A RETROSPECTIVE STUDY OF TWO WHEELER ANTI-THEFT AND RIDER SECURITY SYSTEM

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ABSTRACT
The increment in thefts of two wheelers and the alarming number of road accidents and the death rate of people as a result of such accidents, calls for the need of a system that could both prevent the theft of the vehicle as well as ensure the safety of the rider. The traditional locks available in normal two wheelers do not provide enough security to their owners. Such locks are well known to the thieves and they can be easily broken by them. Thus there is a need for more security options to be available for the two wheelers which would be unique and different from the traditional key locks. Biometrics system can be used as a good and effective security option. An important and very reliable human identification is the fingerprint identification which could be used in one such system. The safety of the rider can be ensured to some extent by assuring that he/she wears a helmet while driving the vehicle and is sober. A smart helmet and an alcohol detector can work that out. In this paper we are focusing on the use of finger print recognition to start or ignite the motorcycle against the use of conventional methods of key locks. Also emphasis is laid on the fact that the ignition of the engine of that respective vehicle won't start if the driver is drunk or not wearing a helmet. This paper also deals with the literature surveys carried out on several researches conducted on fingerprint locking system in two wheelers and some additional features related to the safety of the rider.

KEYWORDS —Fingerprint module, Microcontroller, LCD, GSM etc.

I.   INTRODUCTION

From past till present scenario, safety and security remains an issue of utmost importance whether it is related to human life or the materialistic things.

In this project we are making such a system which is providing more security to two-wheeler systems with the help of biometrics system. Passwords remain the weakest component of many important security systems, so there is a related push from many directions to supplement passwords with less fragile security measures. While pushing it has some effects, particularly in environments that require more security, it has failed to replace passwords the vast majority of computer user's still use passwords on a day-to-day basis. Since the security of passwords relies so heavily on user behavior, studies that empirically examine patterns of passwords creation and use remain important in the evaluation of security policies.

The main focus while developing the bike anti-theft system was to integrate the above features equally. The most significant feature is the vehicle security from theft and it has been ensured by providing three layers of anti-theft protection. First the entry to the vehicle is limited only to the authorized persons are stored into the database before hand and at the time of entry to the vehicle, scanned fingerprints are being cross checked with the database. The biometric scheme is used as the primary layer of protection. The second layer of protection is produced by GSM (Global System for Mobile Communication) technology is used. It sends SMS (Short Message services) [1] [3] to the owner if misuse of bike. If some person theft the bike, the place of vehicle is described by tracker. The third layer of protection is

GPS interfacing with the whole system such that if some takes our vehicle then we can detect the exact location of our vehicle,

Biometric system includes various types such as face recognition, voice recognition, fingerprint recognition, eye (iris) recognition. Among these techniques the fingerprint recognition is the most widely used. This is because fingerprint of every person on the earth is unique and can provide good reliability compared to the other conventional methods. Fingerprint biometrics are easy to implement. The two significant parts of fingerprint biometric system is Identification and Authentication. Fingerprint recognition or fingerprint authentication refers to the automated method of verifying a match between multiple human fingerprints. The process of identification tells you who the user is while the process of authentication tells you whether the user is valid or not. After this identification the next thing is safety of driver which is ensured by an alcohol detector which detects whether the driver is in a state of driving or not. Is the driver conscious or drunk? If the driver found then drunk then also the ignition will be cut-off.

This paper consist of the introduction followed by the multiple literary surveys followed by their comparison & at last the conclusion.

II.   LITERATURE SURVEY

Sudharsana Vijayan etal [6] in this paper the authors have laid emphasis on reducing the number of accidents caused by the carelessness of the riders (i.e. driving in a drunken condition or not wearing a helmet while riding a two wheeler). The authors have tried to implement an electronic technique which does not makes it very easy to bypass the basic rule of wearing a helmet & not consuming alcohol while riding.

The authors have designed a system which checks two conditions before turning ON the ignition of the bike. It includes an alcohol sensor (MQ3) and a helmet sensing switch which is used to detect whether the biker is wearing helmet or not. Alcohol sensor is used to detect whether the biker is drunk or not. The output of these two checks are fed to the microcontroller if both the checks give digital 1 the bike gets its ignition ON, if both or any one of the checks fail to give digital 1 there is no ignition.

The surface of the sensor is sensitive to various alcoholic concentrations. It detects the alcohol from the rider's breath; the resistance value drops leads to change in voltage (Temperature variation occurs).Generally the illegal consumption of alcohol during driving is 0.08mg/L as per the government act. Except for demonstration purpose, we have a tendency to program the drink limit as 0.04 mg/L. An ear lobe detector sense that is fitted with the helmet unit senses the blood flow within the ear lobe region. So the wearing of helmet is confirmed by our system and similarly alcohol sensor fitted in the mouth piece of the helmet.

Manjesh N etal [7] the authors have proposed a model for the accident prevention which states when the system is switched on, LED will be ON indicating that power is supplied to the circuit. The RF is used to start the two wheeler firstly it check whether the driver is drunken or not if drunken it will not allow to start two wheeler .The small voltage of ignition of the two wheeler is grounded. In normal condition when the helmet is used the pressure sensor is senses pressure and the RF transmitter radiates the FM modulated Signal. The RF receiver is connected with the two wheeler which is receive the radiated signal and activate the relay .The relay is remove the ignition wire from the ground and connected with the starter switch now the two wheeler will start. When driver met with accident vibration sensor sends message to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through a message. This message will be received using GSM modem present in the circuit. The message will give the information of longitude and latitude values. Using these values the position of the vehicle can be estimated.

Krutika Naidu etal [8] in this the author's tell about how to make two-wheelers secure from theft. The aim of this project is to alert the surroundings and the vehicle owner via buzzer and a text message about the theft of the vehicle. To check the authentication of the rider in this project a Fingerprint Biometric Module is used. If the fingerprint matches with the fingerprint stored then the ignition is turned ON by using a relay and if not then the alerting system comes into an action. There is also a reminder system attached in this project to remind the owner about the necessities and the formalities about the vehicle like air filling, insurance, servicing, etc. using a GSM modem. An LCD display is also

attached with the circuit to continuously indicate the status of the vehicle. The hardware used in the project is 89C51 microcontroller, LCD display, MAX 232 for serial communication between microcontroller and the memory, GSM modem and a Buzzer.

Manjesh N etal [9] a smart helmet is an innovative concept which makes two-wheeler driving safer than before. This project focuses on whether the helmet worn or not? , is the rider riding drunk or not? And did he met with any accident?

In the project a pressure sensor is used to detect whether the rider is wearing helmet or not and accordingly send the RF signal to the receiver. Similarly an alcohol detector is used to check whether the driver is drunk or not and do the needful. For the detection of accident a vibration sensor is attached with the helmet which will sense a vibration at the time of accident of the rider and send the location and a text message to the mobile number defined in the memory of the GSM module. The GPS module will send the latitude and the longitude of the driver to the GSM module which will be forwarded through the message to the mobile number. An LCD display is attached also to indicate the messages and present condition of the helmet and the rider. The components used are P89V51RD2 microcontroller, Alcohol detector, LCD display, Pressure sensor, Vibration sensor, Relay, GSM & GPS module.

Nimmy James etal [10] the authors of this paper reveals how an alcohol detector provides a unique method to curb drunken people. The designed system detects the content of alcohol in the breath of the rider and thus it attempts to clamp down alcoholics. This device provides much advanced facilities in the present day life as it can easily be implemented in vehicles.

The alcohol sensor, which detects ethanol in the air is one of the straight forward gas sensors so it works almost the same way with other gas sensors. Typically, it is used as part of the Breathalyzer or breath testers for the detection of ethanol in human breath.

This sensor measures the content of alcohol from the breath of drunken people. The sensor delivers a current with linear relationship to the alcohol molecules from zero to very high concentrations. Output of the sensor is directly proportional to the alcohol content. When the alcohol molecules in the air meet the electrode that is between alumina and tin dioxide in the sensor, ethanol burns into acetic acid and more current is produced. So more the alcohol molecules, more will be the current produced. Because of this current change, different values from the sensor are obtained. Output of the sensor is then fed to the microcontroller for comparison. The output of the sensor is in the analog nature which needs to be converted into digital format. This is done by the analog to digital converter of the microcontroller unit. The microcontroller controls the entire circuit.

When embedded in automobiles, each time the driver starts ignition, the sensor measures the content of alcohol in his breath and if the driver is found drunk, the system automatically switches off the vehicle which will stop the drink and driving offenders. Thus alcohol related road accidents can be reduced and hence these kinds of detectors have a great relevance. They can also be used in schools, colleges, offices and some public places such as hospitals, libraries etc.

K. DineshKumar etal [11] in modern days a vehicle antitheft system is of prime importance. The safety of vehicle is extremely essential for public vehicles. First layer of protection in system is fingerprint recognition, based on which locks are opened. Fingerprint matching is done by using a finger print module. If finger ridges match, solenoid valve is open for fuel supply and also a message is sending to owner by GSM. If finger ridges doesn't match it makes vehicle immobilized and an alert message is sent to mobile of owner. If the vehicle is stolen by someone, place of vehicle can be identified by the GPS tracker. This system is more secured, reliable and of low cost. The experimental results proved the functionality of antitheft in working environment. On March'15, three students of bachelor of technology ECE dept. Worked on above stated technology under guidance of Mr. Raghuvaran, ME dept. After working on such technology they published a paper mentioning the introduction, history contribution and future scope of such technology. There model can be modified by attaching some circuitry for rider safety also in the form of helmet or driver monitoring system with alcohol detector attached with the microcontroller.

Vaishnavi Khadasane etal [12] Project is to create authentication system for two wheelers based on most popular biometric that are nothing but finger print recognition of finger print is based on certain factors such as unique patterns, reference points etc. Project consists of AVR microcontroller ATmega328, finger print scanner module and GSM module. As soon as finger print module acquires finger print, finger print module immediately interacts with microcontroller and check if finger print is

valid or not. If it is valid, the ignition system is started provided sufficient fuel must be present. If invalid then a message will be sent to owner of vehicle using GSM module. On March 2016, four students from Electronics Engineering Department, Mumbai University work on above stated technology and published this paper. There model can be further modified with attaching a GPS Tracker along with GSM to get the exact location if vehicle in case of theft.

Prof. P. H. Kulkarni etal [13] The authors of this respective paper aims at designing an embedded system for implementing an efficient alcohol detection system that will be useful to avoid accidents. There are many different types of accidents which occur in daily life. Accidents may be caused due to many reasons. It may be due to some failure in the mechanism of the vehicle such as a brake fail, or due to the recklessness of the driver in most of the cases. In many of the accident cases, the driver is found drunk which contributes to a large proportion of road accidents. Though there are laws to punish drunken drivers but they cannot be implemented absolutely. For instance the traffic police cannot be everywhere to keep a check on whether the driver is sober or not. This can be a major reason for accidents. So there is a need for an effective system to keep a check on the soberness of the drivers.

Therefore in order to avoid these accidents the authors have implemented a prototype project. In that project, it is checked whether the person is drunk or sober by using the MQ3 GAS sensor. In this system, sensor circuit is used to detect whether the alcohol was consumed by driver or not. To that very end, a system is designed which regulates the ignition of a car on the basis of the soberness of its driver. What the system does is that when some alcohol concentration is detected in the breath of the driver, the car will be stopped and the related information will go to a nearby location through GSM. The project is based on EMBEDDED C programming using AVR ATmega16 microcontroller.

The alcohol detector (MQ3) as stated in the paper is suitable for detecting alcohol concentration just like your common breath analyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration which is given to inbuilt ADC of microcontroller.

III.   CONCLUSION

Fingerprint identification enhances the security of a vehicle and makes it possible only for some selected people to start the vehicle. The rider safety system ensures that the rider cannot start the vehicle if he is drunk or not wearing a helmet. This system can offer a number of advantages when implemented in two wheelers, like- only the authorized person will be able to ignite the motorcycle. Not every person with the key will be able to start the vehicle. There will be matching of the person's data with the one already stored and only when the match is found, the bike will start otherwise not and that too only when the driver is sober and is wearing a helmet.

Thus by implementing this relatively cheap and easily available system on a vehicle one can ensure much greater security of the vehicle as well as safety of the rider and exclusivity than that offered by a conventional lock and key. The thief would have to do a great deal of homework to steal the bike, and it is unlikely that they have the fingerprint technology needed to fake your fingerprint.

Intelligent two wheeler and rider safety system will also help in tracking the two wheeler if it gets stolen or dragged somehow by a thief by simply sending an SMS to the owner about the present location of the vehicle and the status that the vehicle is being touched by someone.

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