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Real Time Vehicle Theft Prevention With Safety Measures Using Arduino

M.Charan[1], G.Gokulakrishnan[2], K.Harikrishnan[3], A.Harish[4], S.Senthilmurugan*[5]

[(1,2,3,4)]UG Scholar, Department of Electronics and Communication Engineering,
[5]Assistant Professor, Department of Electronics and Communication Engineering,
Valliammai Engineering College, Srm Nagar, Kancheepuram- 603 203, Tamilnadu, (India)

ABSTRACT

In today's world, road accidents[6] massacres more people than any other serious health diseases or any type of epidemic. This has created a catastrophic situation for every individual to drive safely and carefully. Thus our project mainly focuses on reducing accidents caused by collision[6] with other vehicle or by rash driving[7] and drunken driving[4]. This project has presented a system which will make vehicles self-sufficient to take the decisions and remain protected from different types of accidents. The vehicles by using sensors, GPS, GSM and all these devices are controlled by using Arduino UNO[3]. This project also provided an equal opportunity to provide security to the vehicle using pattern based authentication and ignition system[10]. Aiming at high frequency accidents by the drunken driving[2], the project puts forward an automatic ignition off control system for vehicle drunken driving to prevent the occurrence. Through our proposed system the advanced security level of pattern based digital ignition system can be used to reduce the risk of theft occurring due to hotwiring and opportunistic theft[9]. This method can be installed to reduce the usage of key based ignition system and also to prevent theft possible due to redundant keys. The FET in Electronic Speed Controllers weren't able to provide better accuracy when the roads are less traffic. MEMS[1] can be used as supplement which provides better accuracy in calculating the accurate frequency level, angle of inclination, tilt, and threshold level can be optimized to cut off the ignition system.

Keywords— Alcohol sensor, Arduino UNO, GPS, GSM,MEMS sensor

I.INTRODUCTION

The vehicle theft and tracking machine is an essential kit to reduce the no. of increased theft of vehicles which is commonly known as antitheft kit[8].Most of the theft cases are occurred due to the Hot wiring, Hijacking and opportunistic theft[9]. Certain safety measures are only available at high cost. Here are some of the methods to provide safety measures at low cost. Theft prevention and safety measures[10] can be provided by using Digital Ignition lock with highly efficient sensors like MEMS, MQ3-4753. With our road transportation, the road traffic safety is more severe. Particularly the traffic accident rate by the drunken driving[2] and rash driving[6] is more and more the study of smart locked system for drunken driving[2] and rash driving[7] is very essential, which can be enforceable against the phenomenon and reduce the traffic accident rate. From the active security stand

point the prohibition starting the car engine against the drunken driving and rash driving will be an important method from the bud before traffic accident happened.

On the ground of research and prevention of drunken driving[4] and rash driving[7], this article designs an automatic ignition control system of vehicle which monitors abnormal situations. The system can detect the driver's alcohol concentration gas of breath smelled, display test results and control the relay movement according to the comparison between the driver's alcohol concentration[2] and the direction value and control the car if you can start.

Accidents are the unplanned, unexpected incident which occurs suddenly. The main causes of the traumas are over speeding, drunken driving, not obeying the road signs, losing controls due to rash driving[7], etc. These have made the automobile manufacturer an alarming signal to implement device which will provide a prior indication to the driver regarding the probable accidents there are many futures which were manufactured by various automobile companies. Along with this many ideas were either proposed or formulated to provide safety to the vehicles by using the combination of pattern ignition along with the Alcohol MQ3-4753, MEMS to protect the vehicles from theft and collisions.

Nowadays crucial problem facing in the world is an unnatural death due to drunken driving and driving rash[6]. The main aim of our project is to reduce the road accidents in the world, especially in India, according to the transport research wing(India) survey, accidents have been escalated by 2.5% from 2016. From this analysis, road accidents occurs about 1374 deaths takes place every day in India. Among the available data, 54.1% of persons were killed in between the lifetime of 15-34 years.

According to WHO report, 70% of total road human deaths were caused by drunken driving and rash driving. Given above some of the methodologies which we can implement in vehicles to provide theft prevention using GSM and GPS along with safety measures that can be made with lower cost.

I.A.OBJECTIVE

The main intention of this system is to provide the Real Time theft prevention along with safety measures[9]. The commercially pinpoint available anti-robbery vehicular system is a high ticket and our project can be developed at low cost. The pattern based ignition system[10] is an advantage and cost efficient over the current technology ignition system. The snatching of static vehicle either by shattering and follow in by hot wiring can be prevented by our project[8]. The removal of vehicle that the owner or operator has left unattended with the keys visible can be replaced by pattern based ignition system[10].

I.B.EXISTING SYSTEM

Mechanically controlled ignition key system makes the existing system vulnerable to theft.The (ESC)[1] in the existing system provides the maximum speed limit of 80km/hr. using FET's.Rash driving cannot be monitored using ESC's[1].Alcohol sensor senses the overall concentration and breaks the power circuit even if the driver is non-consumed with Alcohol[4].It does not show good resistance to smoke, vapor and perfume products based on the threshold level[4].

I.C.PROPOSED SYSTEM

Pattern controlled ignition key system ensures additional security and less vulnerable to theft[9]. Our proposed system consists of MEMS[1] that provides the user to extend the speed limit when the pathway is less traffic.Rash driving can be monitored[6]and controlled using MEMS.Alcohol sensors make the power circuits closed when the driver is non-consumed. The Lateral- axis in the MEMS sensor[1] is used to calculate the angle of tilt, steering acceleration through which the level of rash driving can be measured and the overall values can be monitored by Arduino to make the power circuit to be turned off.

II.METHODOLOGY

Here in our proposed system**,** we use Arduino UNO as a Microcontroller. The Sensors like Alcohol (MQ3-4753), MEMS[1] are interfaced with the microcontroller[5]. The Touchscreen display makes the user to provide the pre-stored input pattern. Once the pattern is correctly recognized, the microcontroller makes the circuit closed. Through this, the old key based turn on system can be displaced with the digital pattern based ignition system. MQ3-4753[2] measures the concentration level of alcohol consumption whose range is from 0.01mg/L to 20mg/L. The threshold level of the sensor is made to be adjusted using microcontroller[5]. This makes the ignition system to be turned off when the threshold level exceeds the concentration range from 0.01mg/L to 10mg/L[2]. MEMS[1]measures the angular frequency, angle of inclination, tiltand steering acceleration up to the level of 0.04 to 1.0g. Arduino UNO[3] collects the input level from these sensors and responds to the ignition system according to the deduction. The details about the locality of the vehicle[8] in case of input of wrong pattern will be sent to the owner's registered mobile number through GSM module. In case of any alcohol consumption or increased threshold level of rash driving, the vehicle will be turned off and the information regarding the incident will be passed on to the owner through the registered mobile number.

III.BLOCK DIAGRAM

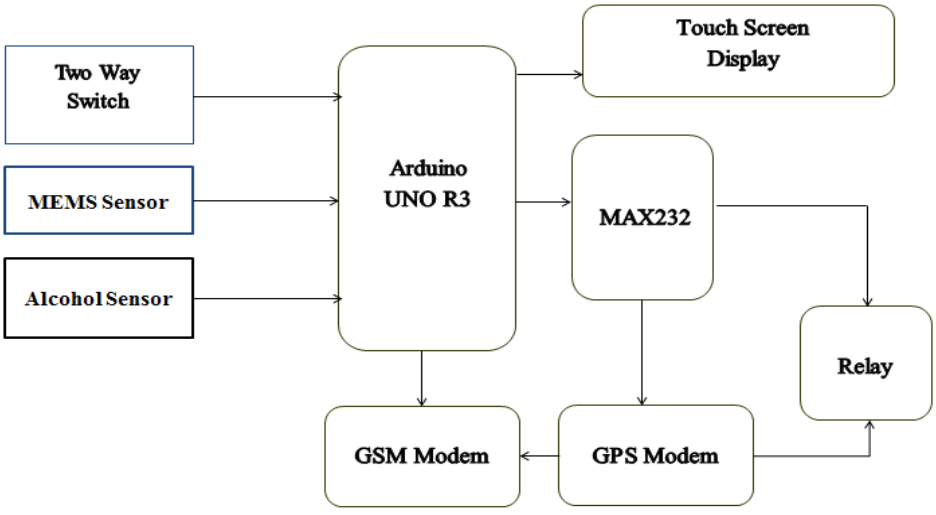

Fig.1. Block diagram of Proposed System.

III.A.COMPONENTS USED

1) Arduino

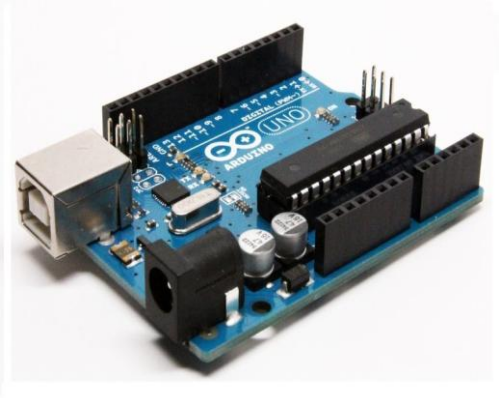

Fig.2. Pin Configuration diagram of Arduino UNO.

Description:-

It is a microcontroller module with ATMEGA328 IC. It consists of 16MHz crystal oscillator to produce oscillations. It contains 14 Digital I/O pins in which 6 pins[3] are used as PWM outputs, 6 Analog inputs.

Advantages:

- It is very cheap when assimilated to other microcontrollers and easy to execute.
- It provides compatibility and upgradability with all essential sensors[3].
-

2) GPS

Fig.3. Image of GPS Module with Pin connector

Description:-

It is the space based satellite which is used to give the information about the navigation on the earth. It gives exact information about the navigation, precise location[9]. It plays major role in the missile, civic and marketable purposes in the earth.

Advantages:

- It provides high accuracy of exact location along with its latitude, longitude and altitude[9].
- It can be easily integrated with any of the microcontrollers/ microprocessors.
- It is highly reliable.

3) GSM

Fig.4. Image of GSM SIM 900A Module

Description:-

It is the system based on the TDMA technique[8] which is used for communication purpose. It digitizes and cuts down the data and then streams it down along a medium with two different paths of client details, each in its own allocated time slots. The architecture consists of a MS, BSS and NSS. It provides improved spectrum efficiency, uses encipher to make phone calls more secured.

Advantages:-

- It provides international roaming .
- It provides compatibility with ISDN.
- It provides short message services with sim phonebook management[10].

4) ALCOHOL SENSOR

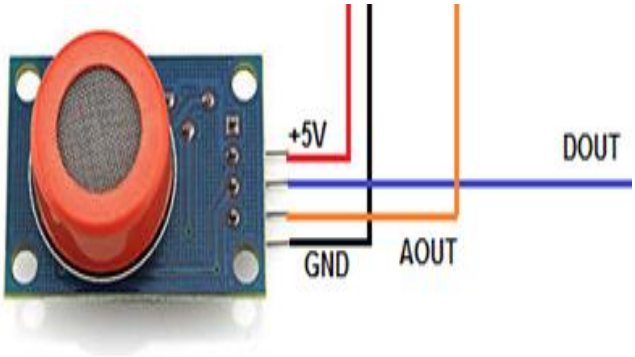

Fig.5. Image of Alcohol Sensor (MQ3-4753)

Description:-

It is a sensor which detectsalcohol in driver's breath[2]. It is habituated to anatomize the breath and used as a breath analyser or breath tester to detect the Ethanol. It has a good resistance to the presence of smoke, vapour, petroleum products and disturb of gasoline products[4].

Advantages:-

- Highly stable and long life
- High sensitivity to Ethanol and Benzene products[4].
- It can hold up to the temperature of 70 degree Celsius[2].

5) MEMS sensor:-

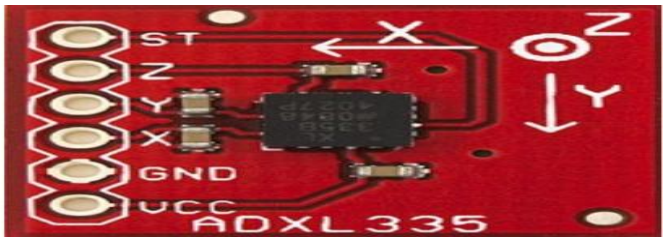

Fig.6. Image of MEMS sensor (ADXL335)

Description:-

It is a tiny, less power, 3- direction accelerometer sensor. It estimates acceleration with a minimum bandwidth range of (+)or (-) 3g. Fixed acceleration measurement in tilt sensing[1] can be measured and it is used in our proposed system.

Advantages:-

- It produces complete 3- axis sensing.
- It has an ability to resist shocks up to 10,000g.
- It has excellent temperature stability.
- It produces better bandwidth adjustments with single charge storage per axis[1].

B.TARGET PARAMETER

The Target parameters of the proposed system are,

As a sensor of inclination, tilt or orientation in 2 or 3 directions, MEMS should produce 8 to 12 Hz[1] whose acceleration should be 0.04 to 1.0 g[1].Alcohol sensor should ensure the concentration range from 0.05 mg/L - 10mg/L[4] Alcohol at the operation temperature 10degree Celsius to 70 degree Celsius.

IV.FLOWCHART

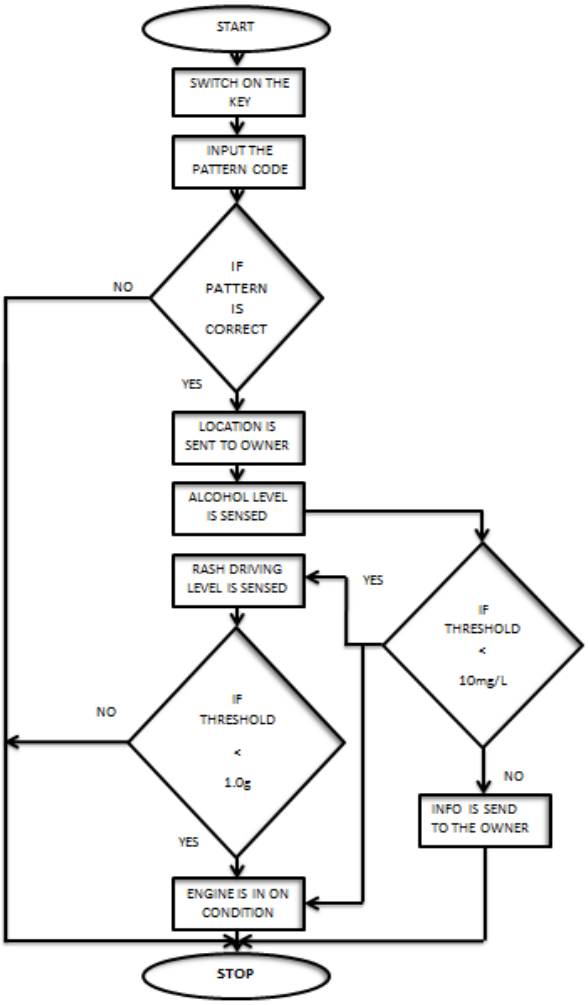

Fig.7. Flowchart of proposed system

The proposed project flow chart is explained in fig.7. At the incipient, the key has to be inserted to make the battery supply on. Input the pre-stored pattern to the micro controller[5]. Once the pattern is authenticated location will be sent to the owner. Based on the threshold levels sensed by the sensors, the engine will be made ON/OFF controlled by the Arduino[3].

V.APPLICATIONS

- The pattern based ignition system reduces the occurrence of theft of vehicles.
- Vehicle tracking systems[8] can also be used for covering driving conduct for both marketable and individual problems. Parents for instance can use tracking devices to maintain an eye in their teenage son/daughters driving[2].
- Accidents occurringbecause of rash driving can be reduced using MEMS sensors[1].

- The pattern based ignition system shall be used to automate ignition locking process without the ignition key [9].

VI.ACHIEVED RESULTS

The threshold angle of (0, 45, 90,135 degrees) measured by the MEMS[1] is calculated for every 2 seconds of steering tilt. Power circuit is open when maximum angle is reached. The threshold level of the alcohol sensor[2] is adjusted to increase the resistance towards smoke, vapor, etc[4].The touch screen display provides 3x3 patterns. When the user provides the stored input, the circuit closed. The GPS/GSM[8] module sends the exact location to the owner as soon as possible when the number of wrong pattern trials has made more than 3 attempts.

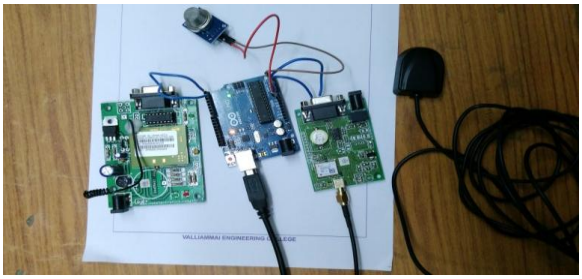

FIG.8.INTEGRATING MEMS, GPS, GSM WITH ARDUINO

VII.CONCLUSION

Our proposed project can prevent the vehicle from hotwiring and fraudulent theft.Our Vehicle theft prevention[9] project can be used for safety, security[8], monitoring performance[10] and communication medium between the owner and the embedded system[3].We can also use EEPROM's to accumulatethe previous traversed positions. Future enhancements can be made by adding fingerprint sensors and face detection sensors[5] that adds additional security to the vehicle.

VIII.ACKNOWLEDGEMENT

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