HELMET MONITORING SYSTEM FOR AVOIDANCE OF ROAD ACCIDENTS

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ABSTRACT

In todays world speeding, drunk driving and low use of helmets, seat belts and child restraints in vehicles are the main contributing factors. Every hour, 40 people under the age of 25, die in road accidents around the globe. Here a system is designed which checks the conditions before the engine of the bike is turned ON.System includes an alcohol sensor and IR sensor.On LCD display,instruction will display as wear helmet.The switch is used to detect whether the biker is wearing helmet.Alcohol sensor is used to detect if the biker is drunk, the output is fed to the MCU. Further if the biker is drunk, MQ3 is used here for detecting the alcohol concentration present in the driver's breath. Sensor provides an Analog resistive output based on the alcohol concentration.For switching purpose two wires are used.When the helmet is properly placed,the wires are short circuited and the engine turns ON.MCU is the controller unit,which controls all the functions of other blocks in this system.MCU takes or read data from the sensors and controls all the functions of the whole system by manipulating these data.

Keyword :- *Alcohol detection, Drunken Driving, Helmet detection, Intelligent system,LCD , Microcontroller, RF transceiver, Safety, Sensor*

1. INTRODUCTION

In today's world road accidents stand among the leading cause of human death. According to the World Health Organization, road traffic injuries caused an estimated 1.24 million deaths worldwide in the year 2010, slightly down from 1.26 million in 2000. That is one person is killed every 25 seconds. Only 28 countries, representing 449 million people (7% of the world's population),have adequate laws that address all five risk factors (speed, drink–driving, helmets, seat- belts and child restraints). According to the first ever Global Status Report revealed by the World Health Organization (WHO), road accidents have earned India a dubious distinction.With over 130,000 deaths annually, the country has overtaken China and now has the worst road traffic accident rate worldwide. The fatal accidents that occur outside the cities are due to drunken driving and there is no check on this kind of drunken driving. Unfortunately, drivers think they are fully armed to drive on the roads when they are fully drunk.Until and unless country comes up with a new method of checking drunkenness on the road, these fatalities cannot be lessened. Campaigns against drunken driving have not proved effective.

The Indian Motor Vehicle Act mandates a legal limit of 30 mg / 100 ml and recommends fines and/or imprisonment for transgression.Implementation is poor,however,and the little enforcement that takes place is non-random in geographical coverage, non-visible,and non-uniform.There has been very little attention given to the aspect of early detection and brief intervention at the level of primary health care providers, emergency room personnel or the police.Application of electronics in the automobile field is very much popular now.People usually prefer motorbikes to buy over 4 wheelers because of the lower prices of the components used and various varieties available in the market.Hence road safety becomes a major issue of concern.Therefore it becomes necessary to implement such a technique which is not easy to bypass the basic rule of wearing helmet and to avoid drunken

driving.Here designed a system which checks the two conditions before the engine of the bike is turned ON.The system includes an alcohol sensor and a helmet sensing switch.

2. LITRETURE REVIVEW

Due to the importance of smart helmet, Researchers have proposed a number of methods and several fingerprint matching approaches. Few of them are as follows:

A helmet is a form of protective gear worn to protect the head from injuries. More specifically, a helmet aids the skull in protecting the human brain. Ceremonial or symbolic helmets (e.g. UK policeman's helmet) without protective function are sometimes used. The oldest known use of helmets was by Assyrian soldiers in 900 BC, who wore thick leather or bronze helmets to protect the head from blunt object and sword blows and arrow strikes in combat. Soldiers still wear helmets, now often made from lightweight plastic Material.The word helmet is diminutive from helm, a medieval word for protective combat headgear.The medieval great helm covers the whole head and often is accompanied with camel protecting throat and neck as well.Originally a helmet was a helm which covered the head only partly.Most of the accident occur due to drinking and then driving bikes and death caused due to neglecting helmet.Government adopted few measures like helmet and alcohol checking by traffic police but are hardly useful.The statics of law breaker is depicted below in table.

LAW BREAKER	TWO WHEELER	FOUR WHEELER
Signal Jamming	220859	146945
Drunken	36727	17837

Hongjie Leng and yingzi Lin[1],have proposed Excessive alcohol content in human body can impair ability,degrade performance,and result in serious diseases.Nonintrusive and real-time sensing of alcohol content in human body is thus an important research topic.They described the development of a novel carbon nanotube (CNT)-based alcohol sensor with a particular focus on the response delay problem presented in CNT based sensors.They further implied a great promise of single-walled carbon nanotube with metal pads as alcohol sensors,as the metal pad is an important element to facilitate data reading.

Ping Li,Ramy meziane[2],have proposed that head gesture and brain activity can reflect.some human behaviors related to a risk of accident when using machine-tools.They have worked upon reducing the risk of injury and thus increase worker safety.Instead of using camera,they presented a Smart Safety Helmet (SSH) in order to track the head gestures and the brain activity of the worker to recognize anomalous behavior.Information extracted from SSH is used for computing risk of an accident (a safety level) for preventing and reducing injuries or accidents.A haptic device, such as vibrotactile motor, is integrated to the helmet in order to alert the operator when computed risk level (fatigue, high stress or error) reaches a threshold.Once the risk level of accident breaks the threshold, a signal will be sent wirelessly to stop the relevant machine tool or process.

Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari [3],have proposed the impact when a motorcyclist involves in a high speed accident without wearing a helmet is very dangerous and can cause fatality.Wearing a helmet can reduce shock from the impact and may save a life.There are many countries enforcing a regulation that requires the motorcycle's rider to wear a helmet when riding on their motorcycle,Malaysia is an example.With this reason, this project is specially developed as to improve the safety of the motorcycle's rider.Motorcyclist will be alarmed when the speed limit is exceeded.A Force Sensing Resistor (FSR) and BLDC Fan are used for detection of the rider's head and detection of motorcycle's speed respectively.PIC16F84a is a microcontroller to control the entire component in the system. Only when the rider buckled the helmet then only the motorcycle's engine will start. A LED will flash if the motor speed exceeds 100 km/hour.

I.V.N.S Aditya, Radha Krishna Murthy, Lt. Ravindra Babu Kallam[4],have proposed an intelligent system that has been embedded in the helmet itself.The signal detected by IR sensor from the earlobe region and an alcohol

sensor will be transmitted to the vehicle control circuit.It will not turn on the vehicle, when the user is without helmet or in drunken condition.The system containing the GPS receiver. In addition to the above,when an accident occurs the system will start alarm and if the user tries to suppress the warning alarm then SMS will not be sent else it will be sent to the user's relatives/friends. During the theft,the current location of the vehicle can be identified by sending the message from the user to the intelligent incorporated system.By this way the recovery of the vehicle is also possible by GPS-GSM communication.

Al-Bayari,O.,B.Sadoun[5],proposed Recent advances in wireless communications and networks have integrated relatively new technologies such as Global Positioning System (GPS),to the popular Global System for Mobile Communication (GSM),second generation cellular systems and the Geographic Information Systems (GIS) technologies.Automatic Vehicle Location (AVL) is based on a combination of GPS, GIS and telecommunication technologies. Automatic Vehicle Tracking systems are more and more used for different purposes, especially those related to tracking one vehicle or a fleet of vehicles.In this work, we introduce a new AVL system, which is based and developed under GIS software environment. The centralized software at the control station offers a new technology of transferring the intelligence of tracking system from the car unit, into the control office PC software. Centralized software will reduce the programming efforts in the car unit and will offer better fleet management. Moreover, the core of our system is based on the objects or the controllers of the GIS software, which reduces dramatically the overall system cost. Our system provides an easy access to change the functions of the system, with great possibility to satisfy the local needs.

Harish Chandra Mohanta, Rajat Kumar Mahapatra and Jyotirmayee Muduli[6],have proposed Safety-along with security plays a vital role in today"s society. The goal of this project is to design an embedded safety and security system for vehicle by integrating and modifying existing modules. This system 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 driver with an alarm and controls the vehicle by stopping it. The gas sensor here is mounted inside the vehicle such that it senses the presence of the gases inside the vehicle cabin if there is any increase in 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. At the same time automatic ventilation will be provided to the vehicle. When an unauthorized person opens the car door, the car anti-theft system becomes active and gives indication by raising an alarm that the car is being under theft.

3. System Architecture

AT89s52

The AT89s52 is a low-power,high-performance CMOS 8-bit microcontroller with 8k byte of in system programmable Flash memory.The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer.

Transformer

Step-down transformer is one whose secondary voltage is less than its primary voltage. It is designed to reduce the voltage from the primary winding to the secondary winding. This kind of transformer "steps down" the voltage applied to it.As a step-down unit,the transformer converts high-voltage,low-current power into low-voltage,high-current power.

LCD Display

Liquid crystal display(LCD) which has been used is 2x16 LCD.I.e. two lines with 16 characters.The LCd has been used in 8bit mode i.e. 8 data lines are required.Other than 8 data line one Rs, one RW & one enable line is also required.

RF Transceiver

Receiver and Transmits serial data over RF.It is possible to use this board with another RF board at TTL level to get MCU to PC RF data link.RF modem can be used for application that need two way wireless data transmission.It features high data rate and longer transmission distance.The module can be embedded to your current design so that wireless communication can be set up easily.

IR Sensor

Proximity sensor is used to detect objects and obstacles in front of sensor.Sensor keeps transmitting infrared light and when any object comes near,it is detected by the sensor by monitoring the reflected light from the object.

Alcohol Sensor

This alcohol sensor is suitable for detecting alcohol connection on your breath,just like your common breathalyzer.It has a high sensitivity and fast response time.Sensor provides an analog resistive output based on alcohol concentration.The driver circuit is very simple,all it needs is one resistor.A simple interface could be a 0-3.3V ADC.

Relay

The single Pole Double Throw SPDT relay is quite useful in certain application because of its internal configuration.It has one common terminal and 2 contacts in 2 different configurations.One can be Normally Closed and the other one is opened or it can be Normally Open and the other one closed.So basically you can see the SPDT relay as a way of switching between 2 circuits.

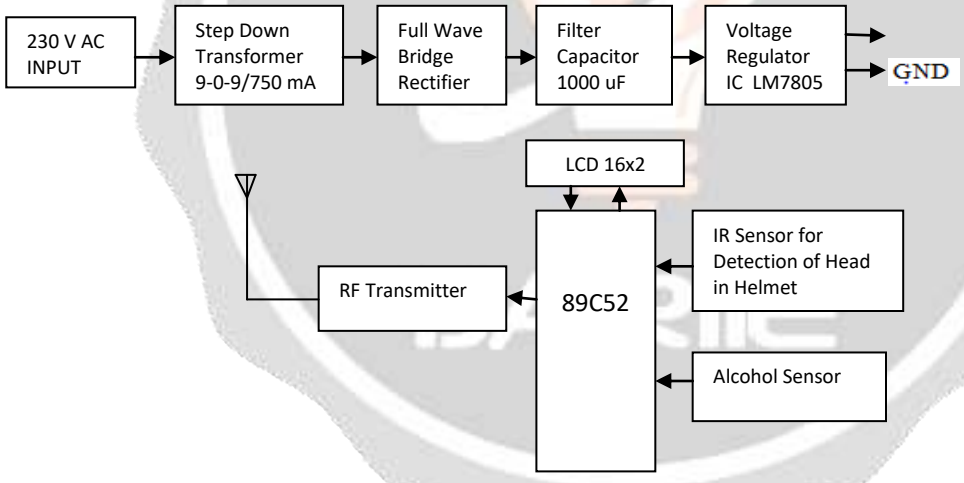


Fig.3.1 (a) Transmitter side

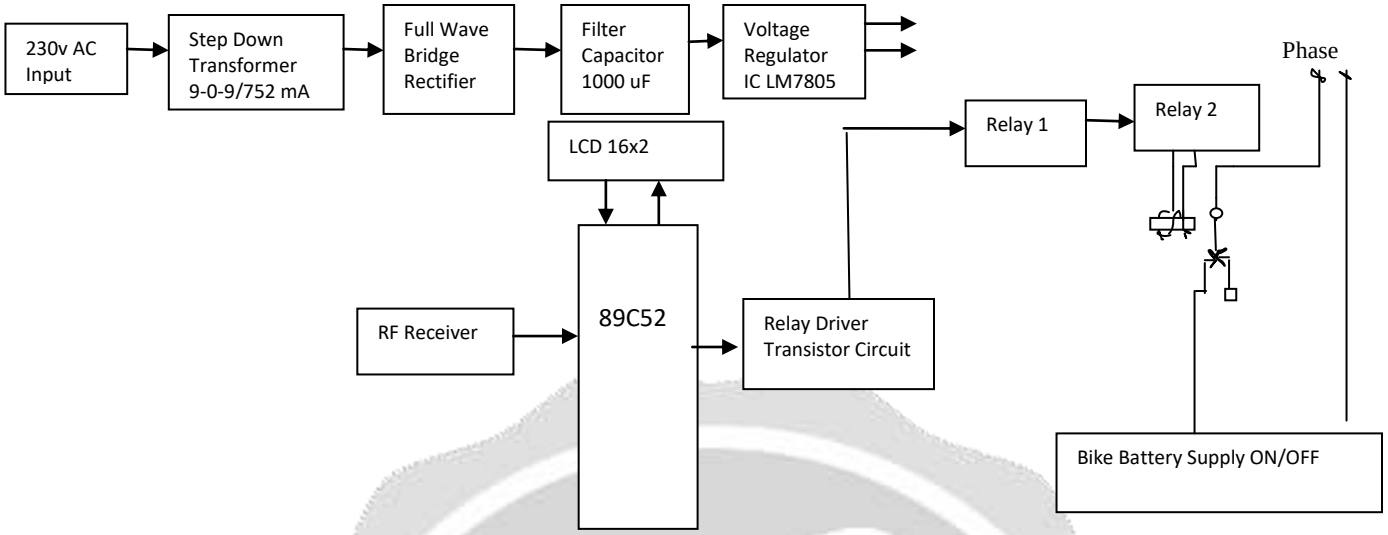
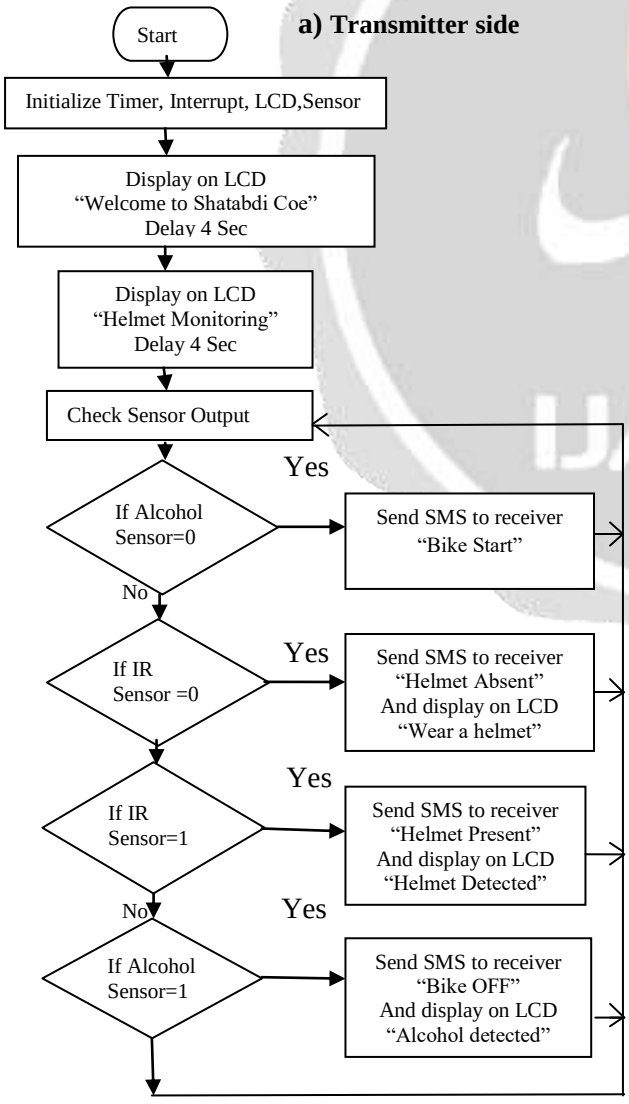


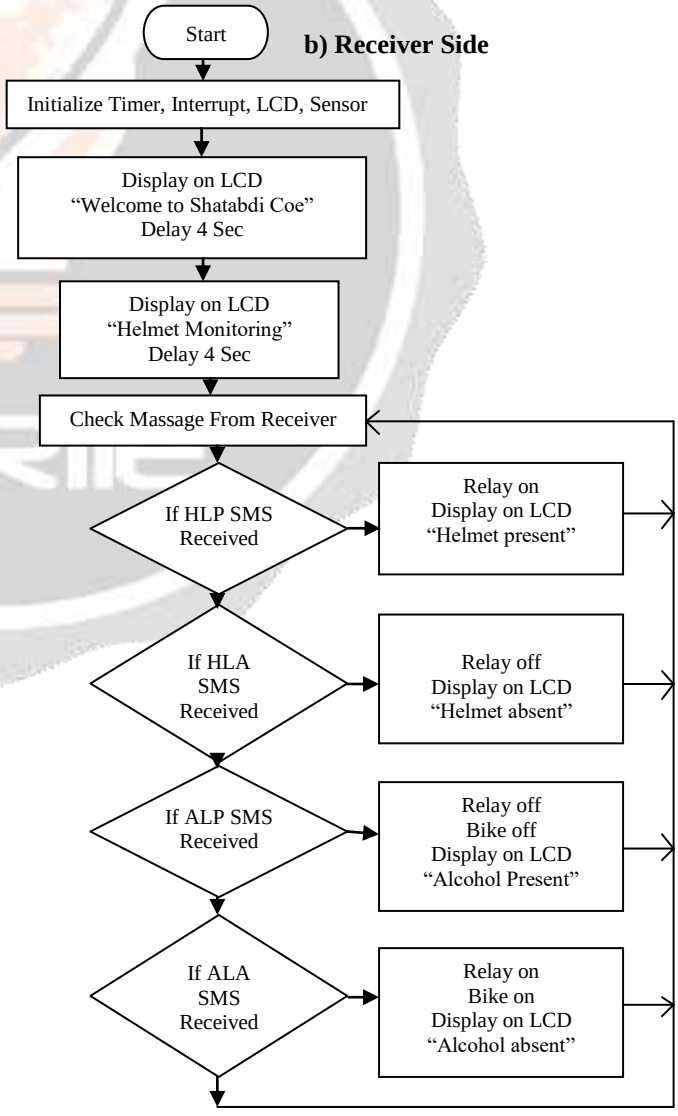
Fig.3.2 (b) Receiver side

4. Flowchart

a) Transmitter side



b) Receiver Side



5. Result and Discussion:

Fig: Project Hardware

The developed system efficiently ensures: 1. Rider is wearing helmet throughout the ride. 2. Rider should not be under innocence of alcohol. 3. Accident detection & theft prevention

In this system bike will start only when the rider wore helmet,hence save the bike from being stolen.The very first and most important application of the hardware model shown above,is the safety of driver.The system made also prevents the road accidents and hence will save life of many people.The use of helmet and riding without alcohol helps in reducing the violation of traffic rules.Hence traffic rules will be followed and the traffic system will be better.

6. CONCLUSION & FUTURE WORK

By implementing this system a safe two wheeler journey is possible which would decrease the head injuries during accidents and also reduce the accident rate due to driving bike after consuming alcohol. A helmet may not be a 100% foolproof but is definitely the rest line of defense for the Rider in case of an accident to prevent fatal brain injuries.The proposed approach makes it Mandatory for the rider to use this protective guard in order to drive a two-wheeler vehicle and ensures the safety of the human brain and therefore reduces the risks of brain injuries And deaths in case of an accident. Besides, the developed system prevents theft of the two- Wheeler.

In future this intelligent system can be fabricated in a compact size so that it is globally acceptable to notify No entry and No parking areas. Government must enforce laws to install such system in every two wheeler.By implementing such mechanism in two wheeler,deaths due to driving under incense of alcohol and other road fatalities can be minimized to large extent.

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