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INTELLECTUAL HELMET FOR ACCIDENT REDUCTION

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Abstract - In India more than 37 million people are using two wheelers. India witnesses 17 deaths and 55 road accidents every hour and 43 per day only due to the failure of wearing helmet. It is estimated that by wearing an appropriate helmet improves chances of survival of bikers by 42%. This paper carries out a systematic study on several strategies and developments for avoidance of accidents and develop helmet detection system. The proposed system is an intelligent/safety helmet. A module affixed in the helmet, such that, the module will sync with the module affixed on bike and will also ensure that biker has worn Helmet. Additional feature of accident avoidance detection module will be installed on the bike.

Keywords - Biker's safety, Accident detection, prevention, Sensors, Smart helmet, IOT, GSM

I. INTRODUCTION

The paper aims to provide total safety for bike riders. From past few decades, helmets have become mandatory, but still people ignore wearing helmet. Since from the last few years, there has been rapid increase in number of road accidents. Due to rise in road accidents, it has now become essential to develop a system to minimize accidental deaths. With respect to vehicle safety, India meets only two out of seven vehicle safety standards by WHO. Two wheelers account for 25% of total road crash deaths. The main cause of these fatalities is people riding two wheelers by indulging with alcohol and violation of traffic rules which later end results in serious conditions. In this paper, we are concerned about prevention of fatalities due rash driving and alcohol consumption by making sure that everyone wears safety helmet .The safety helmet is composed of three sensors- alcohol detection sensor, IR sensor and tilt sensor. RF signals are transmitted from the helmet unit and is received by bike module. The module in the bike permits the rider to start the vehicle once the module receives signals from helmet unit. In case of loss of helmet and there is an emergency to ride bike, the module can be activated thrice by using Android app.

II. BLOCK DIAGRAM

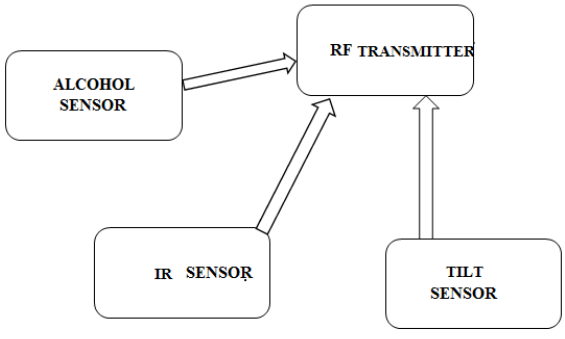

Fig2.1. Helmet module

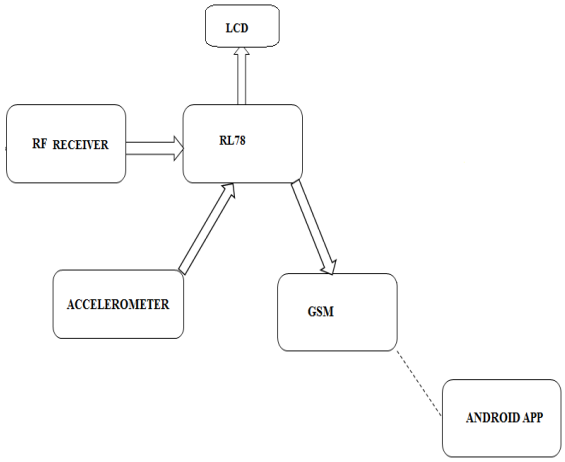

Fig2.2. Vehicle module

III. HARDWARE REQUIREMENTS

- RL78
- GSM SIM 800
- RF transmitter and receiver
- Accelerometer
- Tilt sensor
- MQ-6 sensor
- IR sensor
- LCD

IV. METHODOLOGY

Many embedded systems have substantially different designs according to their roles and needs. In this paper, structured modular design concept is adopted and the systemis mainly composed of a single microcontroller, LCD, GSM, RFtransmitter and receiver, Accelerometer, alcohol sensor, IR sensor , Tilt sensor and on/off switch.

The design has two section of block diagram:

1) Helmet section and 2) Vehicle section. One part is to be implemented in helmet section and consists of transmitter and the other in the bike which consists of

a receiver. The transmitter part analyses the required condition and sends the required signals to the receiver situated in the bike module.

The micro-controller generates the code sequence continuously based on the signals received from receiver block.

The sensor network is composed of three sensors. An IR sensor detects whether the biker has worn the helmet or not. The biker has to wear the helmet mandatorily. Only then, remaining sensor conditions are checked. Alcohol sensor(MQ-6) is mainly used to detect the alcohol concentration ranging from 0.05mg/L to 10mg/L . This sensor is placed in the helmet of the biker to check whether the biker has consumed alcohol or not. The Tilt sensor is used for vibration monitoring and balancing operations on machinery in motion.

It is mainly to detect the occurance of accidents. All the data from sensor network is transmitted to microcontroller in vehicle module and proceeds for the ignition of engine if all the conditions are satisfied. RL78 is the microcontroller used here to generate the code and control the ignition and termination of vehicle's engine.

If the rider has not worn the helmet or indulges in alcohol consumption, the microcontroller restricts the engine ignition based on the signals received from the sensor network. If the rider indulges in rash driving or faces an accident, the related body can take the action by looking for the information received through SMS.

The vehicle module consists of the other components:

- LCD is utilized to demonstrate the whole operation. It is connected to the RL78 microcontroller.
- GSM is used for wireless communication between vehicle and Android device. We use SIM800 for this purpose. It is connected to the microcontroller through wired network. The android device(for SMS) share a wireless connection with it.
- RF transmitter(in helmet) and receiver (in bike)is used for wireless communication between helmet, highway sign boards and vehicle. The receiver forwards the signals receiver from the helmet module to microcontroller.
- Android app, created on user's device is used to ignite vehicle during helmet lost through GSM. Based on the authentication of user, an on/off switch is employed for emergency ignition, which works for three times in a month . A simple SMS mechanism is employed for this process between the android device and the vehicle module.

V. FLOW CHART

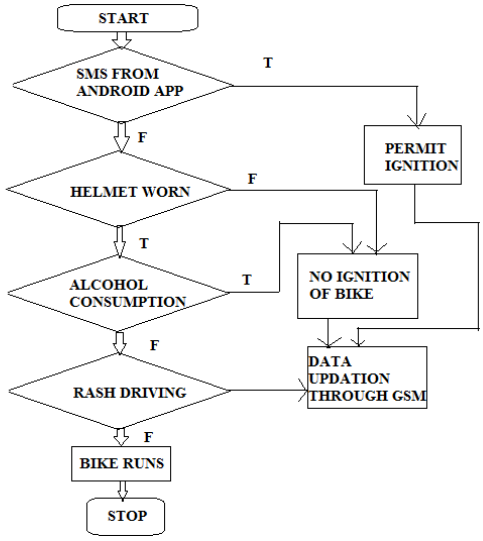

Fig5. Flowchart

VI. MARKET POTENTIAL AND COMPETITIVE ADVANTAGES

- Efficient and reliable system.
- If helmet was stolen then we can start the bike by the android app.
- Reduces probability of accidents.
- Used in Real time safety system.
- Less power consuming system.
- Can further be enhanced in car.
- Easily accessible system.

CONCLUSION

The project is developed using structured designing and is able to provide the expected results. It can be successfully implemented as a Real Time system with certain modifications. Science is discovering and creating major breakthrough in various fields, and hence technology keeps changing from time to time. Going further, most of the units can be fabricated on a single board along with microcontroller thus making the system compact, thereby making the existing system more effective. To make the system applicable for real time purposes, components with greater range and precision must be implemented.

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