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Annexure I

1. Project Title: A Multi feature helmet for reducing accidents and to provide emergency service

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1. Abstract & Objective

1.1 Abstract

The deaths caused due to road accidents are becoming as a major problem to the society. In order to prevent the deaths during accidents helmets are used mostly, but the inconvenience and less features of helmet made many people to neglect the wearing of helmet. 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. Moreover it also useful by making the rider in wearing the helmet as it is compulsory one of the condition to start the bike ignition. 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 even he wears the helmet as it is one of the compulsory rule to start bike. So by using this proposed system we can send that information regarding accident detection with its location to the particular numbers or to the emergency numbers, which will be helpful in providing the medication to the victim just in time. The helmet in this way used to provide protection to rider usually along with the features which include fast emergency services and prevention of alcohol consumption.

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. 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. 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.

1.2 Motivation

The thought of developing this project is to reduce fatalities due to road accidents. Day by day road safety is emerging as a major social concern in the world. According to a survey in India there are around 6986 accidents occurring due to bike crashes per year. The reasons may be many such as fast riding of bike, less use of helmets and drunken and drive etc. Sometimes the person injured in the accident may not be directly responsible for the accident, it may be fault of opponent rider also, but he is also going to suffer due to that accident. If accidents are one issue, lack of treatment in proper time is another reason for deaths. Mostly the people who are injured in the accidents die due to lack of treatment in proper time, because of late arrival of ambulance or no persons at the place where the accident occurred

This is the situation we observe in our day to day life, a thought of finding some solution to resolve this problem hinted my mind with the idea of giving the information about accident as soon as possible and in TIME....!!!!Because time matters a lot, if everything is done in time, at least we can save more than half of the lives that are lost due to bike accidents. By considering three major factors we can avoid the deaths in the accident. Factors are

- I. Make wearing the helmet compulsory.
- II. Avoid drunk and drive.
- III. Intimation about a person who met with an accident

Our idea is to implement a smart helmet by considering above all the three factors, which provides a better solution in decreasing the death rates due to accidents.

1.3 Objective

The main aim of the project is to reduce the road accidents by making the helmet compulsory. In this without the helmet the bike cannot start and if the person consumes alcohol the ignition will turn off if any one of the conditions is met. If it disobeys the two conditions then only the bike will be started. In this by using GPS and GSM modules in case of any accident the emergency alert will be sent to the prescribed numbers by locating the position of the bike. In this way we can reduce the death rates caused by accidents. Moreover alcohol monitoring is continued until ignition turns off and it will send message to preset numbers in case of any consumption.

2. Block Diagram & Technical Specifications

2.1 Block Diagram and Working:

2.1.1. Block Diagram:

Transmitter Section:

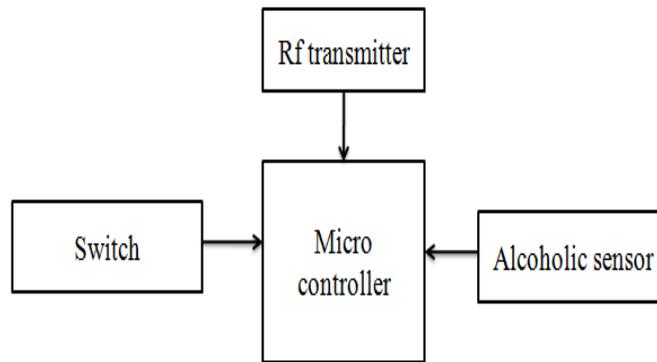


Figure 2.1: Block diagram of transmitter section of multi featured helmet

Receiver Section:

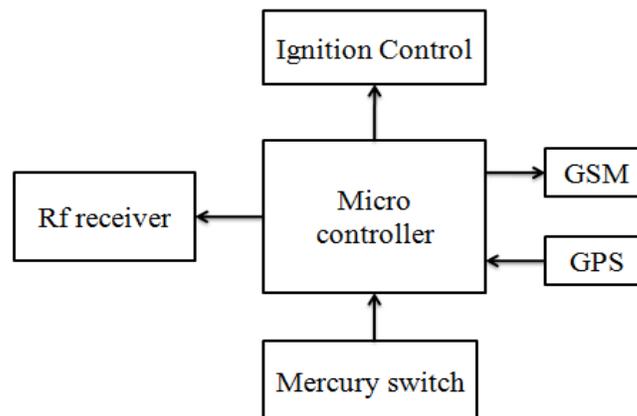


Figure2.2: Block diagram of receiver section of multi featured helmet

In this when the rider wants to start the bike he should satisfy two conditions, firstly he should wear the helmet and the other is he should not consume alcohol.

- Internally, when the rider wears the helmet then switch is used to detect the head of the rider and a signal is produced which is transmitted to the receiver section.
- Alcoholic sensor which is situated in helmet, also transmits a signal. When both signals meet the conditions then the ignition of the bike will be enabled.
- Along with this a mercury switch is used to detect the accidents.
- In this we use GPS and GSM modules. They are used for locating the bike when met with an accident and sending the information to prescribed numbers.
- The helmet is designed in such a way the signals received from transmitter section are processed by lpc2148 and results are produced according to the signals received
- We opted lpc2148 which belongs to arm family
- Lpc2148 is better than 8015, pic and 8086 micro controllers and microprocessors in many ways.
- The sensors are interfaced with arm7 with the help of keil software.

2.1.2. Working:

The above block diagram consists of RFID module, microcontroller, GSM module, LCD and Buzzer. When the car enters the toll plaza then the RF signals from the reader will activates the RFID tag and gets the digital code from the tag. RFID reader then sends the code to the microcontroller and it is compared with the data in the database. If the data is synchronized then the amount will be detected from the respective owner's account and gate will be opened. If the data gets mismatch then the buzzer will be activated. LCD is used to display the detected amount and directions in case of no money in the account.

When the car enters the toll gate the RFID in the car gets activated by using the RF signals from the RFID module. RFID reader gets the data from the tag and then it is checked. If the data is correct then it goes for checking the sufficient balance in the account. If there is sufficient balance in the account then the corresponding amount is detected and message is sent to the particular owner. If there is no sufficient balance then the display shows as take diversion. If the details in the tag are not correct then the buzzer will be activated and gate will not open.

2.2 Technical Specifications:

2.2.1. Arm Controller:

Arm is a 32-bit Reduced Instruction Set Computer (RISC). Instruction set architecture named as Advanced RISC machine and, before that Acorn RISC machine. The ARM architecture mostly used 32-bit instruction set architecture.

Features

- 32-bit RSIC processor core (32-bit instructions)
- 37 pieces of 32-bit integer registers (16 available)
- Pipelined (includes 3 stages)
- Cached (depending on implementation)
- Von Neumann-type bus structure (ARM7) and Harvard (ARM9)
- 8 or 16 or 32-bit data types
- 7 modes of operation
- Simple structure and reasonably good speed to power consumption. •

LPC2148 is the heart of system. Used in all three modules. It controls all the functions. It is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer.

It has the following features:

- 8 to 40 kB of on-chip static RAM. 32 to 512 kB of on-chip flash program memory.
- 128 bit wide interface/accelerator enables high speed 60 MHz operation.
- In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software
- Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms
- Total 64 I/O pins

2.2.2. RFID Technology:

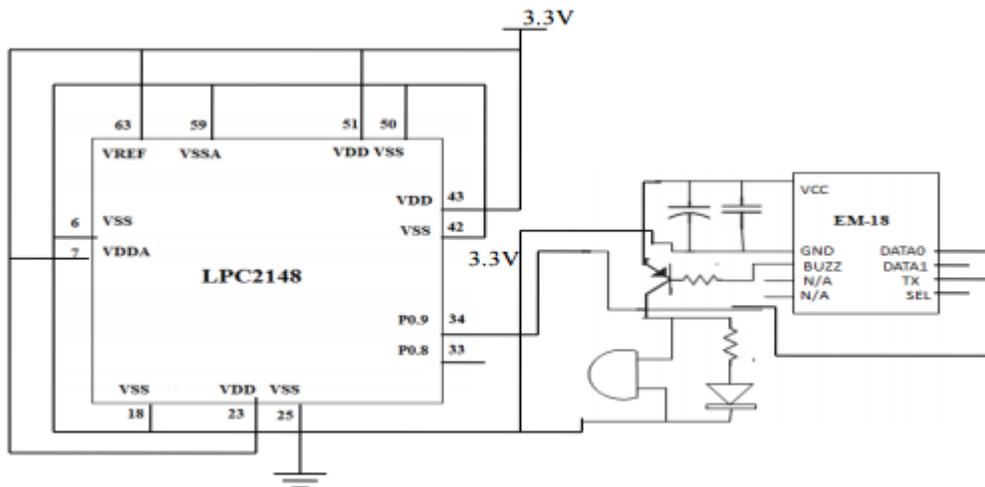
RFID stands for “Radio Frequency Identification”. It is a small electronic device that consists of small microchip and antenna. The chip typically is capable of carrying 2,000 bytes of data or less. RFID works same as the barcodes. It provides a unique identifier for that object. Advantage of RFID over barcodes is it does not need to be positioned precisely relative to the scanner. It will work within few feet (up to 20 feet for high frequency)

RFID tags can read in a wide variety of circumstances, where barcodes or other optically read technologies are useless

- The tag need not be on the surface of the object
- The read time is typically less than 100 milliseconds
- Large number of tags can read at once rather than item by item

Frequency Range	Frequencies	Passive Read Distance
Low frequency	120-140 KHz	10-20 cm
High frequency	13.56 MHz	10-20 cm
Ultra- High frequency	868-928 MHz	3 meters
Microwave	2.45&5.8 GHz	3 meters
Ultra-Wide Band	3.1-10.6 GHz	10 meters

RFID Interfacing With LPC2148:



2.2.2. Serial Communication

RS232 (Recommended standard-232) is a standard interface approved by the Electronic Industries Association (EIA) for connecting serial devices. RS232 is a serial communications standard which enables data to be transferred in serial from between two devices. Data is transmitted and received in serial ‘bit stream’ from one point to another. Standard RS232 is suitable for data transfer to about 50m, although special low-loss cables can be used for extended distance operation. Four parameters specify an RS232 link between two devices.

2.2.3. Global System For Mobile Communication

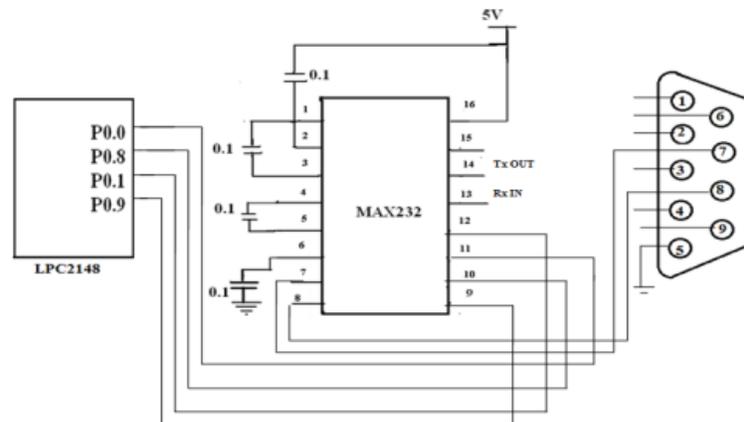
GSM is a digital mobile telephony system. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

Because radio spectrum is a limited resource shared by all users, a method must be devised to divide up the bandwidth among as many users as possible. Chose a combination of TDMA/FDMA as its method. The FDMA part involves the division by frequency of the total 25

MHz bandwidth into 124 carrier frequencies of 200 kHz bandwidth. One or more carrier frequencies are then assigned to each BS. Each of these carrier frequencies is then divided in time, using a TDMA scheme, into eight time slots.

SIM900 General Specification:

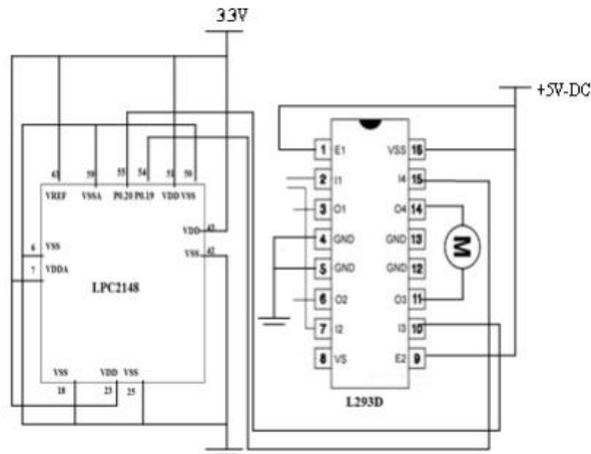
Dual-Band 900/ 1800 MHz GPRS multi-slot class 10/8 GPRS mobile station class B
Control via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands) SIM application toolkit Supply voltage range: 3.2 ... 4.8V Low power consumption: 1.0mA(sleep mode) Operation temperature: -40°C to +85 °C.



2.2.4. Driver L293D:

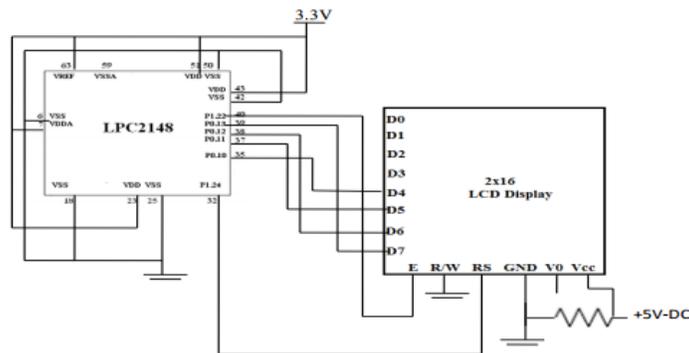
L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).

The l293d can drive small and quiet big motors as well. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, Hence H-bridge IC are ideal for driving a DC motor.



2.2.5. Liquid Crystal Display

LCD is a type of display used in digital watches and many portable computers. LCD displays utilize two sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. LCD technology has advanced very rapidly since its initial inception over a decade ago for use in laptop computers. Technical achievement has resulted in brighter displays, higher resolutions, reduced response times and cheaper manufacturing processes.



2.2.6. Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

2.3. Results & Analysis

When initially the power supply is given to helmet then we can observe the below indication on LCD display



Figure 2.3.1:ARM besed Accident Detector

Then the helmet checks weather the rider wears the helmet or not with the help of push buton then it checks the rider condition. If he is alcoholic the message will be sent to preset numbers as shown in below fig



Figure 2.3.2: Displaying Alcohol Detection



Figure 2.3.4: Sending Message to prescribed numbers

In case of any accidents the accident is detected with the help of mercury switch and message is sent to preset numbers for emergency services with the help of GSM and GPS the position of accident also sent in message as shown in below fig



Figure 2.3.5: Displaying accident detection

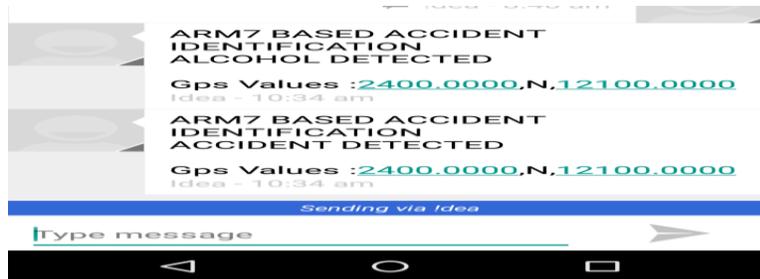


Figure 2.3.6: Tracking of accident location

In this way the multi featured helmet is useful to make the rider wear the helmet along with avoiding alcohol consumption. Moreover it helps in detecting accidents along with place in order to provide emergency services.

2.4. Conclusion

2.4. Conclusion

A “Multi Feature Helmet for Reducing Accidents and to Provide Emergency Services” is not limited for any particular purpose, It can be used anywhere in a developing industry with little modifications in software coding according to the necessities. This concept can be used in many developing countries in order to save the rider life. It ensures that our work will not only be usable in the future but also provides the flexibility to adapt and extend, as needs change.

In our scheme we associated all the sensors to micro controller with the wires. This can be originated with wireless such that we can put different sensors in different places. This sensor will turn on the micro controller with the signals instead of using wires. The multi featured helmet can be improved further along with growing technology and needs of the rider to provide more comfort. And the features like providing navigation system to the rider during riding with the help of GPS and lights during nights etc can be implemented.