



ACCIDENT PREVENTION AND DETECTION OF COLLISION USING RFID TAGS

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Abstract

With increase in means of transportation there has also been a steady increase in traffic. The fatalities of accidents could be so deadly it could result in mortal wounds or even worse instant death. The paper deals with measures that ensure a rider abides by the rules laid out .It also checks if the rider is under the influence of alcohol while on road as most accidents occur due to human negligence. Also if the occurrence of an accident is detected the relative of the victim and the nearby police station is alerted to bring help for the concerned person.

Index Terms: Arduino Uno, MQ3 sensor, GPS, GSM, RFID

I. INTRODUCTION

With the passing year the number of people dying in accidents has increased. The number suggests that at least 413 people die every day in 1,317 road accidents. Most of these accidents are a result of negligence during driving/riding and lack of importance given to safety while driving/riding. Despite the stringent rules to curb such occurrences the individuals lack a responsibility towards following the rules laid out in the interest of their safety. In fact drunken driving is one of the leading causes of road fatalities.

Various techniques were developed in order to avoid accidents and to detect them. However most of these methods have been focused on two wheelers by means of smart helmets. However four wheelers are responsible for the majority of road accidents. The paper ventures into effective means to avoid accidents and measures taken in case of the occurrence of an accident.

After the occurrence of an accident the victim is left unaided while the culprit simply flees the spot. No effective measures are available to identify such culprits. The following paper focuses on catching these culprits and bringing them to justice.

II. LITERATURE SURVEY

Many approaches were taken towards the avoidance and prevention of accidents. One of the methods involved the use of an embedded system that uses piezoelectric sensor and accelerometer and alcohol sensor to detect and prevent accidents. In case of an accident a message is sent to the number that is preloaded [1][8]. Another method involved a system that uses a smart helmet to avoid road accidents. The rider can ride only after he wears the helmet and is tested to be alcohol free. Some initiatives involved the use of IOT. But it is applicable only to two wheelers [2][7][10]. there also were systems that used an MSP430 and an accelerometer to detect accidents and transmit message using Bluetooth. This could even raise false alarm in case rider/driver is not hurt[3]. another initiative was to use of BR Button 300 x 297 and ZigBee to detect driving patterns and thus check and report in case of rash driving[4]. Many systems used an Atmel processor that was interfaced to a GSM module that sends SMS to predefined numbers in case of vibration detection. But again this would raise a false alarm [5]. Even smartphone sensors like the accelerometer were used to detect accidents and transmit the data to a server [6]. Drowsiness was detected with the help of a camera by face tracking. If a yawn was detected an alert was sent [9].

III. COMPONENTS REQUIRED

A. Arduino Uno

Arduino Uno is a microcontroller board that is based on the ATmega328P. It consists of 14 digital input/output pins outputs), and 6 analog inputs it also has a 16 MHz crystal oscillator a USB connection and a power jack.

B. Piezoelectric sensor

It detects pressure changes and conveys this in the form of voltage spikes

C. RFID tag and reader

An RFID system consists of an RFID tag,RFID reader. The tag reader reads the data from the tag. This data is processed by the microcontroller

D. MQ-3

This is the alcohol sensor. It monitors the level of ethanol.

E. MPU 6050

This is the accelerometer sensors which detects the orientation of the vehicle. It is a three axis sensor with 6 d.o.f.

F. GPS AND GSM

The GPS will give the position of the vehicle. The GSM module is used to send a message to the preloaded mobile number.

so the vehicle engine won't start until the drunk person vacates the driver seat replacing it by a non- drunk individual. The person must blow on the MQ-3 sensor which will detect the presence of alcohol in the breath. The breath of the person is continuously monitored and if it crosses the threshold the vehicle is stopped and using the GPS and GSM module a message is sent to the concerned person stating the person is drunk.

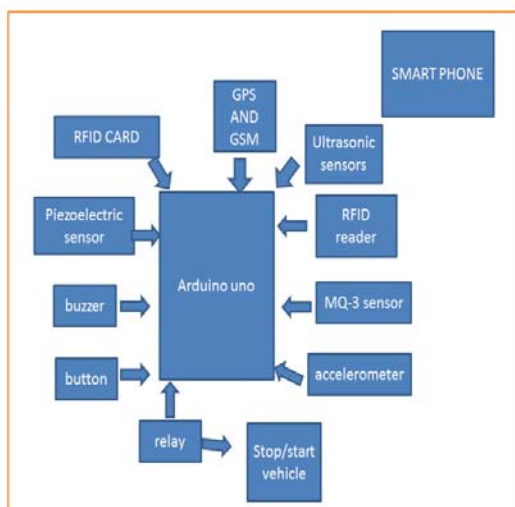
The accelerometer on the vehicle checks for rash driving/riding. If an accident has occurred the accelerometer value will indicate if the person has met with an accident and is in a horizontal position. The values can be monitored in the x, y and z axis.

When an accident is detected, the buzzer starts and a time limit is set within which the person must press a button. If the button is not pressed then a message is passed on using the GPS and GSM modules to a nearby police station, hospital and to a relative. The message comprises of the location of the driver /rider.

In case of a collision the RFID reader is triggered ON. This is done using pressure sensor. If the impact is more a corresponding piezoelectric voltage will be obtained. If the voltage value crosses a certain threshold, the RFID reader is triggered ON. Thus the RFID tag of the colliding car is read . In case of a hit and run case this message is sent to the police station. Thus the person is identified.

Ultrasonic sensors are used to detect the presence of vehicles. This can be very handy in the case low visibility areas. In case of a near collision the car can be stopped

IV. BLOCK DIAGRAM



.fig.a block diagram

V. METHODOLOGY

The MQ-3 sensor detects if the person that enters the car is under the influence of alcohol. If

VI. FLOW CHART

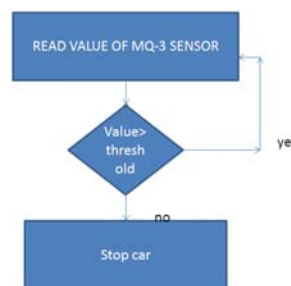


fig.b accident prevention

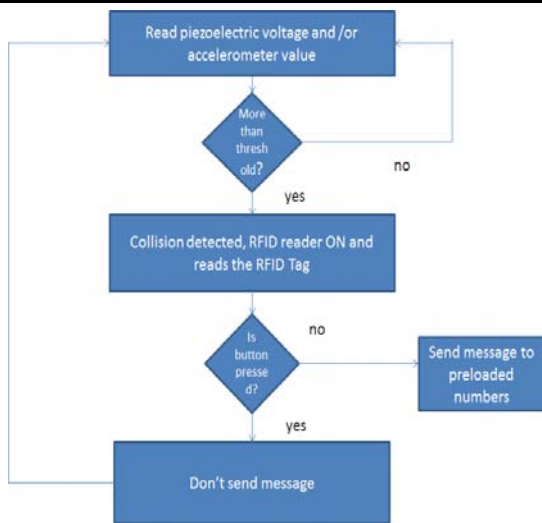


Fig.c accident detection and notification

In fig.b the need for the MQ-3 is emphasized. The sensor continuously monitors the presence of alcohol. If the alcohol content is more than the threshold using the relay the car is stopped.

Fig.c speaks about the accident detection. Both the piezoelectric voltage and the accelerometer values are monitored. If the piezoelectric value is more than the threshold a collision is detected and the buzzer is sounded. In case the accelerometer values are such that it indicates a crash the buzzer is sounded. If the person can press the button within the given time no message is sent. Else a message enclosing the location details of the person is sent to the police station, ambulance and a relative. These numbers are preloaded in the code

VII. FUTURE SCOPE

In addition to the ideas proposed above a few other inputs can be added like Iris detection to detect drowsiness. Thus in case the person is identified to be drowsy an alert is sent. Also in case of near accidents, vehicle to vehicle(V2V) communication can be used to avoid collision between vehicles.

VIII. CONCLUSION

With the help of these methods accidents can be avoided to a great extent and the injured can get timely help. Moreover it also helps to find those who try to escape after their careless deeds. The deaths that occur due to accidents can be reduced

to a great extent. Also the rules laid out to be followed will be abided by.

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