A Panorama of Advanced Ride Safety Notifier

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***Abstract*— People get lot of problems, face adventurous situations, that range from a mild event to severe, lifethreatening context. Risk situations stem from a number of accidents. Human life is more valuable than anything in this world. Timely help is more important than lending a helping hand. Our project is one among those which is designed in a way to save human lives in a timely manner. There are five main modules discussed in our exploitation. When a bike is met with an accident, immediately the message is sent to the parent/well-wisher of the particular concern by using GSM, thereby ensuring timely help to the needy. Thus a novel visualization method to track and to identify, in real-time, when a person is under risk-prone situation is created. Providing safety to a person while riding the bike is of elite concern. One way to do this is by making it mandatory to wear a helmet while riding a bike with the help of limit switch. This is difficult to implement at every time as the concerned people can't keep an eye on everyone. Alcohol is the thirst quencher for most of the drug addicts. So detecting whether the driver has worn a helmet or not, as well whether he has consumed alcohol or not, is the main issue. The system makes it mandatory for the rider to wear a helmet before starting the vehicle by using Radio signals and also he shouldn't have consumed alcohol which is detected by using alcohol sensor(MQ-3).Thus it is mandatory for the rider to do so. And the vehicle cannot be started even if the license of the person is not with him which provides a better way to escape from the police while checking. This is done with the help of RFID. Two-wheelers account for 37% of total road crash deaths. The main reason behind this is over speed. Our invention also stops the vehicle if it exceeds the speed limit thereby reducing the fuel supply.**

Keywords-Accident, Alcohol, Helmet, License, Message, Over Speed, Safety and Vehicle.

Highlights

1. Following traffic violence will be detected and notification is
sent to the registered mobile number. 1.1. Driving without license
1.2. Driving Without helmet
1.3. Drink and drive
1.4. Over speed Cut off
1.5. Accident Occurrence
2. This project put an end to people not obeying the traffic rules and regulations such as not wearing the
helmet, drunk and drive, driving without license, driving more than the speed limit i.e. Over Speed,
etc.
3. It is a cost effective project too.
4. It also has improved reliability and performance.
5. Precaution is provided for safety driving.

I. INTRODUCTION

A system architecture is the conceptual model that gives the detail description about the structure,behaviour, and more views of a system which are legal and academic. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system. System architecture can comprise system components ,externally visible properties of those components, the relationships (e.g. the behaviour) between them i.e. clearly understood. The Graphical abstract depicts the flow of information between the main components of traffic violence. According to experimental and real-world study, the root cause of majority of accidents can be traced back to the behaviour of the one who drives the vehicle, the driver himself. So it is very important for the development of safety features.The limit switch and the LCD and the RF encoder with RF transmitter are connected to the controller. This section is fixed in the Helmet. In this the limit switch is to detect if the person is properly wearing the helmet or not. If the helmet is not worn properly the controller detects the pulse from limit switch and alcohol sensor detects the drunk and drive also that a corresponding pulse transmit via RF transmitter with encoder. In the receiving section with help of the RF receiver and the Decoder receives the command from the helmet. The controller receives the command and then On/Off the engine using relay. And the RFID initially it checks for License Verification without DL Engine will not start. The speed of the vehicle will be calculated by the USLOT sensor and if the vehicle is moving in over speed then the controller will turn off the engine using relay, at the same time the message will be sent to the android app in the user's android mobile and also sends all Sensor Status to Android app. The commands are sent by the microcontroller depending on the limit switch input, and the USLOT sensor input to the controller. Thus we can provide precaution in safety driving.

II. RELATED WORKS

The new approach towards automobile safety and security. According to experimental and real-world study, the root cause of majority of accidents can be traced back to the behaviour of the one who drives the vehicle, the driver himself. So it is not only important to develop more active

safety features to avoid accidents but it is equally important to develop cost-effective technological solutions that can accurately identify the driving behaviour of drivers and to assist them. Previous research uses eye blink sensor technology to detect driver's fatigue. But it is not driver adaptable and has some drawbacks. To overcome those problems, this paper proposes an integrated concept of steering wheel grip force measurement and HRV[3]. It also employs various features such as Mobile Baseband Monitoring, Hands Free Auto Reply SMS, Driver Fatigue Warning, Drunk and Drive Prevention, Collision Pre safe Activation, GSM and GPS Based Accident/Panic Alert using ARM Cortex M3 to assist the driver, thus preventing his malfunctions and ensures a safe journey. The speed sensors observes the average speed value of the cars at regular time intervals and adopt a thresholdbased approach to generate local predictions. Since collisions are eventually reported we assume that the information about the real occurrence of a collision is eventually given to the sensors. We propose an online learning rule that exploits this feedback to adapt the weights that each sensor gives to different local predictions.

III. ARCHITECTURE DIAGRAM

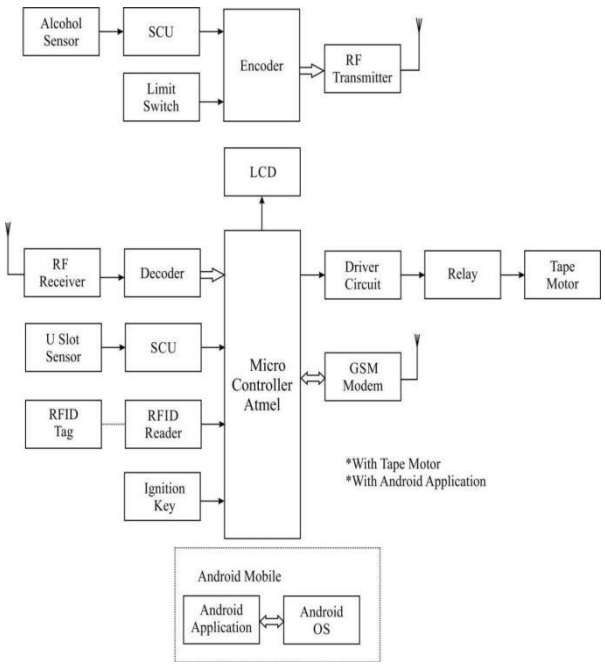

Figure 1. Overall System Architecture

IV. OVERALL SYSTEM VIEW

A system architecture is the conceptual model that gives the detail description about the structure, behaviour, and more views of a system which are legal and academic. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system A system architecture can comprise system components, externally visible properties of those components, the relationships (e.g. the behaviour) between them i.e. it is very clearly understood. The flow of information between the main components of traffic violence is discussed. The limit switch and the LCD and the RF encoder with RF transmitter are connected to the controller. This section is fixed in the Helmet. In this the limit switch is to detect if the person is properly wearing the helmet or not. If the helmet is not worn properly the controller will detect the pulse from limit switch and alcohol sensor detects the drunk and drive Also that a corresponding pulse transmit via RF transmitter with encoder. In the receiving section with help of the RF receiver and the Decoder receive the command from the helmet. The controller receives the command and then On/Off the engine using relay. And the RFID initially it checks for license Verification without DL Engine will not Start. The speed of the vehicle will be calculated by the USLOT sensor and if the vehicle is moving in over speed then the controller turn off the engine using relay, same time the message will be sent to the android app in the user's android mobile and also sends all Sensor Status to Android app. The commands are sent by the microcontroller depending on the limit switch input, and the USLOT sensor input to the controller. So we can provide make precaution for a safety ride.

A. Alcoholic sensor:

The above figure depicts the alcohol measurement using alcohol sensor. Alcohol Sensor for use in Breath analyzer's or in an alarm unit, to detect the presence of alcohol vapors. This sensor unit offers very high sensitivity, combined with a fast response time. The unit will work with a simple drive circuit and offers excellent stability with long life. Ideal sensors are used to detect the presence of a dangerous alcohol use and drive or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has a perfect sensitivity combined together with a quick and fast response time. The sensor can also sense iso-butane, propane, LNG, cigarette smoke, etc., This circuit is mainly designed to measure the alcohol level in the human body. The alcohol is measured by the alcohol sensor. The alcohol sensor is the one type of transducer which produces the voltage signal depends on the alcohol level. Then the voltage signal is given to inverting input terminal of the comparator. The comparator is constructed by the operational amplifier LM 741. The reference voltage is given to non inverting input terminal. The comparator compares with normal reference level and produces the corresponding output error signal which is given to next stage of gain amplifier. In the gain amplifier the variable resistor is connected in the feedback path. By adjusting the resistor we can get the desired voltage gain. Then the final voltage is given to ADC to convert analog signal to digital signal. Then the converted digital signal is given to microcontroller in order to determine the alcohol level. The gas sensor is the special sensor which designed for sense the gas leakage. In the gas sensor the supply voltage is given to input terminal. The gas sensor output terminals are connected to non inverting input terminal of the comparator. Here the comparator is constructed with operational amplifier LM 358. The reference voltage is given to

inverting input terminal. The reference voltage is depends on the desired gas intensity. When there is no leakage the non inverting input is grater then inverting input so the output of the comparator is positive voltage which is given to the base of the switching transistor BC 547. Hence the transistor is conducting. Here the transistor is act as switch so the collector and emitter will be closed. The output is taken from collector terminal. Now the output is zero which is given to hex inverter 40106. When there is gas leakage the inverting input voltage is greater than non inverting input. Now the comparator output is -12V so the transistor is cutoff region. The 5v is given to hex inverter 40106 IC. Then the final output data is directly given to microcontroller to determine the gas leakage.

B. DC Motor Forward Reverse control:

This circuit is designed to control the motor in the forward and reverse direction. It consists of two relays named as relay1, relay2. The relay ON and OFF is controlled by the pair of switching transistors. A Relay in electromagnetic switching device consists of 3 pins. They are Common, Normally close (NC) and normally open (NO). The common pin of two relay is connected to positive and negative terminal of motor through snubber circuit respectively. The relays are connected in a collector terminal of transistors T2 and T4. When high pulse signal is given to either base of the T1 or T3 transistors, the transistor is conducting and shorts the collector and emitter terminal and zero signals is given to base of the T2 or T4 transistor.

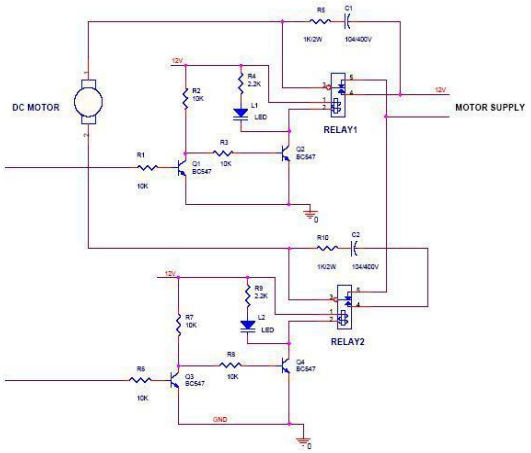

Figure 2. Circuit diagram of forward Reverse control(DCmotor)

So the relay is turned OFF state. When low pulse is given to either base of transistor T1 or T3 transistor, the transistor is turned OFF. Now 12v is given to base of T2 or T4 transistor so the transistor is conducting and relay is turn ON. The NO and NC pins of two relays are interconnected so only one relay can be operated at a time. The series combination of resistor and capacitor is called as snubber circuit. When the relay is turn ON and turn OFF continuously, the back EMF may fault the relays. So the back EMF is grounded through the snubber circuit.

4.2.1. When relay 1 is in the ON state and relay 2 is in the OFF state, the motor is running in the forward direction.

4.2.2. When relay 2 is in the ON state and relay 1 is in the OFF state, the motor is running in the reverse direction.

C. Decoder In RF:

The RF receiver is used to receive the encoded data which is transmitted by the RF transmitter. Then the received data is given to transistor which acts as amplifier. Hereafter the amplified signal is given to the carrier demodulator section in which transistor Q1 is turned on and off and the conducting depends on the signal. Due to this the capacitor C14 is charged and discharged so carrier signal is removed and saw tooth signal is appears across the capacitor.

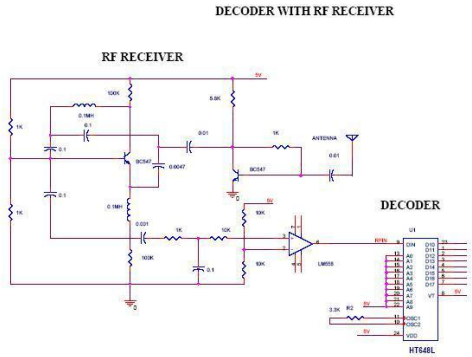

Figure 3. Circuit d iagram of decoder in RF

Then this saw tooth signal is given to comparator. The comparator circuit is constructed by LM558. The comparator is used to convert the saw tooth signal to exact square pulse. Then the encoded signal is given to decoder in order to get the decoded original signal.

1) Decoder:

In this circuit HT648 is used as decoder. The 318 decoder consists of CMOS LSIs for remote control system application. They are paired with 318 series of encoders. For proper operation a pair of encoder/decoder pair with the same number of address and data format should be selected. The 318 set of decoder receives serial address along with the data from that series of encoders that are transmitted by a carrier using an RF or an IR transmission medium. Later the comparison of serial input data twice continuously with its local address is done. If there are zero errors or any unmatched codes that are encountered, the input data codes are decoded and then transferred to the output pins. The VT pin goes high to indicate valid transmission. The 318 decoders have the capacity of decoding 18 bits of information that consists of N bits of address and 18-N bits of data. To meet various applications they are arranged to provide a number of data pins whose range is from 0 t08 and an address pin whose range is from 8 to 18. In addition, the 318 decoders provide various combinations of address/ data numbering different package. In this circuit the received encoded signal is 9th pin of the decoder. Now the decoder separate the

address (A0-A9) and data signal (D0-D7). Then the output data signal is given to microcontroller or any other interfacing device.

D. Encoder if RF:

1) LPT Port:

The LPT is nothing Line printer terminal. It is the 25 pin D type connector acts as interface connector.It is used to interface the computer to the hard ware circuit. In this connector 2 to 9 pins are the data pins which are interfaced with data pins of the encoder. When any data to be transmitted from the PC which is given to encoder through LPT connector.

2) Encoder:

In this circuit HT 640 is used as encoder. The 3_{18} encoders are a series of CMOS LSIs for remote control system application. It has the capacity of encoding 18 bits of information which consists of N address bit and 18-N data bits. Each address/data input is externally trinary programmable if bonded out. It is otherwise set floating internally. Various packages of the 3^{18} encoders offer flexible combination of programmable address/data is transmitted together with the header bits via an RF or an infrared transmission medium upon receipt of a trigger signal.

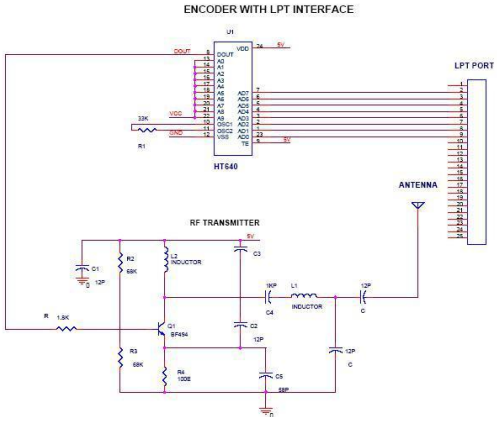

Figure 4. Encoder with LPD interface in RF

The capability to select a TE trigger type further enhances the application flexibility of the 3^{18} series of encoders. In this circuit the input signal to be encoded is given to AD7-AD0 input pins of encoder. The encoder output address pins are shorted so the output encoded signal is the combination of (A0-A9) address signal and (D0-D7) data signal. The output encoded signal is taken from 8^{th} which is connected to RF transmitter section.

E. RF Transmitter:

Whenever the high output pulse is given to base of the transistor BF 494, the transistor is conducting so tank circuit is oscillated. The tank circuit is consists of L2 and C4 generating 433 MHz carrier signal. Then the modulated signal is given LC filter section. After the filtration the RF modulated signal is transmitted through antenna.

F. Limit Switch:

The switch is the most basic of all sensors, consists of 2 types such as open and normally closed. Prior to advances in sensor technology, mechanical switches were used extensively in control applications. Because of increased reliability and performance, mechanical switches are still used for this purpose, but they are primarily used where switch actuation and wear are minimal. The standard limit switch is a mechanical device that uses physical contact to detect the target. A typical limit switch consists of a switch body and an operating head. The Switch body contains electrical contacts for energizing or de-energizing a circuit. The operating head incorporates a lever arm or plunger. This is also called an actuator. The actuator rotates when the target applies force. This movement changes the state of contacts within the switch body. Several types of actuators are available. The roller type actuator is well suited for applications where sliding contact leading the rotary part to rotate will otherwise cause contact wear to take place over a specific time. The fork-style actuator must be physically reset after each operation and is suitable for critical stop applications in movement control. i.e. where a limit of movement has been exceeded and a mutual rest is required following an emergency stop. Flexible loop and spring rod actuators can be actuated from all directions, making them suitable for applications where the direction of approach is constantly changing. Plunger-type actuators are ideal where short, controlled machine movements are present, or where space or mounting does not permit a lever-type actuator. The plunger can be activated in the direction of plunger stroke, or at a right angle to its axis. All switches use the following common definitions of contact type.

G. Relay:

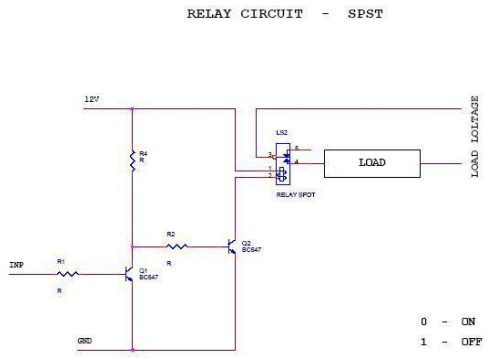

Figure 5. Relay Circuit (SPST)

A relay is an electrically operated switch. Current flowing through the coil of relay causes magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays give permission for one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. Also there is no electrical connection

inside the relay between the 2 circuits i.e. the link is magnetic and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The extreme output current for the popular 555 timer IC is 200mA so these devices allows the supply of relay coils directly without amplification.

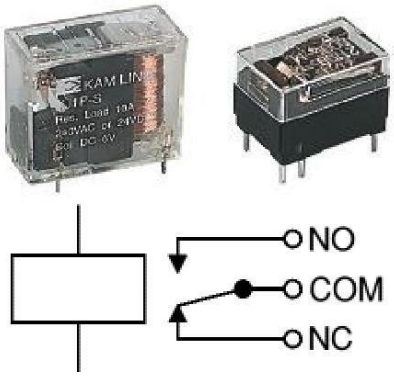

Figure 6. Relays

The relays are generally SPDT/DPDT, which can also have more sets of switch contacts, for example relays with four sets of changeover contacts will be readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay. An animated picture depicts a working relay with its coil along with the switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. Also there is one set of contacts (SPDT) in the foreground and another behind them, producing the relay DPDT. The relay's switch connections are usually labelled COM, NC and NO:

COM = Common, is the moving part of the switch. NC = Normally Closed, COM is connected to this when the relay coil is off.

NO = Normally Open, COM is connected to this when the relay coil is on.

1) Circuit Description

This circuit is designed to control the load. The load may be motor or any other load. The load is turned ON and OFF through relay. The relay ON and OFF is controlled by the pair of switching transistors (BC 547). The relay is connected in the Q2 transistor collector terminal. A Relay is actually an electromagnetic switching device consisting of three pins. They are Common, Normally close (NC) and Normally open (NO). The relay common pin is connected to supply voltage. The normally open (NO) pin connected to load. When high pulse signal is given to base of the Q1 transistors, the transistor is conducting and shorts the collector and emitter terminal and zero signals is given to base of the Q2 transistor. So the relay is turned OFF state. When low pulse is given to base of transistor Q1 transistor, the transistor is turned OFF. Now 12v is given to base of Q2 transistor so the transistor is conducting and relay is turned ON. Hence the common terminal and NO terminal of relay are shorted. Now load gets the supply voltage through relay.

Voltage signal	Transistor Q1	Transistor Q2	Relay
1	On	Off	Off
0	Off	On	On

H. RFID:

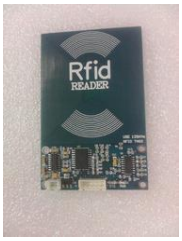

Figure 7. RFID Reader

The RFID reader is used to read EM4100 family transponder tags which are brought in proximity to the reader and output the unique tag identification number through RS232 serial port @9600 bps. The reader outputs 12 byte including one start, stop byte and 10 unique data byte. The start byte and stop byte will easily identify that a correct string has been received from the reader (they correspond to a line feed and carriage return characters, respectively). Middle ten bytes are the actual tag's unique ID. The Vertical and horizontal parity checking has been done in card reading algorithm to make sure of data integrity. One status LED is provided to identify card detection. RFID (radio frequency identification) systems use data strings stored inside RFID tags or transponders) to uniquely identify people/objects when they are scanned by an RFID reader. These types of models are useful in many applications such as passport protection, animal identification, inventory control systems, and secure access control systems, robotics, navigation, inventory tracking, payment systems, and car immobilization. As passive tags require a strong RF field to operate, their effective range is restricted to an area in close proximity to the RFID reader.

1) Product Features:

1.Low-cost method for reading passive RFID EM4100 family transponder tags

2. Reading Distance 10-15CM of the reader (Depend card shape)

3. 125kHz read frequency

4. 9600 baud RS232 serial interface

5. Standard 2.54mm Pitch Berg strip connector

6. Bread Board compatible

7. Low power Requirement 7-9V @ 100mA

8. Small Size

9. Built in Antenna

10. No components at PCB bottom side (easy to stick to any surface like wood, glass etc.,)
11. Status LED for card detection
12. On-Board Power LED

2) Key Specifications:

1. Power requirements : 7-9VDC
2. Current Requirement : <110mA
3. Communication : RS232 Serial at 9600 baud (8N1)
4. Dimensions : 63mm x 98mm x 5 mm
5.Operating temp range : -40 to +185 °F (-40 to +85 °C)

This is a basic VLF RFID tag used for presence sensing, Access Control etc. Works in the 125kHz RF range.These tags come with a unique 32-bit ID and are not re-programmable. Card is blank, smooth, and mildly flexible.

3) RFID Clamshell Card (125kHz) Features:

EM4001 ISO based RFID IC
1. 125kHz Carrier
2. 2kbps ASK
3. Manchester encoding
4. 32-bit unique ID
5. 64-bit data stream [Header+ID+Data+Parity
6. Dimensions: 54 x 85.5 x 1.8mm.

I. ATMEL Microcontroller:

The major Features of 8-bit Microcontroller ATMEL 89C51:

1. 8 Bit CPU optimized for control applications
2. Extensive Boolean processing (Single - bit logic) Capabilities.
3. On - Chip Data RAM
4. Bi-directional and Individually Addressable I/O Lines
5. Multiple 16-Bit Timer/Counters
6. Full Duplex UART
7. Multiple Source / Vector / Priority Interrupt Structure
8. On - Chip Oscillator and Clock circuitry.
9. On - Chip EEPROM
10. SPI Serial Bus Interface
11. Watch Dog Timer
12. On Flash program memory.

J. Global System for Mobile Communications (GSM):

GSM services are a standard collection of applications and features available to mobile phone subscribers all over the world. The GSM standards are defined by the 3GPP collaboration and implemented in hardware and software by equipment manufacturers and mobile phone. The common standard makes it possible to use the same phones with different companies' services, or even roam into different countries. GSM is the world's most dominant mobile phone standard. The design of the service is moderately complex because it must be able to locate a moving phone anywhere in the world, and accommodate the relatively small battery capacity, limited input/output capabilities, and weak radio transmitters on mobile devices.

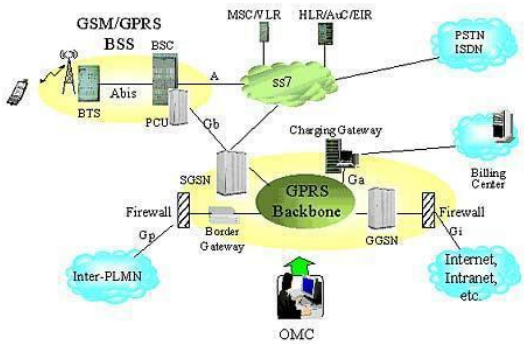

Figure 8. GSM

K. Vehicle sensing process:

1) RFID tag:

1. In a basic RFID system, tags are attached to all items that are to be tracked. These tags are made from a tiny tag-chip, sometimes called an integrated circuit (IC), connected to an antenna that can be built into many different kinds of tags which includes apparel hang tags, labels, and security tags, along with a wide variety of industrial asset tags. The tag chip contains memory which stores the product's electronic product code (EPC) and other variable information so that it can be read and tracked by RFID readers anywhere.

2. An RFID reader is a network connected device (fixed or mobile) with an antenna that sends power as well as data and commands to the tags. The RFID reader acts like an access point for RFID tagged items so that the tags' data can be made available to business applications.

L. Uslot sensor with driver circuit:

1.This circuit is designed to monitor the speed of the motor. The holes type pulley is attached in the motor shaft. The pulley is rotated across the USLOT. The USLOT consists of IR transmitter and receiver.

2. Infrared transmitter is one type of LED which emits infrared rays generally called as IR Transmitter. In the same way IR Receiver is used to receive the IR rays transmitted by the IR transmitter. It is to be noted that the both IR transmitter and receiver should be placed in a straight line.

V. EXPERIMENTAL RESULT

A test case, in Software Engineering, is a set of conditions under which a tester will determine whether an application, Software system or one of its features is working as it was originally intended. The mechanism for determining whether a software program or system has passed or failed such a test is known as a test oracle. In some settings, an oracle could be a requirement or use case, while in others it could be a heuristic. It may take many test cases to determine that a software program or system is considered sufficiently scrutinized to be released. Besides a description of the functionality to be tested, and the preparation required to ensure that the test can be conducted, the most time-consuming part in the test case is creating the tests and modifying them when the system changes. Under special circumstances, there could be a need to run the test, produce results, and then a team of experts would evaluate if the

results can be considered as a pass. This happens often on new products' performance number determination. The first test is taken as the base line for subsequent test / product release cycles. Acceptance test which use a variation of a written test case, are commonly performed by a group of end users or clients of the system to ensure the developed system meets the requirements specified or the contract. User acceptance tests are differentiated by the inclusion of happy path or positive test cases to the almost complete exclusion of negative test cases.

TABLE I. TEST CASE

S.NO	TEST cases	EXPECTED OUTPUT	ACTUAL OUTPUT	STATUS
1.	Helmet worn	Bike will start	Bike will start	pass
2.	No helmet	Bike will not start	Bike will not start	pass
3.	Alcohol detected	Bike will stop	Bike will stop	pass
4.	overhead	Bike will stop	Bike will stop	pass

VI. CONCLUSION

Thus the paper proposes an approach for effectively designing user-friendly driver vigilance application especially target at preventing accidents. This paper aims to design an advanced driver safety awareness and assistance system that will monitor the driver and command the vehicle to take vital safety measures in order to overcome the serious problems. In future, a more advanced version of this system can also be developed according to the advancements in science and technology. Some of traffic violations are identified in a mechanized way, This system can especially be used in public transportation system of our country and also to reduce the number of accidents in the country's roads and streets.

VII. FUTURE ENHANCEMENT

1. Device is useful for two wheeler drivers.
2. In Future it can also be used for four wheeler with small modification. For, example, Adding Seat belt wearing by replace helmet, traffic sign detection and voice alert.

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