International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 04 | Apr 2021 www.irjet.net p-ISSN: 2395-0072

MONITORING SPEED CONTROL FOR VEHICLE SAFETY USE GSM & ARUDINO

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Abstract - *- A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this helmet is to provide safety for the rider. 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 is compulsory to wear the helmet, without which the ignition switch cannot turn ON. An RF Module can be used as wireless link for communication between transmitter and receiver. If the rider is drunk the ignition gets automatically locked, and sends a message to the registered number with his current location. In case of an accident it will send a message through GSM along with location with the help of GPS module. The distinctive utility of project is fall detection; if the rider falls down from the bike it sends a message.*

Keywords— *smart helmet, accident detection, Arduino, GPS, RFtrans , receive, GSM*

1. INTRODUCTION

In recent times helmets have been made compulsory in Telangana State. Traffic accidents in India have been increased every year. As per Section 129 of Motor Vehicles Act, 1988, every single person riding a two-wheeler is required to wear protective headgear following the standards of BIS (Bureau of Indian Standards).Also drunken driving under the influence (DUI) is a criminal offence according to the Motor Vehicle act 1939, which states that the bike rider will get punishment. Currently bike riders easily escape from the law [1]. These are the three main issues which motivates us for developing this project. The first step is to identify whether the helmet is worn or not. If helmet is worn then ignition will start otherwise it remains off. For this, Force Sensing Sensor (FSR) sensor is used. The second step is alcohol detection [2]. Alcohol sensor is used as breath analyzer which detects the presence of alcohol in rider's breath and if it exceeds permissible limit ignition cannot start. It will send message to the number saying that "Rider is drunk and is trying to ride the bike". MQ-3 sensor is used for this purpose. When these two conditions are satisfied then only ignition starts. The third main issue is accident and late medical help. If the rider has met with an accident, he may not receive medical help instantly, which is one of the main reasons for death. Every second people dies due to delay in medical help, or in the case where the place of accident is unmanned. In fall detection, we place accelerometer in the bike unit. By this mechanism accident can be detected. The aim of this project is to make à protection system in a helmet for the safety of bike rider. The smart helmet that is made is fitted with different sensors responsible for detection [3]. There are two main units in this project. Each unit uses a microcontroller. Signal transmission between the helmet unit and bike unit is done using a RF module

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1.1 BLOCK EXPLANATION

It is already mentioned that the project is divided into two units namely helmet and bike. In helmet unit, also called the transmitter unit shown in Figure 6 (a),the force sensing resistor is placed on inside upper part of the helmet where actually head will touch with sensor surface. And alcohol sensor is placed on in front of rider's mouth so that it can sense easily. Solar panels are mounted on upper side of helmet which is in direct sunlight. And the battery and regular circuits were fixed inside the helmet. Secondary controller and RF transmitter circuit were also placed inside the helmet. Antenna is located outside the helmet. The receiver unit shown in Figure 6 (b) is placed in the bike. The RF receiver accepts all the data from the helmet (i.e. transmitter) unit. Depending on the conditions, if true, the ignition starts and bike moves. The GSM can continuously send the location information of the bike. If any accident occurs, the vibration sensor gets activated and sends the location information to the registered mobile number

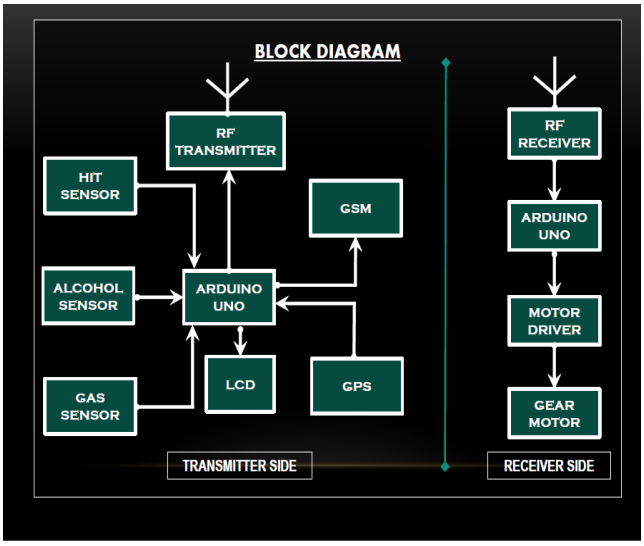

Fig. 1. Block diagram of the proposed system

1.2 Working

The first step of project is it initializes all the port and next step is accident detection using accelerometer. If No accident occurs, then it will go to third step. Third step is listening to RF module continuously for Data and interprets data using if conditions. Fourth step is to check weather helmet is wear or not. If Helmet is not wearing then display Message "Please wear the helmet" will be displayed. Next step is to check the condition of drunk, if rider is drunk, display message "You are Drunk" and then send the message to stored number with location, and ask for the password. If password is correct then bike will start. If accident is detected in sixth step, then it will stop everything and send a message with location. The main contributions of this paper can be brief as follows: a) preventing accident, b) reducing accident causality, c) identifying the accident, and d) to bring helmet wearing e) to control speed. In this paper, we propose a model of a smart vehicle for accident identification and preventing the accident. There use IR sensors, gas sensors, and ultrasonic sensors for preventing an accident. Arduino is used for processing sensors data and building a communication system between sensors and mobile applications. The mobile application is connected with a central monitoring system and authority can monitor every user accident history. When any accidents occur, the accident location sends to the monitoring database, and the monitoring system sends the location to the nearest hospital and police center. In Fig. 1 the main theme of this paper is described in the block diagram

2. Working Principal

If the pin of MQ3 is low and that of flex sensor is high, two signals would be generated and the two data's from the Arduino can be encoded and given to the RF transmitter. The engine of the two-wheeler is turned on using the relay. The relay is programmed to be turn on only when these two conditions are satisfied. The transmitted data from the helmet unit is received by the RF receiver and is decoded by the decoding circuit and it is given to the digital pin of Arduino. The ignition would be switched on only when the rider is not drunk and if he wears the helmet. The information regarding the axis is given to the analogy pin of Arduino According to the output of accelerometer, information regarding the accident would be send to the GPS module.

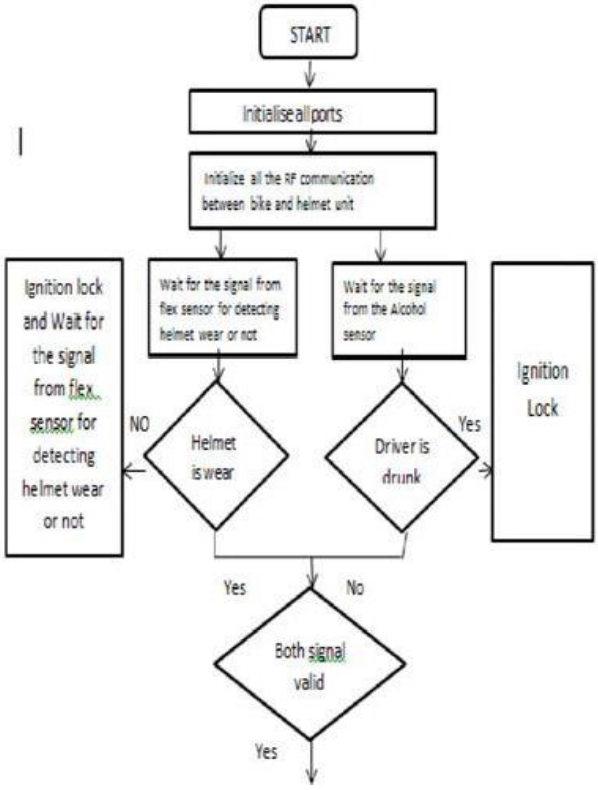

Fig. 2. Working principle of the onboard circuit

The receiver pin of the Arduino is connected to the transmitter pin of GPS. When the accelerometer is tilted and detected the threshold, the GSM is turned on and the message is send to the predefined number. The transmitter pin of the Arduino is connected to the receiver pin of the GSM.LCD display is used for monitoring the output.

The smart helmet circuit consists of two sensors, an alcohol sensor, and an IR sensor. Alcohol sensor measures alcohol present in the rider's breath and the IR sensor detects the presence of the rider's head. If there any alcohol presents or doesn't wear the helmet, an abnormality signal sent to the onboard circuit by RF signal at the frequency of 433 MHz Any abnormality found in the helmet circuit which gives a signal to the microcontroller for high pulse output to the encoder IC HT12E. The encoder IC sent the signal at RF frequency to the decoder antenna. When the antenna receives any signal, decoder IC HT12D decodes the signal and sends it to Arduino Uno for the further process. If there is any abnormality in the helmet circuit, the relay will activate to disconnect the battery circuit. Therefore, the motorcycle can't start. Before starting the motorcycle, the rider login to the mobile application

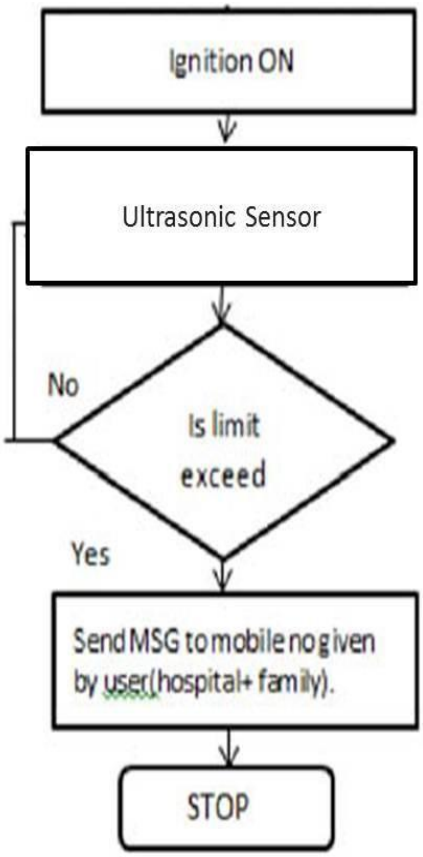

Fig. 3. Working principle of the onboard circuit

After starting the load sensor measures the current load of the rider. If there is any excess load for two minutes, the rider will notify through the mobile application. For over speed biker also notify. The over speed and overload data sent to the database by the mobile application. The over speed and overload data send to the mobile application through Bluetooth communication. There choose two kinds of different communication (Bluetooth and radio frequency communication) for avoiding interference

Fig. 4. Working Model

If there is an acceleration variation in a short period, Arduino detects it as an accident. When an accident occurs, Arduino waits two minutes for a touch sensor response. Touch sensor used for the mild accident. When an accident occurs, if the rider touches the touch sensor, that accident report as a mild accident that can't send any message to the emergency contact number. If the rider can't touch the sensor, accidents' current location sends immediately to the database and emergency contact number automatically. The mobile application detects the current location by the mobile's built-in GPS (Global Positioning System) module. And GSM (Global System for Mobile communication) sends the location to the emergency contact number. The accident location is sent to the database via the internet. When the database operator notified any accidents, the operator's system sends the location and other details to the nearest hospital and law enforcement agencies for immediate action

3. CONCLUSIONS

The two-wheeler safety system developed with smart helmet and intelligent bike system is reliable and aims to help in the prevention, detection and reporting of accidents hence reducing the probability of the drunk drive cases. It also has several advantages compared to the previous systems. Our proposed system gives the primary importance of preventing the accidents and ensures safety for a greater extent in two wheelers. Nowadays, most accident cases occur due to motor bike. The severities of those accidents are increased because of the absence of helmet or by the usage of alcoholic drinks. By implementing this system, a safe two wheeler journey is possible which would decrease the head injuries throughout accidents caused due to the absence of helmet and additionally reduce the accident rate due to drunken driving. A GSM modem is used in this system that will send a message to the predefined numbers that are programmed using microcontroller in case of any accident.

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