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IOT based Delivery Boys Safety Control and Bike Analyzer

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Abstract: ***Two wheelers are widely used than any other mode of transportation because of cost efficiency and simplicity.. The major concern of all riders is safety. The safety of delivery boys who works for online business travels across areas using two wheelers, where safety of bike rider counts. Hence to track the activities of such rider and to provide safe riding this project has been proposed. This project aims 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: GSM (Global Service For Mobile Communication), Alcohol sensor, Touch sensor, Accelerometer sensor, Helmet, Android Smartphone

1. Introduction

In day to day life, helmet had made compulsory for all the riders of two wheeler. 300-400 fatal people are found our of 500-600 accidents every day. Pune stands in the first place when it comes to two wheeler riders. Number of road accidents has been increased from last few years. It is very necessary to generate a system which avoids accidents, in World Health organisation (WHO) India meets two out of seven vehicle standards with respect to vehicle safety. Crash record shows that 25% of deaths are caused due to not wearing of helmets by the motorcycle riders. The main cause of these fatalities, the people riding the to wheeler is influenced with alcohol consumption which results in traffic rule violence. The survival of fatalities wearing helmets are higher as compared to the people who doesn't wear helmet during the ride.

Thus this project has been proposed, which gives the safety aspects for online working delivery boys by making them to wear helmet compulsory and by checking the aspect of alcohol consumption and speed detection by storing the activities in the database of the rider.

2. Description

Many embedded systems have substantially different designs according to their functions and utilities. In this project design, structured modular design concept is adopted and the system is mainly composed of a single microcontroller, LCD, GSM, RF transmitter, RF receiver, RFID, GPS, emergency switch, buzzer and android application. The microcontroller located at the centre of the block diagram forms the control unit of the entire project. Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided.

The project aims to provide total safety for bike riders In this project there are two module namely helmet and vehicle module, helmet will have control over the vehicle start and stop.

In Helmet the sensor module is built using sensors like alcohol sensor and touch sensor. This sensors are connected to RF transmitter .sensor module will be placed in the helmet to detect weather a person worn helmet are not, once the person wear the helmet the signals gets transmitted. The module in the bike allows the rider to start the vehicle once the module receive signals from helmet unit. The status of helmet worn are uploaded to user's database. In case of alcohol consumption the vehicle remains off though helmet is worn and status is uploaded to database. The rash driving detection is done using accelerometer sensor The server is maintained by company authorities looking at database the rider status is tracked and required measures are taken. In case of helmet lost android app is provided to ignite the vehicle through password.

The existing system basically has a wireless telecommunication, and is connected to a smart phone. The prototype uses sensors to detect a crash or accidents and the communication hardware is used to automatically dial a predefined emergency contact. The other existing system is to control the speed in which the biker is going in. The helmet is fixed with all the components and sensors that read the status of the bike rider and accordingly instruct the rider to reduce or increase the speed based on the sensor value. Drunk and driven case is also detected.

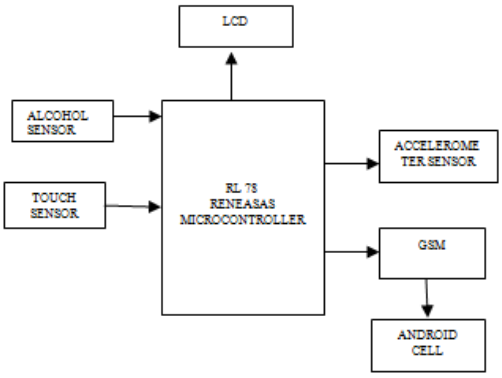

Figure. 1. Block diagram

The figure above contains essentially microcontroller, Alcohol sensor, touch sensor, Accelerometer sensor, LCD, GSM, and an Android smart phone. Many embedded systems have significantly different designs depending on their functions and utilities. In this project design, the concept of structured modular design is adopted and the system is mainly composed of a single microcontroller, interfaced to sensors and android application.

The microcontroller in the centre of the diagram forms the control unit for the entire project. A program integrated in the microcontroller helps the microcontroller act according to the inputs provided by the RF transmitter.

- The proposed system has two unit helmet and vehicle. Vehicle is controlled via signals from helmet unit. The helmet unit has sensor module to monitor helmet worn or not, alcohol detection and vibration detection, all connected to RF transmitter.
- The vehicle unit has RF receiver. Based on RF signal received the vehicle starts and stops automatically. And every status is uploaded to database via GSM. In case of helmet lost the vehicle is ignited

3. Components

a) GSM Module (SIM 900):
It is reliable and wireless module which is ultra compact. it can be embedded in the customer application which is complete dual band GSM/GPRS solution in SMT module. it has GSM/GPS 900/180Mhz performance of voice, sms, data and fax with low power consumption. it fits into almost all the space requirements in user application with configuration 24mmx3mm.
The SIM interface is controlled from an inside controller in the module having apparent voltage 2.8V. All pins reset as yields driving low. The "AT" or "at" prefix must be set toward the begin of each summon line. To end a charge line enters<CR>. Summons are for the most part trailed by a response that includes."<CR><LF><response><CR><LF>". All through this record, only the responses are displayed, <CR><LF> are disposed of purposely.

b) RENESAS RL78x 16bit Microcontroller:
The Renesas Electronics RL78 microcontroller is a 16-bit CPU core with CISC architecture with abundant features with inbuilt ADC. It has programmable input and output peripherals processor core. It has instruction sets to the control of input and output. The instruction address are in the form of bits and bytes.

c) Alpha-numeric LCD Display:
In 8051 based embedded projects 16x2 LCD module is used commonly. It has 16 rows and 2 columns LCD dot matrix. it is available in 16 pin package having contrast adjustment function..

d) Android
Android is a Linux-based mobile operating system developed by Google. Android is unique because Google is actively developing the platform, but offers it free to hardware manufacturers and phone operators who want to use Android on their devices. It is a stack of software for mobile devices that includes an operating system, middleware, and key applications. The Android SDK provides the tools needed to start developing applications on the Android platform using the Java programming language.

e) Alcohol sensor
Alcohol sensor is the sensor which is used to detect the alcohol content in the breath. Whenever there is a content of alcohol found in the breath, the detection of alcohol is sensed from the range 0.04mg/L to 4mg/L with the power supply less than 150ma to 5v.

f) Touch sensor:
Touch sensor captures the physical touch that activates on the device. It is also called touch detector, which is made using optical, electricity or magnetism.

g) Accelerometer sensor:
Accelerometer sensor is used to detect the variation in the speed, once the vehicle gets started the speed may vary from low to high. Speed variation is detected and noted in accelerometer sensor.

4. Advantages

- This project can be used in real time safety system for accident avoidance.
- Safety of delivery boys is considered by using the helmet, which uses less power consumption.
- The module is easy to use, which is efficient and reliable. In case of helmet loss vehicle can be started using password.

5. Conclusion

To provide safety for online delivery boys this module is developed. In this project, we aim for accident avoidance by affixing different components in both helmet as well as vehicle module. The delivery boys who works for online business travel across areas using two wheelers where safety of the rider counts.

6. Future Work

For project demo concern, we have developed a prototype module. In future, this project can be taken to the product

level. Additional features can be added such as GPS and so on.

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