A REVIEW ON SMART RIDING HELMET

[1]Rishi Kant Dixit, [1]Purushottam Kumar, [2]Neeraj Gupta, [2]Arun Kumar Singh
[1]Student, B.Tech. , [2]Assistant Professor
[1]Department of Electronics & Communication engineering
[1]Amity University Haryana, Gurugram, India

Abstract : The intention of this paper is to explain about the concept of a smart helmet which will perform various functions in order to ensure the safety of the rider. In this research paper, the previous models of the helmets that were introduced before have been explained in brief and the proposed smart helmet model is explained.

IndexTerms **- Alcohol sensor (MQ-3) sensor, Bluetooth, encoder, decoder.**

1. INTRODUCTION:

There are a lot of accidents that take place due to drunk driving and every year, thousands of lives are lost due to this. Another cause of death is that in remote locations, if an accident occurs there is no help which can be provided to the rider. Human lives are lost due to negligence and this leads to loss of productivity and pain to family members. This concept if implemented properly can be extremely helpful and prevent many such future accidents.

2. BACKGROUND STUDY:

There were a lot of proposed models before the implementation of our model. The primary objective involved with each helmet is the same that is ensuring safety to the rider.

2.1 SIMPLE HELMETS:

The aim of these simple helmets is to perform the main function of providing safety to the rider, protect the rider's head during collision or accident and also prevent fatal injuries which may ultimately result in the death of the rider.
These types of helmets can be categorized into different categories such as full face helmet, open face helmet and half face helmet.

2.2 HELMETS WITH BLUETOOTH SENSORS:

The second advancement in helmet technology was bluetooth helmets. Bluetooth technology has eliminated the need of wires to transmit data from one user to another. The Bluetooth helmets were proposed so that the rider can attend a call without holding the cellphone.
Bluetooth helmets make use of piconets which are short range networks which are used to establish connection between two compatible devices. The advantage of Bluetooth helmets is that the signal strength is very strong and the battery life is very good [1].

2.3 HELMETS WITH ALCOHOL SENSORS:

In order to improve the safety on the roads and also to reduce accidents due to drunken driving, helmets were proposed which had alcohol sensors. The basic ideology behind the construction of such helmets was if the alcohol sensor detected the presence of alcohol in the rider's breath, then the bike engine will not start.
The system includes the alcohol sensor MQ-3 and a helmet sensing switch which is like a clip. The function of the clip is to detect whether the rider is wearing the helmet or not. Alcohol sensor is used to detect whether is rider is drunk or not. The alcohol sensor (MQ-3) is connected to the microcontroller unit via an interfacing unit. The clip is connected to the microcontroller unit directly. The microcontroller unit is used to control the functions of every element in the system. The alcohol sensor gives an analog output based on the alcohol concentration to the microcontroller unit. The microcontroller unit obtains signals from all the sensors and processes it and manipulates it and converts it to digital signal to be passed to the encoder. The bike engine will start only when the clip is inserted and there is no alcohol concentration is less than the set value [2].

2.4 SMART HELMETS USING ALCOHOL SENSORS AND SPEED SENSING ALARMS:

In order to improve the safety on the roads and also to reduce accidents due to drunken driving, helmets were proposed which had alcohol sensors. The basic ideology behind the construction of such helmets was if the alcohol sensor detected the presence of alcohol in the rider's breath, then the bike engine will not start.
The second safety method that was introduced was installing an alarm which detects the bike speed and if the speed is more than a certain value for eg 90kmph, there will be a buzzer which will go off and LED will indicate increased speed.
Hence, by these techniques the biker will be alerted.
The microcontroller used here is PIC 16F84A which controls the entire system . The main sensors used in this system are Force Sensing Resistor and Brushless Direct Current Fan (BLDC Fan).
The force sensing resistor is used to sense whether the rider is wearing the helmet or not.
The brushless direct current fan is used for speed sensing purpose. The advantage of using BLDC fan is that they are highly efficient [3-4].

3. PROPOSED SYSTEM:
The proposed system is a modification of the previous systems. We have seen smart helmets which have Bluetooth, alcohol sensors and also those systems which use alcohol sensors and speed sensing alarms.
The new system proposed uses three sensors.
The three sensors that are used are:
1. MQ 3 alcohol sensor.
2. Helmet clip
3. Accelerometer

The MQ-3 alcohol sensor used in the transmitter section performs the role of sensing and detecting the alcohol concentration in the breath of the rider.
If alcohol is detected, then an SMS will be sent to the registered SIM number by the GSM module and also the dc motor which is a part of the receiver section will not start and the buzzer will start ringing.
If the helmet clip is not inserted, the DC motor will not start.
The role performed by the accelerometer is that being a part of the helmet unit, it senses a sudden jerk in x,y direction and if it crosses the threshold, then an SMS will be sent to the registered SIM number of the rider's family member through the GSM module [5].
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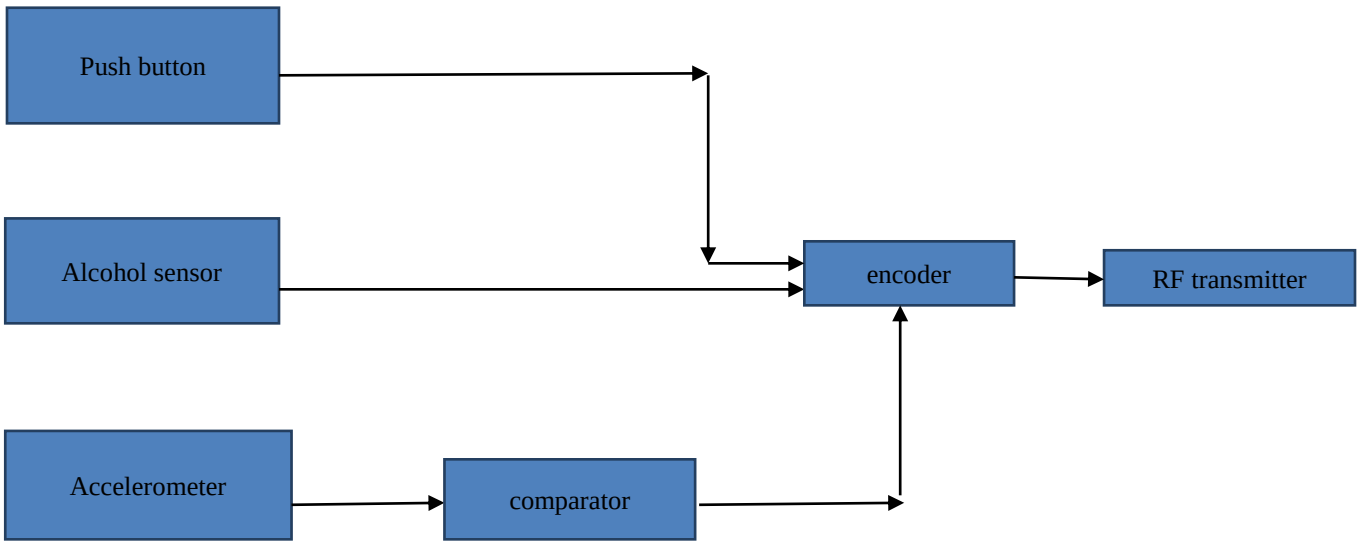
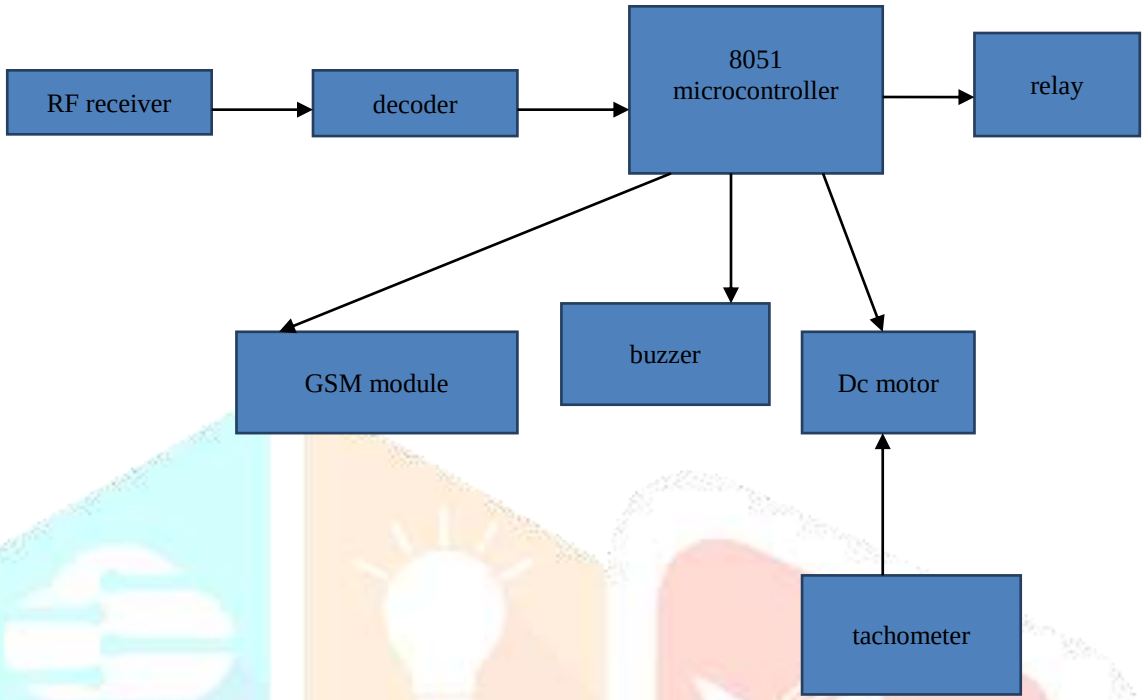
4. FLOW CHART DEMONSTRATING ACTION FLOW IN THE PROPOSED SMART HELMET SYSTEM:
The system is divided two units.
1.Helmet Unit.
2.Vehicle Unit.

As shown in the figure, the push button senses the wearing of helmet .The alcohol sensor senses the alcohol in the breath. Accelerometer senses the sudden tilting of helmet. Comparator converts the analog values of accelerometer into digital values. All the outputs are sent to inputs of encoder. Encoded values are sent to RF transmitter.



Output of RF transmitter is fed into H12D decoder. The decoded values are fed into the microcontroller. If the driver is drunk, then microcontroller put on the buzzer and sends the SMS to the registered contact number by GSM module. If driver wears the helmet then the relay actuates the DC motor. Tachometer checks the RPM of wheel.



5. CONCLUSION:

This helmet can reduce number of road accidents that takes place every day. The helmet will provide safety to the rider which will eventually reduce the death rate. This helmet, if made mandatory by the authorities will be a great boon to the society.

6. REFERENCES:

[1].Sudhir Rao Rupanagudi, Sumukha Bharadwaj, Varsha G. Bhat, S. Eshwari, S. Shreyas, B. S. Aparna, Anirudh Venkatesan, Amrit Shandilya, Vikram Subrahmanya, Fathima Jabeen, "A novel video processing based smart helmet for rear vehicle intimation & collision avoidance", *International Conference on Computing and Network Communications (CoCoNet)* , pp. 799-805, 2015.

[2].Chun-Lung Chiu; Chen, Y.-T.; You-Len Liang; Ruey-Hsun Liang; , " Optimal Driving Efficiency Design for the Single-Phase Brushless DC Fan Motor ", IEEE Transactions on Magnetics, vol.46, no.4, pp.1123-1130, April 2010

[3]. Wei-Chao Chen; Ying-Yu Tzou; , "Current-mode sensorl ess control of single-phase brushless DC fan motors," IEEE Ninth International Conference on Power Electronics and Drive Systems (PEDS), vol., no., pp.659-663, 5-8 Dec. 2011.

[4]. Constantinos Patsakis, Achilleas Papageorgiou, Francisco Falcone, Agusti Solanas, "s-health as a driver towards better emergency response systems in urban environments", *IEEE International Symposium on Medical Measurements and Applications (MeMeA)*, pp. 214-218, 2015.

[5]Kagami, S.; Takahashi, Y.; Nishiwaki, K.; Mochimaru, M.; Mizoguchi, H.; , " High-speed matrix pressure sensor for humanoid robot by using thin force sensing resistance rubber sheet, " Proceedings of IEEE Sensors, vol., no., pp. 1534-1537 vol.3, 24-27 Oct. 2004

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