# SMART HELMET FOR SAFE DRIVING

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*Abstract---*This study has been undertaken to enhance the security measures during a ride. A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking, use as a hands-free device, fall detection. This makes it not only a smart helmet but also a feature of a smart bike. It makes use of GPS and GSM modules that helps in tracking the location and sending the message to predefined contacts.

*Index Terms* – Arduino Uno, RF Transmitter and Receiver, GPS, GSM, Tilt Sensor, Motor, Alcohol Sensor, Limit Switch.

## I.INTRODUCTION

The thought of publishing this paper comes from social responsibility towards the society. As many accidents occurring around us, there is a lot of loss of life. According to a survey of India there are around 698 accidents occurring due to bike crashes per year. The reasons for the accidents may be many such as no proper driving knowledge, no fitness of the bike, rash driving, drunk and drive etc. In some cases, the person injured the accident may not be directly responsible for the accident, it may be fault of some other rider, but end of the day it's both the drivers involved in the accidents who is going to suffer. If accidents are one issue, lack of treatment in proper time is another reason for deaths. According to the same survey if 698 accidents occur per year, nearly half the injured people die due to lack of treatment in proper time. The reasons for this may again be many such as late arrival of ambulance, no person at place of accident to give information to the ambulance. This is what is running situation in our day-to-day life, a thought of finding some solution to this problem come up with this idea of giving the information about accident as soon as possible and in TIME!!!!Because after all time matters a lot, if everything is done in time, at least it can save half the lives that are lost due to bike accidents. So, a thought from taking responsibility of society came this paper "SMART HELMET FOR SAFE DRIVING".

## II.EMBEDDED SYSTEMS

An embedded system is a computer system with a dedicated function within alarger, often with, real-time mechanical or electrical system constraints. It is incorporatedas part of a complete device that often includes hardware and mechanical parts. Integratedsystems today control many commonly used devices. 92% of all microprocessors areproduced as embedded system components.

Integrated systems range from portable devices, such as digital clocks and MP3players, to large stationary systems such as traffic lights, factory controllers and largecomplex systems such as hybrid vehicles, magnetic resonances, and avionics. Thecomplexity varies from low to high, with a single microcontroller chip, with the highestnumber of units, peripherals, and networks mounted within a large frame or enclosure.An embedded system is a special-purpose computer system designed to performone or a few dedicated functions, sometimes with real-time computing constraints. It isusually embedded as part of a complete device including hardware and mechanical parts.In contrast, a general-purpose computer, such as a personal computer, can do manydifferent tasks depending on programming. Embedded systems have become veryimportant today as they control many of the common devices we use.Since the embedded system is dedicated to specific tasks, design engineers canoptimize it, reducing the size and cost of the product, or increasing the reliability andperformance. Some embedded systems are mass-produced, benefiting from economies ofscale.

Physically, embedded systems range from portable devices such as digital watchesand MP3 players, to large stationary installations like traffic lights, factory controllers, orthe systems controlling nuclear power plants. Complexity varies from low, with a singlemicrocontroller chip, to very high with multiple units, peripherals and networks mountedinside a large chassis or enclosure.In general, "embedded system" is not an exactly defined term, as many systemshave some element of programmability. For example, Handheld computers share someelements with embedded systems — such as the operating systems and microprocessorswhich power them — but are not truly embedded systems, because they allow differentapplications to be loaded and peripherals to be connected.

An embedded system is some combination of computer hardware and software,either fixed in capability or programmable, that is specifically designed for a particular kindof application device. Industrial machines, automobiles, medical equipment, cameras,household appliances, airplanes, vending machines, and toys (as well as the more obviouscellular phone) are among the

myriad possible hosts of an embedded system. Embeddedsystems that are programmable are provided with a programming interface, and embeddedsystems programming is a specialized occupation.

Certain operating systems or language platforms are tailored for the embeddedmarket, such as Embedded Java and Windows XP Embedded. However, some low-endconsumer products use very inexpensive microprocessors and limited storage, with theapplication and operating system both part of a single program.

## III. BLOCK DIAGRAM OFPROPOSED SYSTEM
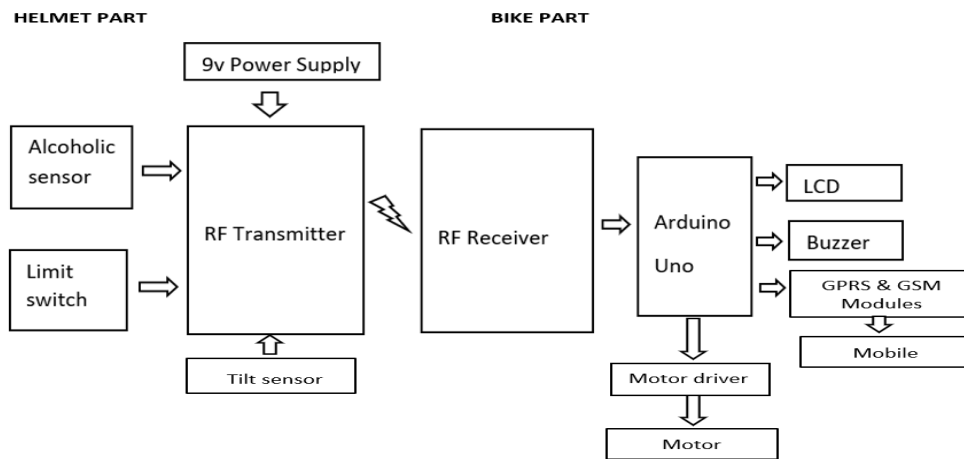


**Fig 1.** Block diagram of Proposed system

Figure 1displays the connection between the various blocks. These blockstogetherdefinethefunctionalityofArduinoUNO.Thiswork consists of RF transmitter and receiver to have a wireless transmission of data. It has two sensors for detecting alcoholcontentindriversbreathethat is alcoholsensorand alimit switch for indicating thathelmetisworn or not.ArduinoUnoisusedtotakethedatafromreceiverandif any unpleasant actions happenedit helps to display the respective message in LCD and to generate sound in buzzer to warn the person, andtwoLEDsareusedfor indication of ignitionONandOFF.
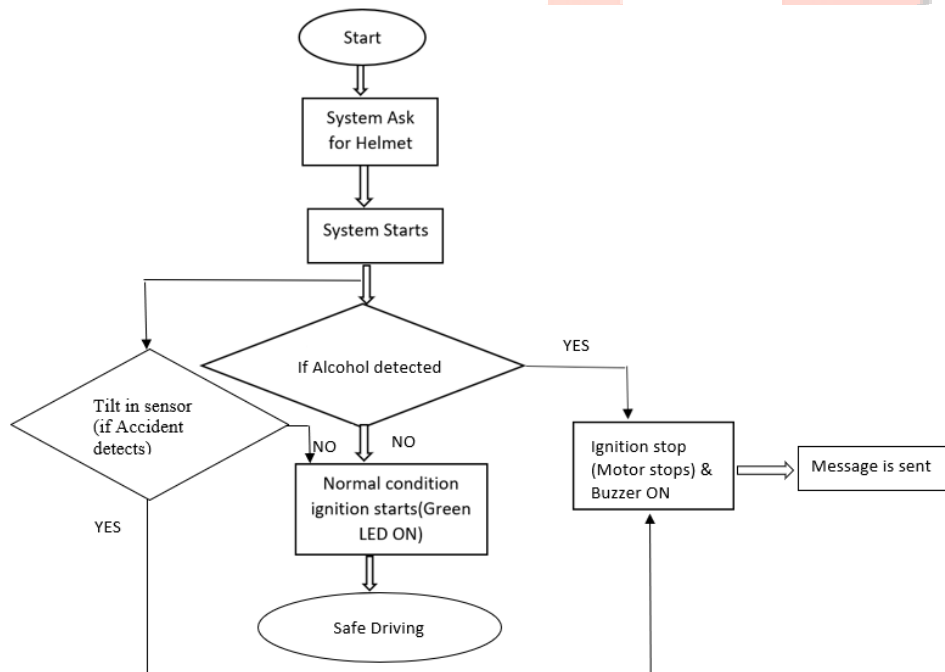
## IV. FLOWCHART



**Fig 2.** Flowchart of Smart helmet system

Figure 2 displays the working of Smart helmet system. When the poweris ON the system ask to wear helmet then further steps are taken. After the driver wearshelmet, the limit switch will turn ON then system starts. After the system starts it checks for any alcohol content is present or not, if notgreen light glows thatmeans it indicating the ignition should be ON. If in the middle of driving helmet is taken off the ignition stops and displays the respective message in LCD that to wear Helmet. and if the alcohol content isdetected, redlight will turnON, thatindicatesignitionshould be OFFand buzzergenerates sound thatwarnstherider. And if accident occurs, it directly sends the GPS Coordinates to pre-defined numbers through GSM module or if not, it means it's a SAFE DRIVING.
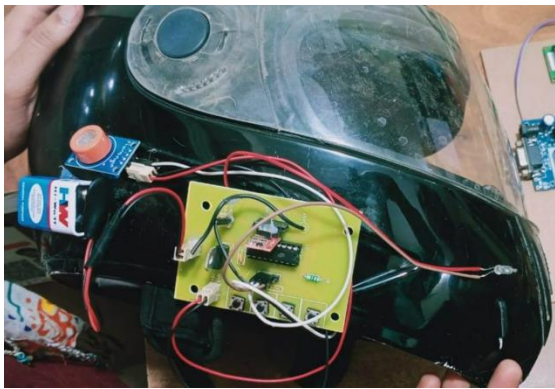
## V.RESULTS AND DISCUSSION



**Fig 3.** Helmet Part

**Figure 3**displays the helmet part of the kit that act as a transmitter which transmits the information regarding about wearing helmet by limit switch, alcohol detection using alcohol sensor accident detection with the help of tilt sensor these data collected by receiver through antenna. The Transmitter module consists of three pins namely Vcc, Din and ground. The Vcc pin has a wide range input voltage from 3V to 12V. The transmitter consumesa minimum current of 9mA and can go as high as 40mA during transmission. The center pinis the data pin to transmit the signal. This signal modulated using the ASK and then sent onair at a frequency of 433MHz.
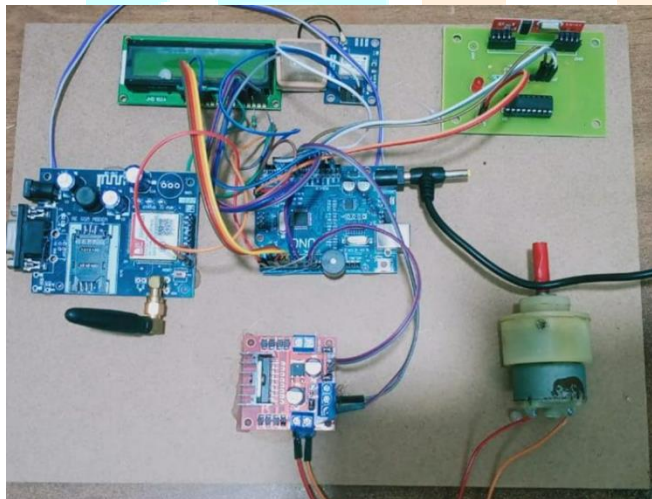


**Fig 4.** Bike Part

**Figure 4**displays the bike part of the system that can be also called as Receiver part which tracks the data from transmitter through antenna and process through microcontroller ATMega328p.RF receiver module has four pins namely Vcc, Dout, Linear out and Ground. The Vcc pin should be powered with a regulated 5V supply. Theoperatingcurrent of this module is less than 5.5mA. The pins Dout and Linear out is shorted togetherto receive the 433Mhz signal from air. This signal is then demodulated to get the data andsent out through the data pin. In the normal mode of operation that means when the rider wear helmet with no alcohol consumption the motor starts running. The GPS module is used to track the location when accident occurs, with the help of GSM module it sends the location details with warnings to the predefined numbers.

## VI. CONCLUSION

Now-a-days, rash driving of motor bikes is the major reason for most of accidents. The severities of those accidents are increased because of the absence of helmet or by the usage of alcoholic drinks. This papertends to develop an electronic smart helmet system that efficiently checks the wearing of helmet, drunken driving, and accident occurrence. By implementing this system, a safe 2-wheeler journey is possible which would decrease the head injuries throughout accidents caused from the absence
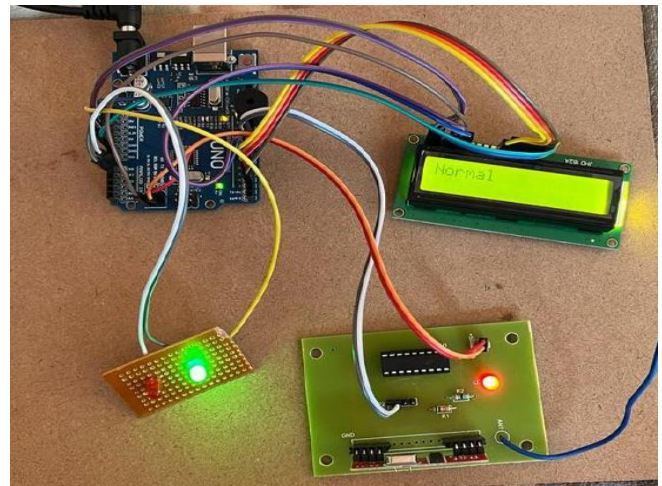


**Fig 5.**Normal mode of operation

**Figure 5**displays the Normal mode of operation that exist with the following conditions, when the rider wear helmet and no alcohol content is detected. This data processed from the transmitter to receiver that processed through microcontroller which makes further actions like rider can start the ignition and ride safely. The green LED indicates the ignition. The LCD is used for the warnings like it display the rider to wear the helmet, it also displays message to stop drunk and drive that also stops the ignition. The tilt sensor is used to detect the accident come off it trigger the GPS and GSM modules and send the location.
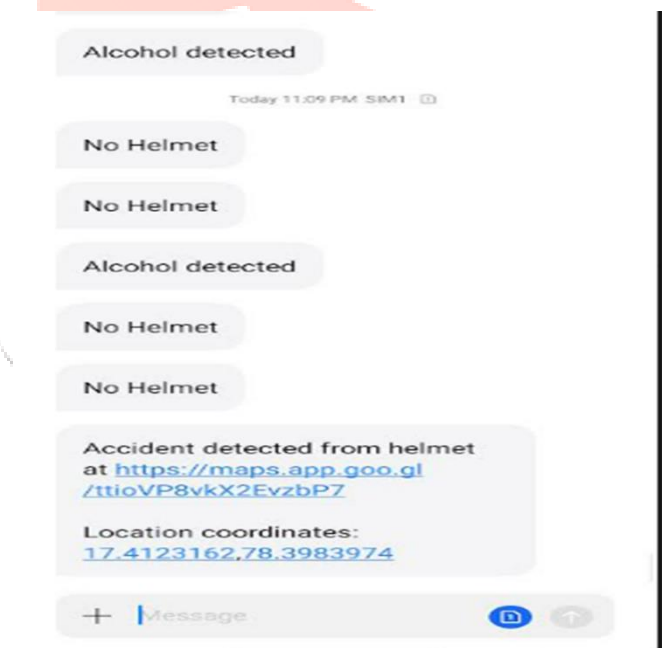


**Fig 6.** Output of the system

**Figure 6**displays the message sent through GSM module by antenna to corresponding predefined number as warnings and accident location details.

of helmet and additionally reduce the accident rate due to drunken driving. Andtends to introduce advanced sensors techniques and radio frequency wireless communications are included in this to make it a good one. The system efficiently checks the wearing of helmet, drunken driving and able to detect the accidents by using GSM and GPRS modules,it sends the location coordinates to predefined contacts through message.Thus, it may help to reduce the death rates.

## VII.FUTURE SCOPE

a) The whole setup can be made into a chip to decrease the area.We can even add more contacts and helpline numbers like ambulance.
b) Further this work can be used in cars or other vehicles by increasing the frequency range and installing the helmet part to the seat belt.

## VIII.ACKNOWLEDGMENT

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