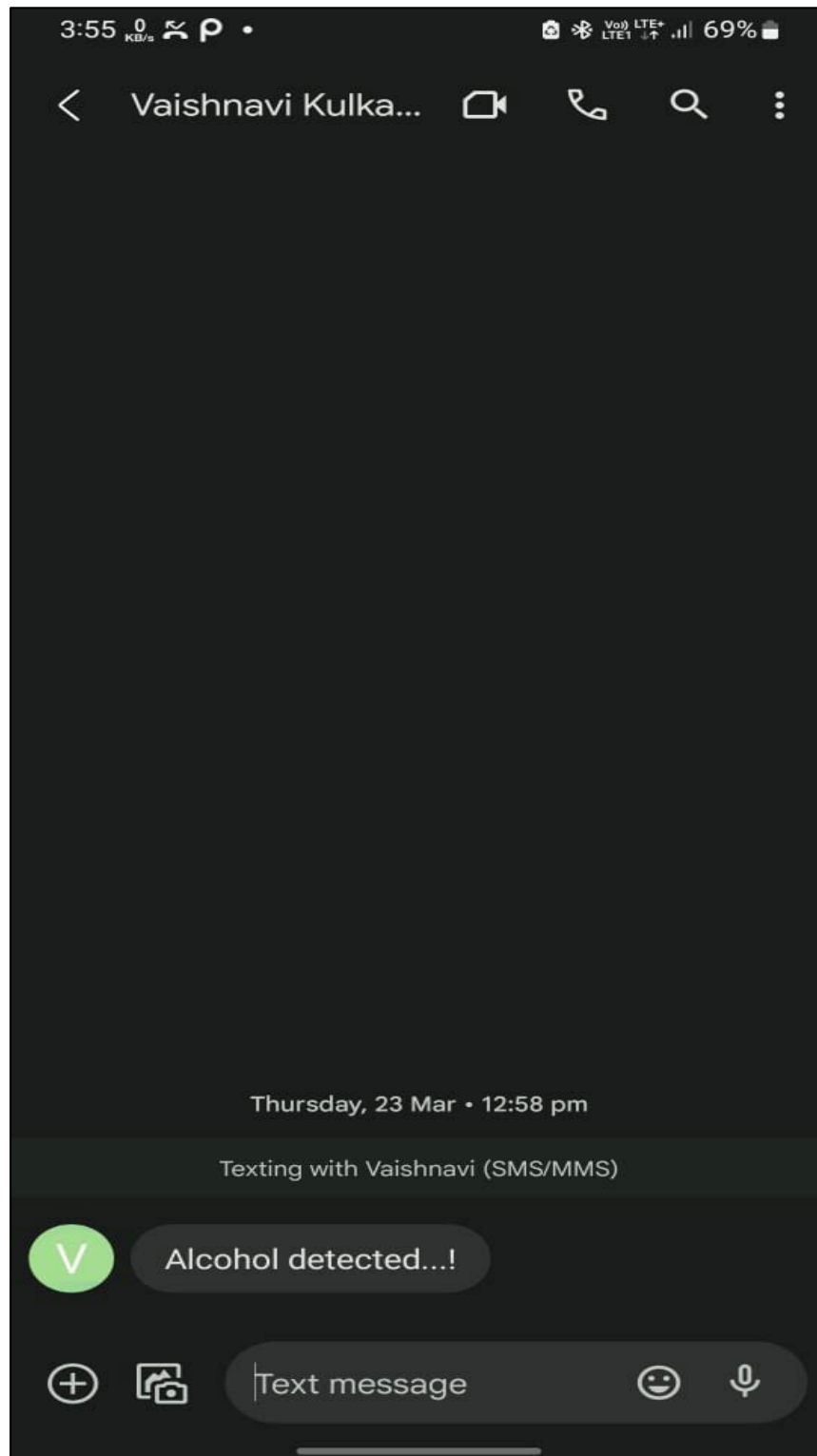
Flowchart

Result

Conclusion

The proposed system can reduce the number of road accidents that are occurring due to drunken driving. This system can now be implemented in cars or any four-wheeler. And also itcan be implemented in two Wheeler's. It can also be used in any organization to detect drunken persons.

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