

## Intelligent Bike System

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**Abstract:** The main objective of intelligent bike system is to develop a protection system in a helmet for the safety of the bike rider. The features of this helmet include detection of helmet, alcohol detection, accident detection and identification, location tracking. Various sensors are implemented on the helmet as well on the bike system. Even though there has been continuous awareness from the government authorities regarding helmet and majority of the riders do not follow them. In order to resolve this situation, we have developed the intelligent bike system for two wheelers, a way to stop starting of vehicles without wearing helmet. Additionally, it has a great feature of detecting accidents and informs emergency contacts via SMS with location with the help of GPS GSM based tracking system, thus aiding ambulance to reach the correct location. We have implemented all the sensors within the helmet, which will send the information to the module connected with the bike engine wirelessly. The helmet module and the bike module will be linked through RF Communication.

**Keywords:** Alcohol detection, Fall detection, Helmet detection, Location tracking, Road safety

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### I. Introduction

The safety helmet for two-wheeler riders has become a continuous topic of discussion. According to section 129 of the motor vehicles Act, 1988 it is compulsory for two-wheeler riders to wear safety helmets. As per the rule the helmet should be 20-25 mm thick, with foam quality. The antagonism for compulsion of helmet has been a serious issue. According to a survey, almost 57% of two wheeler riders and 74% of pillions do not wear helmet. In 2018, around 50,000 people lost their life due to road accident .Use of helmet can reduce the probability of severe injuries by 72%. Intelligent bike system detects whether the rider has worn helmet or not through the Force sensing resistors placed on the upper part of the helmet. If the helmet is not detected, the ignition of bike motor will not take place. Thereby, the law of compulsion of helmet will not be violated. Hence, reducing the probability of injuries and deaths due to road accident.

Under Section 185 of motor vehicle act, 1988; drink and drive is prohibited and can lead to monetary fine and imprisonment. Intelligent Bike System detects the consumption of alcohol. If detected, bike won't ignite. As a result, drink and drive cases would be reduced and provide safety to not only the driver but also to the pedestrian.

Intelligent bike system using Global System for Mobile Communications (GSM) & Global Positioning System (GPS) Technology for Accident Detection and alerting system. Different sensors are placed at different parts of bike and helmet module which will be useful for various features mentioned above. With the use of GSM technology, alert messages can be send to the nearby hospital and immediate medical facilities can be provided.

### II. Methodology

#### 2.1. Block diagram:

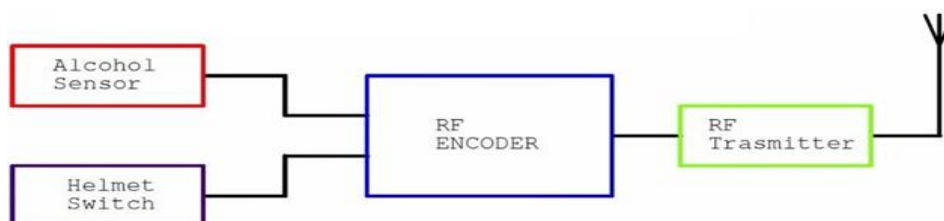
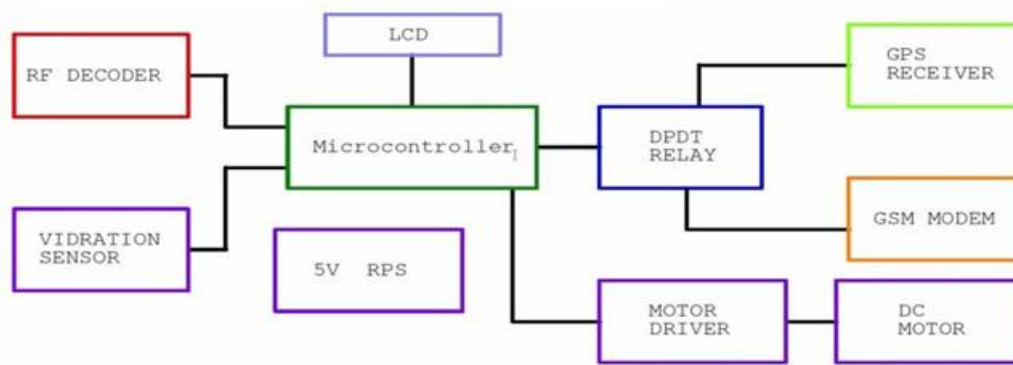


Fig.1. Helmet Unit



**Fig.2.** Vehicle Unit

## 2.2. Components

1. ATmega32A Microcontroller
2. 16\*2 LCD
3. HT12E Encoder
4. HT12D Decoder
5. RF Transmitter & receiver
6. L293D Motor Driver
7. SIM 900 GSM Modem
8. GPS Receiver
9. 12V DPDT Relay
10. Vibration Sensor
11. Alcohol Sensor
12. Limit switch
13. DC Gear Motor
14. 5V Regulated Power Supply
15. 12V Adapter

## 2.3. Working :

The intelligent bike system is divided in two units, helmet unit and vehicle unit. The alcohol sensor, vibration sensor and limit switch are placed on the helmet unit and connected to the microprocessor through GPIO pins. The entire system is powered by 12V which is converted to 5V using LM7805 regulator IC. When power is supplied to the microcontroller, it will initialize the peripherals on the receiver side. It continuously monitors the RF decoder. When the power is applied to the transmitter, it will initialize the peripherals like GPIO and timer. The helmet status will be monitored continuously. It starts the motor when helmet is worn and stops when removed. When alcohol consumption is detected, the vehicle will automatically stop. The transmitter recognizes the accident with the help of vibration sensor and sends information to the receiver. In the receiver, microcontroller reads the latitude and longitude from GPS receiver and sends it to the emergency contact through the GSM modem.

## III. Conclusion

Intelligent bike system provides an efficient result for many issues faced today. The detection of helmet, accidents and alcohol consumption is possible with the help of various sensors placed on the bike and the helmet module. The implementation of GPS and GSM module ensures immediate medical services to the injured rider. Hence, an Arduino-based system is beneficial for the safety of rider as well as the pedestrian.

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