International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 03 | March - 2021 ISSN: 2582-3930

MATLAB BASED REAL TIME DROWSINESS AND FATIGUE DETECTION FOR BIKERS USING HELMET

Dr. A. Rajasekaran[1], D.Prasanth[2], B.Harish Chowdary[3], B. Nikhil Chowdary[4]

[1]Assistant Professor, Department of Electronics & Communication Engineering, SCSVMV, Kanchipuram , India

[2,3,4]UG Scholar, Department of Electronics & Communication Engineering, SCSVMV, Kanchipuram , India

---

Abstract: *Nowadays most of the countries are enforcing their citizen to wear helmet while riding bike and to not ride bike when the person is under the influence of alcohol, but still rules are being violated. so as to beat this problem, "Accident Detection, Theft and Drive protection using Intelligent Wireless Safety Helmet" is developed. It consists of an intelligent system embedded into the helmet and therefore the vehicle. Helmet unit ensures that the rider is wearing helmet and not under the influence of alcohol throughout the ride. It communicates with vehicle unit to modify off ignition of motorcycle if above condition isn't met. Vehicle unit checks and intimates accident through geometric coordinates via Short Message Service. By using geometric coordinates, location of the in juried rider are often traced using simple Global Positioning System tracking application. Also, this technique provides theft protection as helmet is additionally essential along side key to start out bike.*
Keywords: ATMEL Microcontroller, Arduino, GSM, GPS.

INTRODUCTION

Nowadays there are many accidents occurred in our lifestyle . This technique is especially for the safety purpose and safety for the bike riders against the accidents. the primary step during this system is to see whether the helmet has been wear or not ,the bike won't start unless the rider wears the helmet for this we choose FSR sensor which can sense the pressure and force. The camera within the bike will check whether the rider had wear the helmet or not. The second step is to spot whether the rider has consumed the alcohol or not. An alcohol sensor will check the alcohol in rider's breath, so as to stop the accidents thanks to drunken and driving which cause tons of accidents[1]. Alcohol sensor is use as breath analyzer which detect the presence of alcohol in rider breathe if it's exceeds permissible range ignition cannot start. it'll send the message to register number. For this only choose MQ3 alcoholic sensor. These two steps are utilized in helmet unit. Third step is, just in case of any accidents GPS system within the bike unit will globally locate the rider and immediate message are going to be sent to the relations or local authorities about the situation of the accident. For this choose vibration sensor which can sense the pressure of the bike. The aim of this paper is to form a protection system during a helmet for an honest safety of motorcycle rider. The smart helmet that's fixed with sensors which act on detect wear helmet or not. There are two different microcontroller is employed during this project[4]. Each unit has used a separate microcontroller, for bike unit ATMEL microcontroller is employed . Signal transmission between the helmet unit and bike unit is using a RF concept.

II. RELATED WORKS

In India still most of the people prefer two wheelers compared to other sort of vehicle thanks to simplicity and its low cost. One important problem is bike riders suffer from inadequate roads and bad driving conditions. Other important problem with bikers is that the majority of the time they don't wish to wear helmet which might be fatal when accidents happen. Two wheelers in everyone's life play vital role, moreover the security is taken into account to be primary of all. consistent with some statistics 50% of accident occurs thanks to bad conditions of road and not wearing helmet[2]. To avoid accidents and to encourage people to wear helmet is to be introduced that has smart interactive robotic helmet with features like road hazard warning, wireless bike authentication and traffic adaptive mp3 playback. This helmet will warn the

rider when road hazard is ahead, helmet also will communicate with rider if he's not wearing it and can perform wireless bike authentication that act as prevention from theft. it'll also adjust the quantity of the speakers automatically while rider is taking note of music as a security precaution. Since in India the usage of two wheelers is more compared to four wheelers, it requires more attention as far as safety cares . Safety-along with security plays an important role in today's society. The goal of this Anti-theft mechanism system is to style embedded safety and security system for vehicle by integrating and modifying existing modules. this technique endures mainly with three modules namely Gas sensing module, Obstacle detection module and Anti-Theft alert system; these are interfaced with ATmega16 microcontroller. IR sensors transmit signal from its sensor head and again receive the signal reflected from an obstacle and instruct the microcontroller which alerts the driving force with an alarm and controls the vehicle by stopping it. The gas sensor here is mounted inside the vehicle such it senses the presence of the gases inside the vehicle cabin if there's any increase within the level of the toxic gases it informs to the microcontroller which alerts the persons inside the vehicle with an alarm and also sends a SMS to the authorized user through GSM[3] At an equivalent time automatic ventilation are going to be provided to the vehicle. When an unauthorized person opens the door , the car anti-theft system becomes active and provides indication by raising an alarm that the car is being under theft. This design and implementation of intelligent bike system is aimed toward making vehicle driving safer than before. this is often implemented using arduino. The driver's condition springs in real time environment and therefore the detection of alcohol is proposed using alcohol detector connected to arduino such when the extent of alcohol crosses a permissible limit,the vehicle ignition will close up and therefore the GPS module will capture this location of the vehicle[5]. Also the GSM module will automatically send distress message to police or relations . Disadvantage of current technology is thanks to negligence of rider and difficulty of implementation of traffic rules by traffic police. Following are the most drawback of existing technology

• Rider don't wear helmet in regions where the traffic checking isn't done.
• There may be a tendency of the driving force to wear helmet only where the anticipate checking may happen , else they are doing not wear helmet where no checking is completed .
• The vehicle are often turned on and stolen by bypassing the switch .
• Testing alcohol content present in blood in each individual rider in big countries like India is nearly impossible .

diagram OF PROPOSED SYSTEM

The system mainly consists of two major units. the 2 units are

• Helmet unit
• Bike unit

HelmetUnit

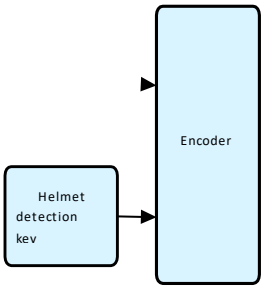

Fig. 1: Block diagram of Helmet Unit

Microcontroller is that the flash type microcontroller during which already programmed to regulate the ignition of motorcycle supported the decoded value of the encoded signal from smart helmet. It consists of Helmet Detection Key, Alcohol sensor, Encoder as shown in figure 1.

BikeUnit

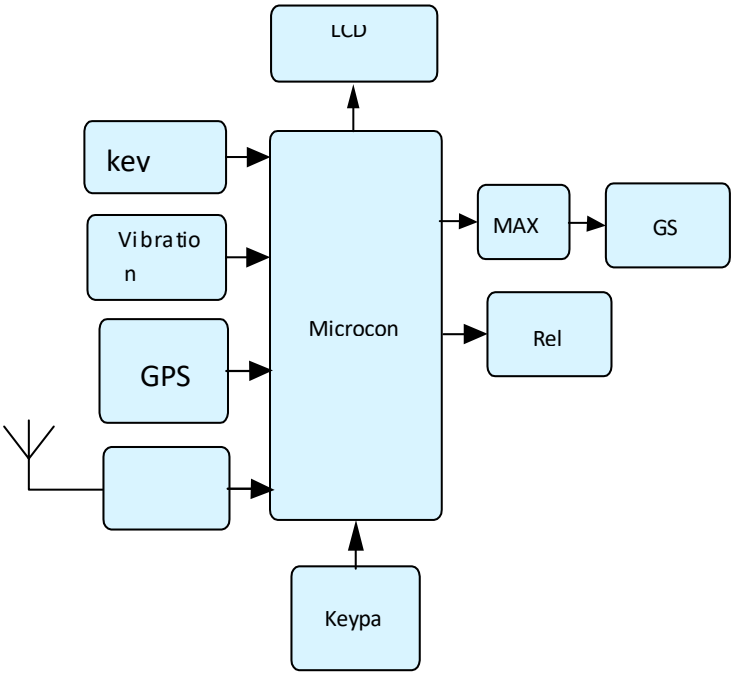

Fig.2:Block diagram ofmotorcycleUnit

This module helps the rider to drive with full safety by allowing the rider for ignition of motorcycle as long as rider wears the helmet and not drunken alcohol, for doing this the helmet is given alcohol sensor and helmet detection key. The alcohol sensor is capable of detecting the alcohol consumed by the rider and therefore the helmet detection key's wont to identify whether the rider wears the helmet or not. The key and therefore the sensors were connected to an encoder, therefore the values sent by the alcohol sensor and therefore the key were sent as encoded signal from the smart helmet, which is decoded within the bike circuit to make a decision whether to permit the person for ignition or not[6]. The ignition is controlled by the microcontroller through the relay circuit. albeit the key is turned on, the on signal is given only to microcontroller, the microcontroller check for the security of the rider, if the rider found to be not wearing helmet or seems drunken they the controller not tell the relay to show on the ignition, otherwise the controller asks for the rider to enter the password using the keypad for authenticating the rider and if the authentication is successful, relay is allowed to show on the ignition. If the rider enters the password wrongly, then the bike alerts the user with a SMS using GSM module[7]. In any case if the rider met an accident, supported the vibration obtained from the vibration sensor the accident is identified by the controller and sends an emergency aware of the hospital by sending as SMS to hospital number with the GPS location obtained from the GPS module as shown in figure 2.

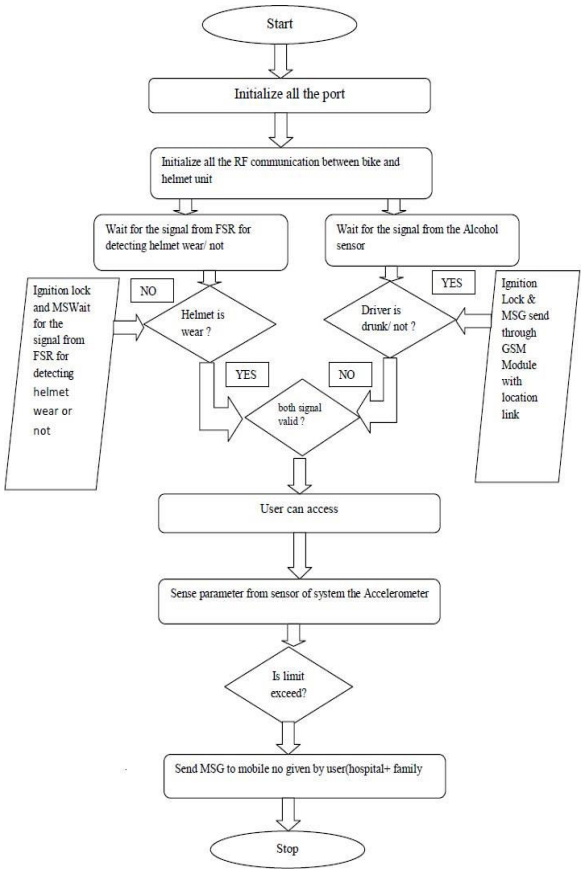

Fig. 3: Flowchart of the Proposed System

Figure 3 shows the flowchart of the proposed system. The flowchart describes the functionality of the "Accident Detection, Theft detection and drive protection using intelligent wireless safety helmet". The helmet unit conditionally checks "Helmet Wearing" and "Alcohol Sensing". If condition is met then helmet unit sends affirmative signal to bike unit through RF communication[8]
.There after the vehicle start moving. When accident happen then GSM module sends location using GPS to saved contact list.

IV.RESULTS AND DISCUSSIONS

With the assistance of helmet detection key ,driver without helmet are often avoided. If rider doesn't wear helmet then the LCD will display as "NO HELMET PLS WEAR IT" in figure 4.

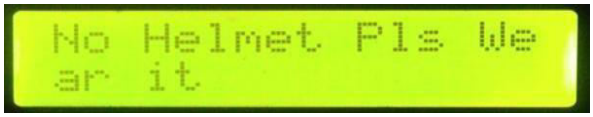

Fig.4: Helmet Detection Result

If RF module isn't in range or it's not been switched on then the output are going to be in figure 5.

Fig.5: Password Detection Result

Illegal consumption of alcohol during driving is 0.08 mg/L as per the govt act except for demonstration purpose, it's programed to the edge limit 0.04 mg/L .threshpld are often adjusted using potentiometer. If sensitivity of MQ-3 is more 0.04 mg/L of alcohol in breath then the helmet unit will communicate with vehicle unit and show"Driver is drunken"thereafter the ignition get transitioned as shown in figure 6.

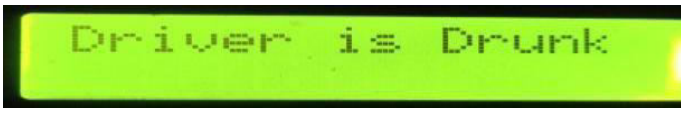

Fig. 6: Alcohol Detection Result

Arange of frequency generated depending upon the vibration produced thanks to accident or obstacle .if the frequency is bigger than the edge value then vehicle unit shows "Bike has fallen"as shown in figure 7.

Fig.7: Accident Detection Result

Once vehicle unit detected that there was an accident then Gsm sends location of accident with the assistance of GPS .It sends latitude and longitude continously to saved SIM number as shown in below figure8.

Fig. 8: Accident Intimation Result

The helmet unit shows in figure 9 receives the availability from internal source. the primary stage of helmet unit checks whether the top is touch with helmet or not. If it touches with head,it enables the alcoholic sensor to see the alcohol consumption of an individual . supported the Ethane content within the breathe,the alcoholic sensor detects the drunken person. If an individual is drunken,the encoder won't send signal to the decoder. it'll automatically lock the ignition .

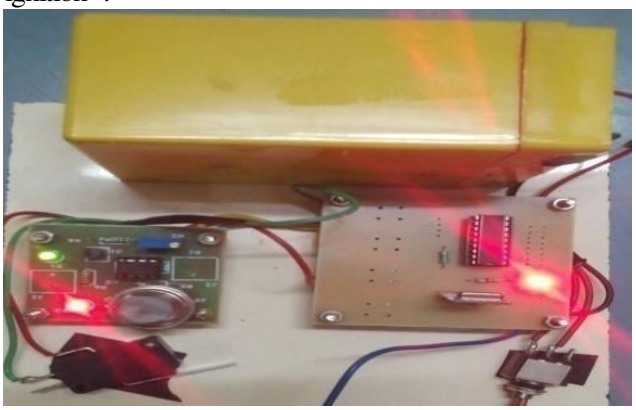

Fig. 9: Helmet Unit

Figure 10 shows the bike unit construction. If the decoder receives the signal from helmet unit,it will advance to a security system. If rider enter an encrypted password, it enables the ignition through relay.Otherwise, it locks the ignition . If any accidents occures, the vibration sensor senses the vibration value[9]. If it reaches the edge value, it'll sends a sign to microcontroller and GSM. The SMS will sent to a registered mobile number through GSM[10]. The accident location will sent to a registered mobile number through GPS supported latitude and longitude value.

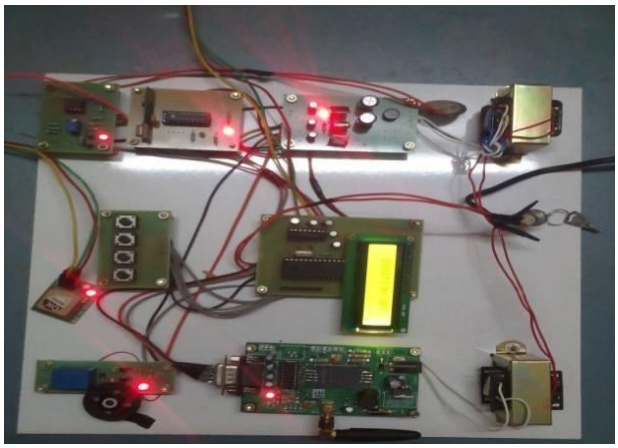

Fig.10:BikeUnit

V.CONCLUSION

The developed system efficiently ensures. Rider is wearing helmet throughout the rider. Rider shouldn't be under influence of alcohol, Accident detection &theft protection. By implementing this technique a secure two wheeler journey is feasible which might decrease the top injuries during accidents and also reduce the accident rate thanks to driving bike after consuming alcohol. A helmet isn't be 100% foolproof but it definitely the primary line of defence for the rider just in case of an accident to stop fatal brain injuries. The proposed approach makes it mandatory for the ruder to use this protective guard so as to drive a two wheeler vehicle and ensures the security of human brain and thus reduces the danger of brain injuries and deaths just in case of an accidents. Besides the developed system prevents the theft of two wheeler.

REFERENCES

1. Amitava das and SoumitraGoswami [2015],"Design And Implementation of Intelligent Helmet to stop Bike Accident In India".
2. E.D.Dekiaris, A.Spadoni and S.I.Nikolaou,May 2009,"New safety and luxury in powered two wheelers".
3. Harish Chandra Mohandas, Raja Kumar Mahapatra and Jyotirmayee Module (2014)", Anti-Theft Mechanism System with Accidental Avoidance and Cabin Safety System for Automobiles", International Refereed Journal of Engineering and Science (IRJES), Vol. 3, No. 4.
4. M.Pieve,F.Tesauri and A.Spadoni,May 2009,"Mitigation accident risk in powered two wheelers:Improving effectiveness of human machine interface collision avoidance system in two wheelers"
5. Orace, V.S.Reinhardt and S.A Vanghn, "Integrated disease Surveillance Project –Project Implementation plan", 2004.
6. Ping Li, RamyMeziane, Martin J.-D. Otis, Hassan Ezzaidi, September 2015" a sensible Safety Helmet using IMU and EEG sensors for worker fatigue detection" REPARTI Center, University of Quebec at Chicoutimi Chicoutimi, Canada Email: Martin_Otis@uqac.ca Philippe Cardou REPARTI Center, Laval University Quebec, Canada
7. Prof.PratikshaBhuta,KaranDesai,ArchitaKeni, "Alcohol Detection and vehicle controlling",International journal of Engineering Trends and application, 2015.
8. Prof.Sudarsan .K and Kumaraguru . P (2014), "Helmet for Road Hazard Warning with Wireless Bike Authentication and Traffic Adaptive Mp3 Playback", International Journal of Science and Research (IJSR), Vol. 3, No. 3, ISSN.
9. Prof.Sudarshanraju,Manjesh, January 2015 "Two Wheelers By Smart Helmet and 4 Wheelers by Vehicular Communication", International Journal Of Engineering Research, Hindupur.