

## **A Solar Powered Smart Helmet With Multifeatures**

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**Abstract:** - Traffic jams in India are very common and are so intense that it would take hours to travel for miles; also the temperature is more than the average temperature inside the helmet, at that particular situation rider will face discomfort. Mainly accidents will occur by attending the calls while driving. By providing the Bluetooth device inside the helmet we can avoid the handy talking and also it is very difficult to find the person where he met with an accident. To resolve this issue we developed a helmet which gives better solution to this current problem. This helmet is equipped with cooling device modules which will reduce the temperature by using the external power as solar energy, this Bluetooth device is inbuilt in a helmet so we can continue the call without removing of helmet and during the case of accident this helmet uses GSM with the help of GPS can message the precise location of the accident to a preset number..

**Keywords:** *GSM Modem, Ignition control in bike, GPS, Microcontroller, Vibration Sensor.*

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### **I. INTRODUCTION**

Security and safety is one of the most talked of topics in almost every aspects. Previously the most compulsion is to wear the helmet for the bike rider's. For the inconvenience caused many of them failed to wear the helmet which caused the death of the people. Keeping in the view of the inconvenience caused in the helmet we have implemented many features in the helmet which are flexible to the rider. Actually in existence system ,if the person met with any accident we can't get the information regarding that accident so the person may die due to the late medication by using these proposed system can send that information like accident alert and position of the accident place to the particular number or ambulance emergency number so we can provide the medication to the victim just in time and the main draw back in existence helmet we can't attend the call while driving if you want to attend any call means defiantly the helmet must be remove than only we can talk with the phone. By avoiding these problems proposed system will be helped. In these proposed system one inbuilt Bluetooth will be arranged so whenever the person get the call means we can continue the call without removing of helmet. And another main feature ignition control using helmet .whenever the rider where these helmet then only the engine will be started unless we can't start the bike .so using these application in bike we can reduce the accident deaths.

### **II. HARDWARE IMPLEMENTATION IN HELMET**

#### **RF MODULE**

RF module comprises of an RF Transmitter and RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps. The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter. The RF module is often used along with a pair of encoder/decoder. The encoder is used for encoding parallel data for transmission feed while reception is decoded by a decoder. HT12E-HT12D, HT640-HT648, etc. are some commonly used encoder/decoder pair ICs. This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

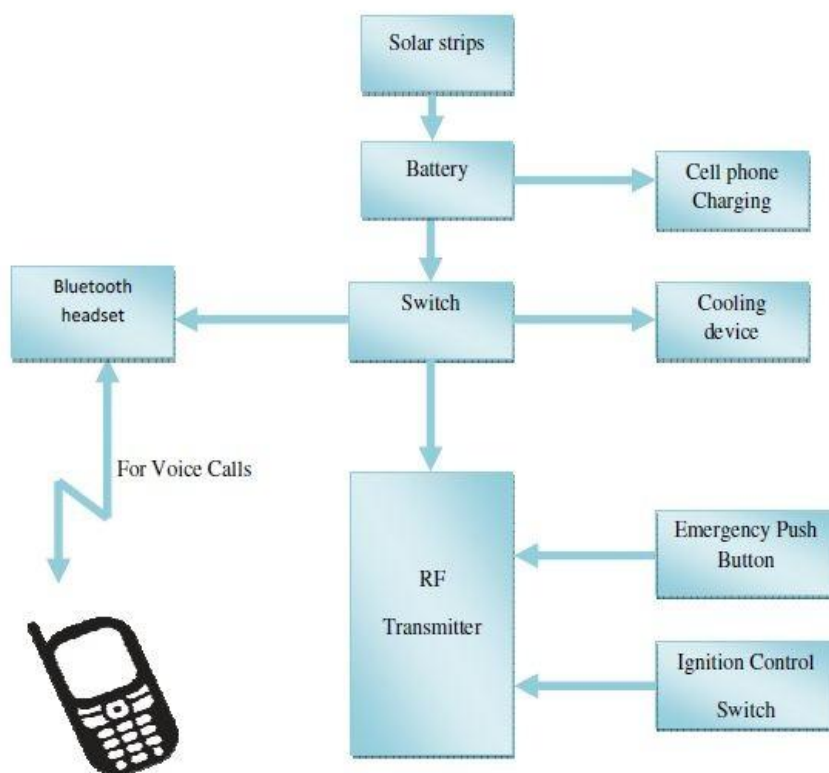


Fig.1: Block diagram of the proposed system in helmet

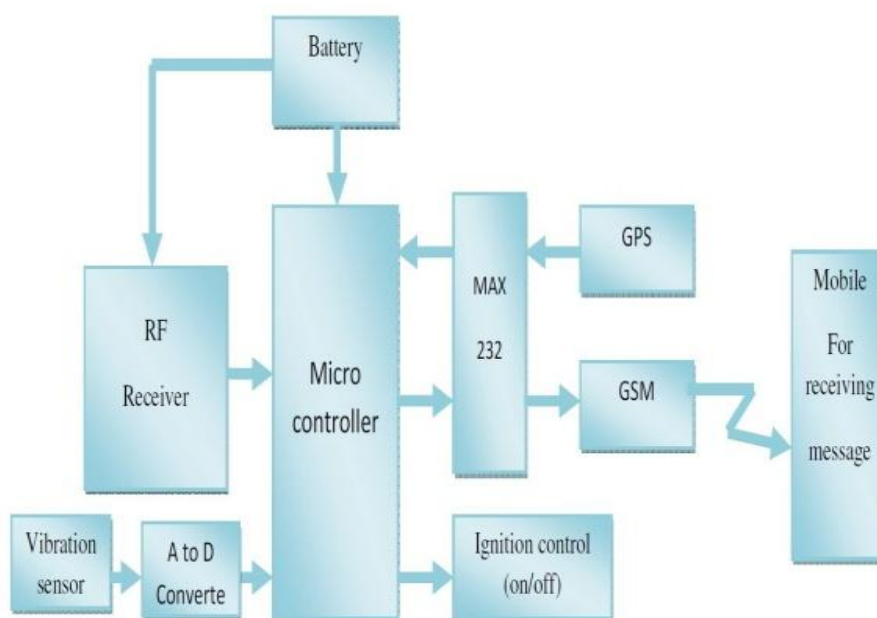


Fig 2: Block diagram of the proposed system in bike

### RF Transmitter

In RF transmitter section using two buttons one for emergency switch and another from ignition control switch. The output data will be taken from the same address line of the receiver side.

### RF receiver

In RF receiver section the output data i.e. ignition controlled data will be connected to the ignition control board, and second switch is connected to the microcontroller in order to send the emergency message to particular number using GSM and GPS.

### Vibration sensor:

The piezo-electric property is a reversible phenomenon. Whenever an electric excitation (voltage) is applied across the opposite faces of quartz crystal, it starts to vibrate and hence produces mechanical oscillations. Whenever mechanical vibrations are applied to the crystal, it produces electric potential across opposite faces of the crystal. Thus a crystal can be used for the construction of vibration sensor. The frequency of oscillations depends on the physical size and the shape of the crystal. Generally, smaller dimensions of crystals produce higher frequencies and bigger crystals produce lower frequencies.

The mechanical vibrations are applied to a thin diaphragm. The diaphragm vibrates in accordance with the applied mechanical vibrations and applies pressure to the crystal. The crystal generates a voltage in accordance with the vibrations. These voltages are of very low amplitude. Hence these signals are fed to an op-amp amplifier. The amplified signals are fed to a monostable multivibrator for producing pulses of fixed duration. The microcontroller routinely checks the outputs of the monostable multivibrator.

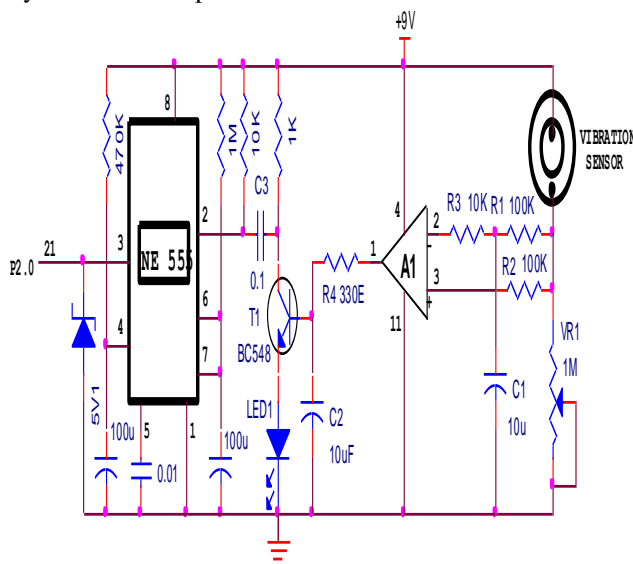
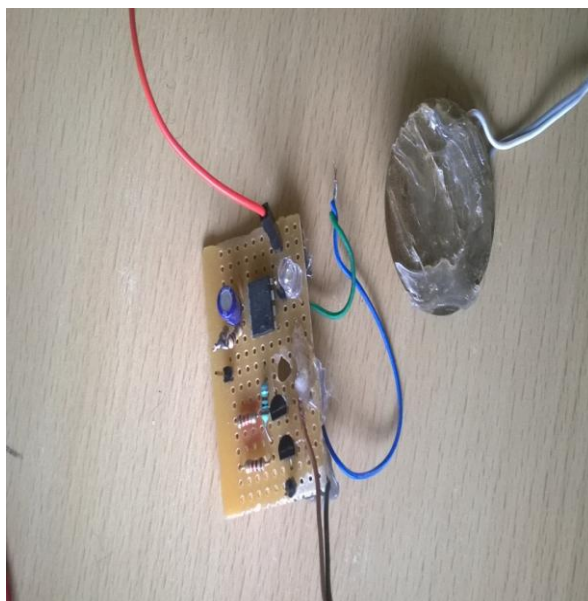


Fig 2.4: Design vibration sensor circuit

When the piezo element is disturbed, it discharges the stored charge. This alters the voltage the voltage level at the inputs and the output momentarily swings high as indicated by led. This high output is used to trigger switching transistor T1, which triggers monostable multivibrator built using NE555 IC. The circuit is as shown in fig 2.4.

### III. RESULTS & DISCUSSION

In this project we have designed the vibration sensor unit for any accident detection, and also we designed a ignition controlled circuit. The bellow figure shows the vibration sensor that gives the 5v output whenever the sensor will gets the activated that means when ever sensor is hitted.



*Fig 3.1: Design of vibration sensor with 5v output voltage*

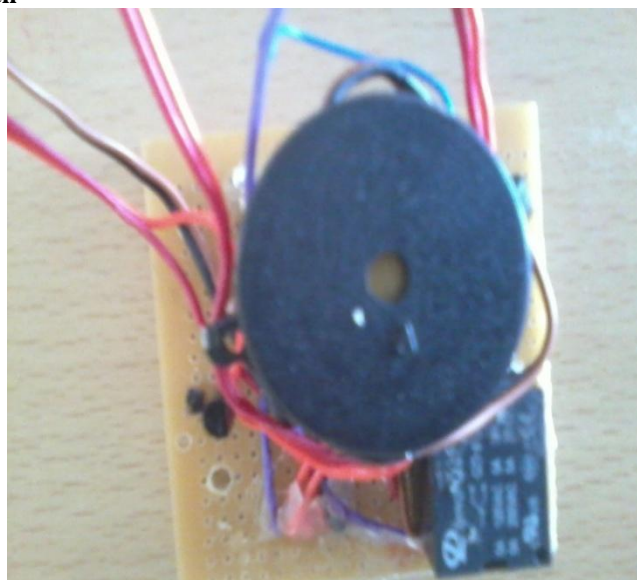
In this project the output of the vibration sensor will be given to the microcontroller to detect the accident and that alert and position of the place of the accident will be sent using the GPS and GSM.

For vibration sensor:

Output : High (5V) - whenever the vibration sensor hitted.

Low (0V) -when there is no interruption on vibration sensor.

#### **Ignition controlled switch**



*Fig 3.2: Ignition controlled circuit board*

This circuit is used to control the ignition of the vehicle .So using these whenever the rider wear the helmet then only the bike will start or else the bike cont be started. The signal will be receives through the RFID module these modules .whenever the rider wear these helmet the one of the RFID module switch will be activated and the output of the RF receiver will be zero. Initially the RF receiver out will be high whenever the transmitter pin activated that time it gives the zero output. That out will be given to the ignition controlled circuit. In this ignition controlled switch consists of the inverting circuit for inverting the voltage levels, Relays for switching purpose and buzzer is used to give the beep indication to rider to wear the helmet. The above figure shows that the total ignition controlled circuit board.

#### IV. THE PROPOSED SYSTEM IN HELMET

The below figure show the total setup of the helmet .In this helmet all the components are inbuilt like solar strips, Bluetooth headphones, cooling fan for comfort driving, Ignition controlled switch inside the helmet and RF transmitter in order to send the emergency signal and ignition controlled signal to the bike.

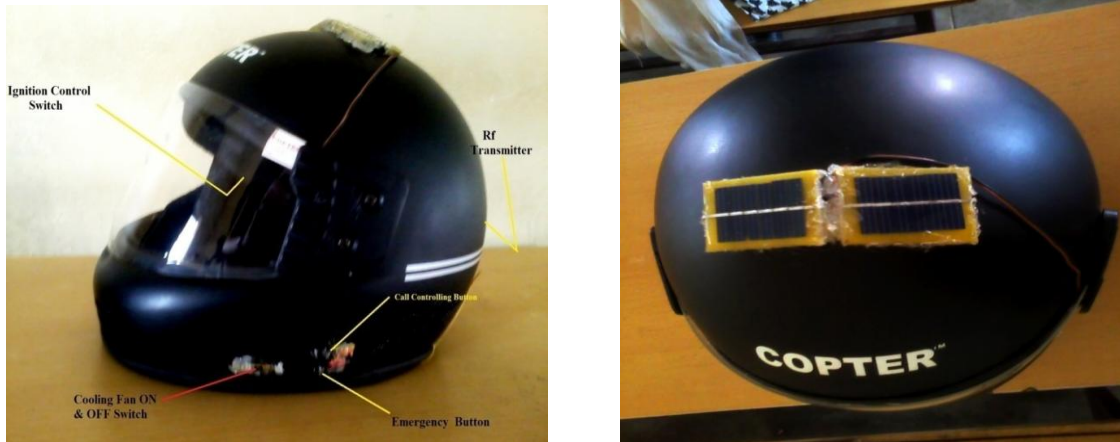
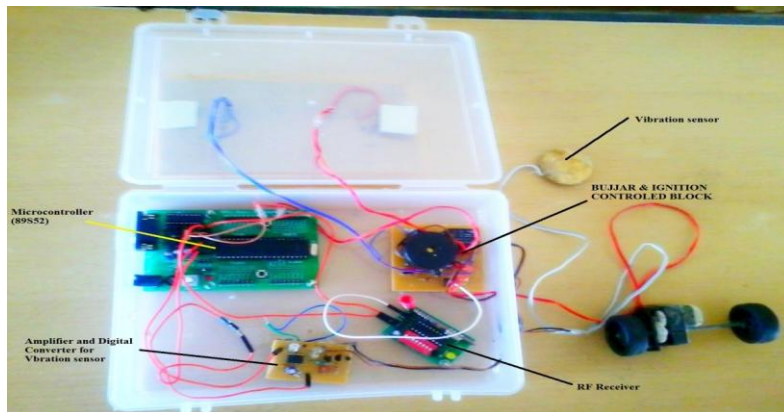


Fig 3.3: The total proposed system in helmet

#### V. THE PROPOSED SYSTEM IN BIKE

Theses section will be inbuilt inside the bike only .these consists of the GSM, GPS in order to send the emergency and accident alert to the particular number, Ignition control board to controlling the bike ignition and vibration sensor also kept in bike only for detection of any accident. The total setup will be shown in bellow figure.



#### GSM &GPS RESULT

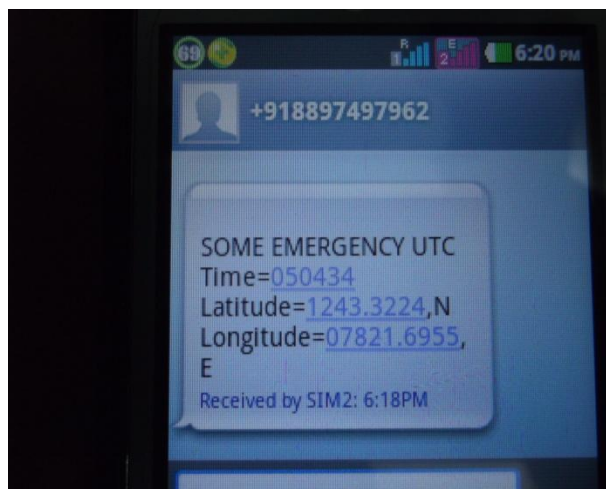
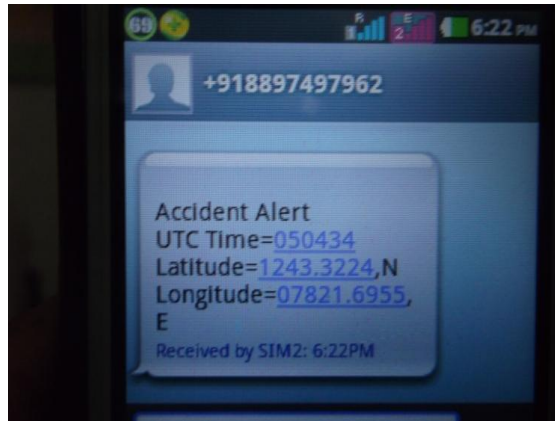


Fig 3.4: Some Emergency Message



*Fig 3.4: Some Emergency Message*

The above figure shows that the output of the emergency alert system and accident navigation system. In these the message and position the will be send to the given particular number .So using these longitude and latitude we can trace position.

## **VI. CONCLUSION & FUTURE SCOPE**

In this paper we have discussed about developing of the “a solar powered smart helmet with multi features” like inbuilt Bluetooth, cooling fan ,cell phone charging are help for comfort driving to the rider and ignition control ,accident detection and navigation system are help safety to the rider.

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