

TWO-WHEELER FATALITY PROTECTION USING INFLATABLE TUBE MECHANISM

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Technology degree in Biomedical Engineering.

By

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**DEPARTMENT OF BIOMEDICAL ENGINEERING
SCHOOL OF BIO AND CHEMICAL ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Durga M (37240022)**, have done the project work entitled “**TWO-WHEELER FATALITY PROTECTION USING INFLATABLE TUBE MECHANISM**” under my supervision from **October 2020** to **March 2021**.

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DECLARATION

I, **M Durga (37240022)** hereby declare that the Project Report entitled “**Two-Wheeler Fatality Protection Using Inflatable Tube Mechanism**” done by me under the guidance of **Mrs. Sindu Divakaran**, Department of Biomedical Engineering is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Biomedical Engineering.

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PLACE: Chennai.

SIGNATURE OF THE CANDIDATES

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ABSTRACT

An accident can be defined as a particular, unusual, unexpected and unintended external action that occurs during a specific time and place, with no apparent and voluntary cause but with marked effects. The carelessness of the driver is the major factor of such accidents. The traffic authorities provide a lot of instructions to the vehicle operators. But many of them do not obey the traffic rules and regulations. At present most of the countries are forcing the motor riders to wear an helmet and to avoid using the vehicles when the person is in a drunken state. But still, the users tend to violate the rules. To overcome this problem, we have introduced an intelligent system called the Smart Helmet, that automatically checks whether the person is wearing the helmet and has non-alcoholic breath while driving. In this we have fixed a transmitter at the helmet and the receiver at the bike. There is a switch used to sure the wearing of the helmet on the head. The ON condition of the switch ensures the placing of the helmet properly. An alcohol sensor is placed to detect the presence of alcohol. The microcontroller is responsible for controlling the function of relay and thus the ignition. It also controls the engine with the help of a relay and a relay interfacing circuit. The system also sends a message stating "Accident occurred" that includes the latitude and longitude location of the incident using GSM and GPS. It uses an Accelerometer sensor to detect an accident and it has the extra safety future for the helmet in case it detects the rider is going to fall the helmet will automatically inflate the tube.

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LIST OF ABBREVIATIONS

DMP	Digital Motion Processor
eSIM	Embedded Subscriber Identity Module
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communication
JSON	JavaScript Object Notation
LED	Light Emitting Diode
MEMS	Micro Electro Mechanical Systems
MCU	Microcontroller
MPU	Microprocessing Unit
PIC	Peripheral Interface Controller
PSI	Pounds per Square Inch
QFN	Quad Flat No Leads
RoHS	Restriction of Hazardous Substances
RPM	Revolutions Per Minute
USB	Universal Serial Bus
VLSI	Very Large Scale Integration

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CHAPTER 1

INTRODUCTION

1.1 ROAD ACCIDENTS

India has a huge number of road accidents every year. The accidents may be due to many reasons like by drink and drive, driving rashly, exceeding the speed limit, etc. As the number of bikers in our country are increasing the road mishaps also increase day by day due to which most of the deaths occur. Most of them are caused due to most common mistake of not wearing the Helmets and reaching the high speed. Sometimes, the person who gets injured might not be responsible for the accident. It can be the fault of some other vehicle rider also. But overall both riders will get affected. Due to a lack of first aid and emergency medical services on time, the riders may die. Some deaths are due to the ambulance not reaching the desired location on time. In case of an accident, to save time and inform the concerned person, a system is proposed which can make sure that the rider gets the required attention in a short time (Mahesh S., et.al., 2020).

Application of electronics in the automobile field has become very much popular now. Due to the low prices and wide varieties available in the market people prefer motorbikes to buy over 4 wheelers. Hence Road Safety is a major issue of concern of all times. Therefore it becomes necessary to implement such a type of technique which is difficult to bypass the basic rule of wearing helmet and to avoid drunken driving. In many accidents, the rider gets injured mainly on the head (Sudharsana V., et.al., 2014).

As per World Health Organization (WHO) we have identified that 40% of the deaths and 70% of severe injuries can be reduced if bike rider wears the helmet. Most of the accidents occur outside the cities and is mostly due to drunken driving and no testing methodology is adopted to avoid these fatalities in highways (Nataraja N., et.al., 2018).

Human error is the main factor causing accidents such as violate traffic signs and speeding above the speed limit. These factors are reasonable because speeding could reduce the driver's response time to avoid unexpected obstacles. In addition, judging from the high percentage of deaths where head injury as the main cause and the reduction in injury probability by 25% can be concluded the importance of the rider to wear the helmet correctly. According to a study, there are three factors that contribute to the traffic accident such as, agent (human factor), host (vehicle condition) and environment (road and weather condition). If the rider is in good health and both vehicle and environment are in perfect condition, traffic accident should not occur. In addition to potholes and speed bump that doesn't meet the standard could also cause the accidents. Pothole and speed bump will affect the stability of the motorcycle if the rider passthrough with an unsafe speed. Compared to road factors, it is clear that human factors are relatively easier to control (Agung R.B.,et.al.,2018).

1.2 OUTLINE OF THE PROJECT

A helmet plays a very important role in saving the life of a rider. So to encourage people to wear helmets and to avoid accidents, an intelligent system is proposed that synchronizes the module present in the bike with the module present on the helmet. Here we have designed a system that checks the two conditions before turning ON the engine of the bike. Our system also includes an alcohol sensor and a switch that can sense the helmet. Two switches are used to detect whether the biker is wearing helmet. The role of alcohol sensor is to detect whether the rider is drunk with his breath. The output is fed to the MCU. The switch is fitted on the helmet. If any of the two conditions are violated the engine won't be turned ON. If a rider is not wearing the helmet and starts the bike, it won't start. The rider must wear the helmet to start the bike. Only when the rider wears a helmet, the module present in the bike synchronizes with the module present on the helmet. There is an MQ- 6 (alcohol) sensor that is placed near the bike rider's mouth. If the MQ-6 sensor senses the alcohol content in the rider breath then the bike won't start. The Alcohol Sensor provides an analog resistive output based on the concentration of alcohol. Here, MCU is the microcontroller unit, that controls all the functions of other blocks connected in this system. MCU takes or reads the data from the sensors incorporated and controls all

the functions of the complete system by manipulating the data. Alcohol sensor is connected to the MCU via an interfacing circuit and therefore the helmet sensing switch is connected to the MCU directly. MCU receives data from the sensors and it provides a digital data corresponding to the sensor output to the encoder only if the two conditions are satisfied. After clearing the tests of wearing the helmet and the alcohol sensor test, the bike can start. The distinctive speciality of project is fall detection. This is detected with the help of a Tri-axial Accelerometer. This is fitted on the bike. When the accelerometer inclines more than a particular angle it senses that the person has fallen. This leads to inflation of a tube around the rider's neck. if the bike rider fails to press the emergency button on the bike the alert message with the help of GSM will be automatically delivered to the rider's concerned person (Sudharsana V, et.al., 2014).

1.3 DIFFERENT SMART HELMETS:

1.3.1 *Lumos helmet*



Fig 1.3.1 Lumos helmet

Lumos tends to be the world's first smart bike helmet which integrates lights, hard brake, turn signals, and helmet into a single cohesive whole. It features 48 individual LEDs in both the front and back to ensure our visibility on the road. Lumos comes in a one size that fits most of the riders and is adjustable to a head measurement of 54cm

62cm. They are yet to add additional sizes including a kids size in the future. Bright white LEDs in the front, red in the rear, and left and right turn signals proved illumination that stands out and can be easily understood by other road users. The helmet includes a small wireless handlebar remote which can activate the turn signals. The water resistant helmet and the remote are powered with a rechargeable battery. The helmet is available in three attractive colors: Pearl White, Charcoal Black, and Cobalt Blue (Patil N.S., 2018).

1.3.2 Cross helmet



Fig 1.3.2 Cross helmet

Till date motorcycles have evolved faster than helmets have. This product combines integrated head-up display with 360 degree range of view, sound management, along with Bluetooth features for the riders. It is the smartest motorcycle helmet ever. The helmet works by syncing with our phone in a wireless mode (using Bluetooth). The app can connect to Strava, or we can use the inbuilt GPS feature to track our route to provide navigation. The helmet straps have built-in bone conduction speakers that sit on the forward strap portion, contacting your cheekbones, allowing us to listen to music, podcasts or take calls (Patil N.S., 2018).

1.3.3 LifeBEAMs



Fig 1.3.3 LifeBEAMs Helmet

LifeBEAMs are wearable Smart Helmets that enables the cyclists around the world to train for their maximum effort. Bike rides have officially become Smarter, and so no more restricting fitness gear. LifeBEAMs wearable Smart Helmet combines accuracy, knowledge and results in almost every bike ride. Track and exceed your limits with accurate measurements of your heart rate, steps, and calories. Andrew Artishchev the founder of LiveMap once told TechCrunch at CES 2018 that his company has enough runway to certify the helmet for use in America and enter into production. He strongly believes that his company has the proper design and management to get LiveMap certified and to let it in the market. LiveMap is targeting a US launch. With the fully-integrated, intelligent, augmented-reality helmet, a rider will only have to think about a single device. Because it is integrated into the helmet, the rider is never going to leave it behind or lose it, or even worse, have it stolen, while he goes to refuel, have a coffee while taking a break on his journey. Charging is simple and is done with a single device and that can take place at home or en route (Patil N.S., 2018).

CHAPTER 2

LITERATURE SURVEY

Our project has been done in the state of Chennai, India and we have kept the local statistics of accidents in account. We have come across various inputs that enhance the importance of wearing a helmet during bike riding. The occurrences of accident are very common in our country, especially when it comes to two-wheeler or bikes. Moreover, the chances of getting injured in a two-wheeler accident are far greater as the rider is fully exposed during the ride. Although four wheelers have air bags and various other ways to save the passengers in case of a major or minor accident, bike riders remain entirely exposed in the way of harm. Therefore, our project aims at providing safety to the two-wheeler riders.

Our project will provide a method like airbags in cars for the riders in a bike. The purpose is to mainly protect the head of the rider in case of any major accidents. Whether the accident is big or small, the chances of head injury are huge and even minor head injuries can lead to fatal complications. It is extremely important for riders to keep their head especially protected while riding.

This is where our project concept comes in. With the guidance of our teachers or Sathyabama Institute of Science and Technology, we have come forward with an concept and prototype for the safety of bike riders. Our project was performed with the help of Barola Technologies. We have developed a prototype of a helmet that inflates in case the rider is in an accident. The inflated tube is for the purpose of cushioning the head of the rider during the accident to prevent hard jerks to the head. Moreover, our device will also prevent 'drink and drive' with its alco-lock technology. The rider's safety is also taken care as in case of an accident, the bike module of our device will inform the local hospital, police station and relatives whose numbers will be fed to the device previously. The location of the rider will also be shared using a GPS module to ensure that help arrives as soon as possible.

In literature, survey we come across various methods used to improve the Two-wheeler or bike safety inflatable helmet. The helmet consists of alcohol sensor and accelerometer and acts as accident prevention device. The intelligent helmet consists of sensors that detects the occurrence of an accident and makes provisions to sound an alert using GSM device. The “Two-wheeler or bike safety inflatable helmet” automatically checks whether the person is wearing the helmet and has non-alcoholic breath while driving. The relay does not ON the vehicle unit if these two conditions are not satisfied. The ALCHO-LOCK function is used to prevent drink and drive scenarios and accelerometer is for detecting accidents. There is a switch used to check whether the helmet is worn or not. The ON condition of the switch indicates tht the helmet is placed properly. An alcohol sensor is attached near to the mouth of the driver in the helmet to detect the presence of alcohol. The accident detection device sends the accelerometer values to the processor which continuously checks for erratic variations. The most important property of the bike is that the bike’s engine gets started only when the person wears helmet. The device uses advance properties like alcohol detection, accident identification, and uses hands free device, solar powered, fall detection. This makes not only two-wheeler or bike safety inflatable helmet but also property of smart bike. The vehicle location is obtained by making use of the global positioning device. The device promises a reliable and quick delivery of information relating to the accident in real time (Arpitha et.al., 2018).

The main problem is motor vehicles invented for making human life better, but it affects adverse on human being in the form of accident. Road accidents take place mostly by motor vehicles and motor vehicle is only a human made device if it causes badly in the form of road accidents. Accidents on roads cause harmful injuries to the biker. Mostly death occurs due to collision at brain of biker. This happens due to avoid the helmet while driving. In the accidental condition, primary treatment to the victim is generally delayed. This leads to increasing number of deaths in road accidents. Although cycling confers significant health benefits, the bicycle is associated with more injuries than any other consumer project except for motor vehicles. Data from the National Highway Traffic Safety Administration (2008) indicate 698 bicyclists were killed and 44,000 were injured in 2007 and 15% of those killed and 29% of those injured were under the age of 16. These data also show the 10 to 15 year age group had the highest fatality and injury rates, with fatality rates 46% and injury rates 162%

more than the average rate for all bicyclists. Bicycle fatality rates are highest in the state of Florida. Head injuries account for 75% of bicycle related deaths and more than two thirds of bicycle related hospital admissions. Bicycle helmets have been documented to decrease the risk of head injury by 85% and brain injury by 88. It is found that helmet misuse in the 6 to 15 age group was more than double the step observed in the 16 to 30 age group. Several studies indicate that usage of helmet is lesser among young teens than younger. Several studies have attempted to find as to why middle school aged children are less likely to wear helmets or take part in education programs and helmet giveaways than elementary school students. One factor that tends to appear in many studies is lack of peer support and unappealing helmet design. Another study conducted focus group discussions with young adolescents who reported that bicycle helmets were not comfortable because they found it difficult to fit (Nataraja et.al., 2018).

Many designs have been proposed by the researchers and engineers to bring up a safety system for two-wheeler riders. Smart helmets have been designed with vibration sensors to detect an accident and send a help notification using GSM and GPS technology. Installing vibration sensing devices inside a helmet cannot be a vital idea to detect an accident, as the system will consider an accidental fall of a helmet as an accident and will unnecessarily send a help notification [2]. Another approach that has been taken for the compulsory use of helmets by the drivers is by maintaining the record of the complete journey details on the server [3]. Besides the condition of wearing a helmet, a system of detecting whether the rider is sober enough to ride the bike has also been designed [3][4][5][6]. Another design is a system in which the information or data from various sensors are sent to the cloud which in turn sends a help notification along with a visual image captured at the time of the accident. Use of cloud technology to send help notification is not a reliable idea as it requires a high speed internet [7]. Designing an accident alert system has also become a major requirement to provide swift delivery of first aid and medical care to the injured [8]. An accident detection system using Force sensing Resistor (FSR) and BLDC Fan is designed to detect the rider's head and motorcycle's speed respectively. The two-wheeler can be started only when the helmet's strap is buckled. The system does not

stop the person from riding a bike even if he is not sober and does not send any help notification in case of accidents (Aakriti Suman et.al., 2020).

There are many previous works done in the field to enhance the helmet for the safety of the rider. A study worked on providing a safety helmet for the coal mine workers. This helmet was provided with a carbon monoxide sensor and a methane gas sensor. The sensor data is transmitted via X-Bee in wireless mode to the control room. Another design proposed consisted of three basic works with the helmet; detecting any collisions, any person removing the helmet during the work, and checking the air quality. This design was used for mining industry workers. Another design was proposed for a helmet that detects whether the rider is drunk or not and the speed limit is also taken care of by sending a message using the GSM module to the registered mobile number after crossing the speed limit. Another helmet has a module that synchronizes with the bike module for ensuring whether the helmet is worn by the rider or not. If the helmet is not worn by the rider then the bike won't start. It has a module for accident avoidance detection. Another helmet was proposed for collision and alcohol sensors for the detection of the collisions and sensing the alcohol presence from the mouth of the rider. Another helmet was designed specifically for accidental avoidance. In case of accident avoidance, the GSM module sends a message to the nearby hospitals for getting the help for the riders in a short time. Another design monitors and informs the riders regarding the heavy trucks and buses present near him. A design for the helmet came with a wiper interfaced with it. The wiper will get activated when the sensor senses the rain or moisture in the air or a water drop falls on the sensor. By keeping all the previous designs, a new design is proposed which implements all the existing features with a try of reducing the power consumption by making the circuit as consolidated as possible (Mahesh S et.al., 2020).

Soon after the person wears the helmet the signals will get transmitted. The module is designed in such a way that the bike allows the rider to start the vehicle only when the module receives signals from the helmet unit. Accident detection device sends the location of the accident occurred to the predefined number and alerts the nearest police station about the accident if the rider does not get up to push the emergency button in a certain amount of time. Our technology which can be used for this purpose

is compulsion of wearing the helmet to the bikers as well as a prior intimation about obstacles in highways to the biker. This needs a device which can be applied on vehicles. The ignition device of bike must not start without receiving the signal from transmitter at the helmet. Thus, helmet must be worn by the biker. This device must be the user. If a rider meets with an accident due to unavoidable circumstance, this module turns off ignition of the bike and sends the location to the predefined numbers which will be saved in the memory of the microcontroller. In addition, this module also gives audio alert to the local police station and hospital for help. One peculiar property of this device is the ability to distinguish between major and minor casualties. In case of minor casualties, the rider can press an emergency switch to prevent the sending of alert message to predefined numbers. In case of major, if that switch is not pressed at a given time message is sent. Thus, a switch can distinguish between major and minor casualties (Nataraja et.al., 2018).

The proposed device model works with simultaneous working of the transmitter and receiver section. A magnetic chip interfaced with the helmet detects whether the rider is wearing the helmet or not. The chip sends out an analog signal, signaling the device that helmet is detected and therefore the rider is wearing it. This is determined by a high output received from the chip. A low output is generated when the clip is not connected making the device to turn off the bike. Another scheme uses a gas sensor (MQ-6), which can detect the presence of alcohol. The sensor surface is sensitive to various alcohol concentrations. It detects alcohol within the exhaled air of the rider. The value of the resistance decreases which leads to a change in the voltage. This changed voltage is fed to the comparator, which compares the voltage with the predetermined value, and changes according to the alcohol concentration below the step of illegal consumption. If the sensor voltage exceeds the output voltage of the present comparator, the microcontroller performs the relevant action. Accident detection circuitry consists of an accelerometer along with some resistors. The accelerometer checks the tilt of the helmet to determine the occurrence of an accident. When the helmet gets tilted more than a preset value, which is set in accordance with an accident case, free-fall sensing concludes that the rider has met with an accident. During an accident, the accelerometer discharges a voltage that is read by the unit transmitting a signal to the bike module to turn OFF the engine and it sends message to one personal contact that an accident has occurred. GSM modem communicates

with microcontroller and microcontroller gives command to GSM modem to send message to one personal contact (Rashmi et.al., 2017).

The researches that have been noted are not far away from the system that has been proposed. Intelligent Helmet, a paper presented by AISSMS' IOIT, SPPU, Pune, India, have used an RF transmitter that triggers the vehicle if the rider is drunk. This doesn't allow the vehicle to start its ignition. The only work on safety helmets that is seen today are the ones that are sold in the market. The accreditation on helmets is the DOT certification. Although, these helmets do not provide any electronic help by which chances of lives to be saved get higher. There have been start-ups in the recent past that have been trying to come up with helmets that are a step ahead than the current generation helmets (Shika G et.al., 2019).

CHAPTER 3

AIM AND SCOPE

3.1 AIM

To provide a cost effect life saving, intelligent system for the two-wheeler riders.

To design an airbag system for motobikes just as in the four-wheelers.

3.2 EXISTING SYSTEM

The existing project is a simple telemetry system, activated by a pressure that is applied inside the helmet. The technology used is RoHS compliant and is absolutely the same for long-term use. Most of the attention today in helmet innovation is on things like adding an MP3 player or wireless phone or even a flash light on it. But none of those features provide additional safety for the rider and are just meant for amusement. Another 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 reads the speed of the bike and accordingly instruct the rider to scale back or increase the speed based on the obstacles ahead of the bike.

3.2.1 *Disadvantages of existing system*

- The rider does not wear a helmet in regions where traffic checking is not done.
- The difficulty of implementation of traffic rules by traffic police.
- The features mostly focus on entertainment and not on the safety part.
- Testing the alcohol content present in blood in each rider in big countries like India is impossible.

3.3 PROPOSED SYSTEM

The system with the help of alcohol gas sensor checks if the rider is drunk and driving. If the rider is drunk then the ignition of the bike is avoided and therefore not letting the rider to ride the bike. In this system, we have used an Arduino microcontroller interfaced with an alcohol sensor which is used to monitor the driver's breath and constantly sends signals to the microcontroller. The microcontroller on encountering alcohol signal from the sensor and send the signals to the motor using Arduino to the motor driver which stops the dc motor to demonstrate as engine locking.

The system will need a push button to start the engine. The engine is locked following the detection of alcohol.

The system also sends a message that reads "Accident occurred" and the latitude and longitude of the location of the incident using GSM and GPS. The accident is detected with the help of tri-axial accelerometer and then the accident notification message is sent. The circuit also consists of an emergency button. Failing to press this button within 10 seconds after the driver has fallen will enable the GSM to send the accident message to the concerned person. It has the extra safety feature for the helmet in case it detects the rider is going to fall the helmet will automatically inflate the tube.

3.3.1 Advantages of Proposed Method

- It is a less power consuming safety system.
- The whole circuit can be converted into a smaller module with added features.
- Accidents can be detected easily in accident prone zones and thus medical services can be easily provided
- By using alcohol detector, drunken drive can be simply avoided, thus reducing the probability of accidents.
- It is economical and can avoid the fine imposed by making the helmet wearing is compulsory.
- It is easy to implement.
- Efficient and Cost effective.
- The various sensors used are easily replaceable.

3.3.2 Applications

- It can be used as a real-time safety system for regular drivers, delivery agents, racers, motorcyclists etc.
- This two-wheeler safety system can be enhanced into 4-wheeler safety system by replacing helmet with seatbelt.
- It can be designed for less power consuming safety system.
- The whole circuit can be incorporated into small VLSI chip that can be embedded into the helmet and the bike as well.

3.4 SCOPE

We have developed a prototype module concerning the project demo. Based on the test analysis, there are various improvements that can be done as future work in order to make this project durable and user friendly. It should accommodate the needed facilities in a cost effective and compact manner. Going further, most of the units are embedded alongside the controller on a single board with change in technology, leading to the reduction of the size of the system. The Government should enforce laws to implement these modules on two-wheelers and cars as a real time application. By implementing this system the fatality rate due to road accidents in our country can be reduced. The other features that can be incorporated in this project includes:

3.4.1 eSIM

eSIM is also called as an electronic SIM card that can replace the actual plastic SIM card with a virtual embedded equivalent SIM card that cannot be removed. If this technology is incorporated in the smart helmet, there will not be a need to use a separate module for the same, thus making the system more efficient.

3.4.2 360° camera

The usual camera that is available in the market does not have a wide-angle to record an accident. Accidents could occur from any side. Hence, if a set of 4 cameras are placed at 90° degree to each other forming a cube like structure, or a single camera pointed at a convex lens could help in attaining a 360° degree view.

3.4.3 Mountable Solar Panel Powering

A solar sheet/panel fitted onto a helmet would help power the smart helmet by itself without the need for an external power supply or battery. There need not be any other power source to make it work. This would make the helmet not only lighter, but the circuit could be integrated within the helmet, and also making it eco-friendly.

CHAPTER 4

MATERIALS AND METHODS

4.1 COMPONENTS

The major components in this project includes:

- Arduino UNO Microcontroller
- DC Compressor
- DC Motor
- Accelerometer
- Alcohol Sensor
- LCD Display
- GSM Module
- GPS Program
- 12V Rechargeable Battery

4.1.1 *Arduino UNO Microcontroller*

Arduino Uno was first developed by Arduino.cc. It is an open-source platform, which suggests the boards and software are readily available and it are often modified and optimized for better functionality. It has USB interface i.e., USB port is added onto the board for developing a serial communication with the computer. There are 14 I/O digital and 6 analog pins incorporated within the board that permits the external reference to any circuit with the board. These pins provide the pliability and simple use to the external devices which will be connected through these pins. There is no hard and fast interface required to attach the devices to the board.

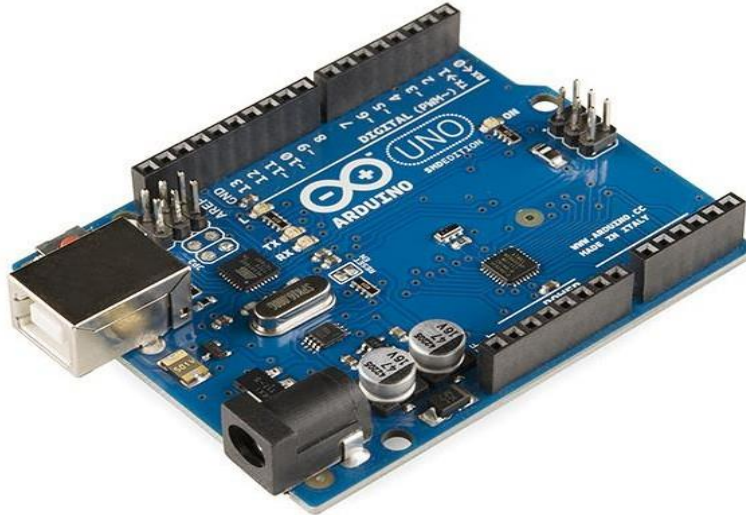


Fig 4.1.1 Arduino UNO Microcontroller

4.1.2 DC Compressor

It is a Highly compact wheel shaped 12 volt tyre compressor with a metallic body. This portable air compressor has a small electric motor that compresses the air in a small attached tank. It is provided with a pressure gauge and 3 nozzle adapters. It has a Maximum operating Pressure of 260 PSI. it can also inflate Bicycle/Scooter/Moped tyres and also allows inflation of many other inflatable tubes/tyres. It has a flow rate of 35L/min and horsepower of 10. No strength required for pumping air as it is all electronic & is powered directly from a sealed battery.



Fig 4.1.2 DC Compressor

4.1.3 DC Motor

DC Motor – 100RPM – 12Volts geared motors are generally a simple DC motor with a gearbox attached to it. This can be used in all-terrain robots and variety of robotic applications. These motors have a 3 mm threaded drill hole in the middle of the shaft thus making it simple to connect it to the wheels or any other mechanical assembly. 100 RPM 12V DC geared motors widely use for robotics applications. Very easy to use and available in standard size. Also, you don't have to spend a lot of money to control motors with an Arduino or compatible board. The most popular L298N H-bridge module with onboard voltage regulator motor driver can be used with this motor that has a voltage of between 5 and 35V DC or you can choose the most precise motor driver module from the wide range available in our Motor drivers category as per your specific requirements.

Nut and threads on the shaft to easily connect and internally threaded shaft for easily connecting it to the wheel. DC Geared motors with robust metal gearbox for heavy-duty applications, available in the wide RPM range and ideally suited for robotics and industrial applications. Very easy to use and available in standard size. Nut and threads on the shaft to easily connect and internally threaded shaft for easily connecting it to the wheel.

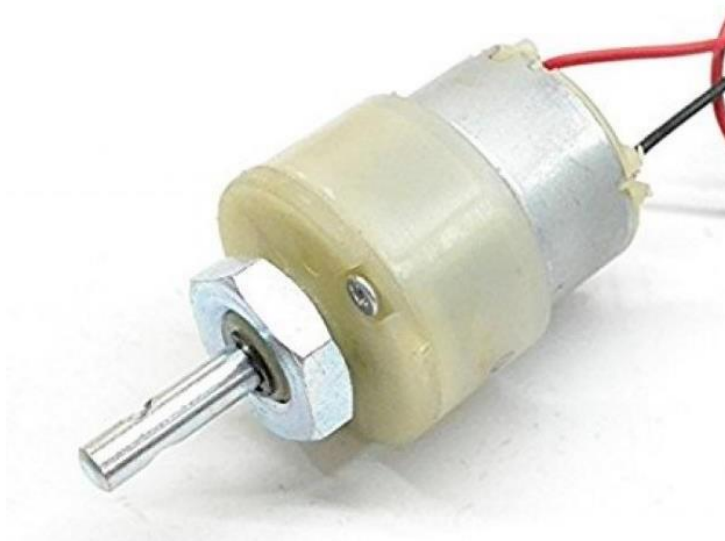


Fig 4.1.3 DC Motor

4.1.4 Accelerometer

The MPU-6050 is a combination of a MEMS 3-axis gyroscope and a 3-axis accelerometer on the same silicon die together with an onboard Digital Motion Processor (DMP) capable of processing complex 9-axis MotionFusion algorithms, the MPU-6050 does away with the cross-axis alignment problems that can creep up on discrete parts. The breakout board for the MPU-6050 makes this tiny QFN package easy to work into our project. Every pin you need to get up and running is broken out to 0.1" headers, including the auxiliary master I2C bus which allows the MPU-6050 to access external magnetometers and other sensors.

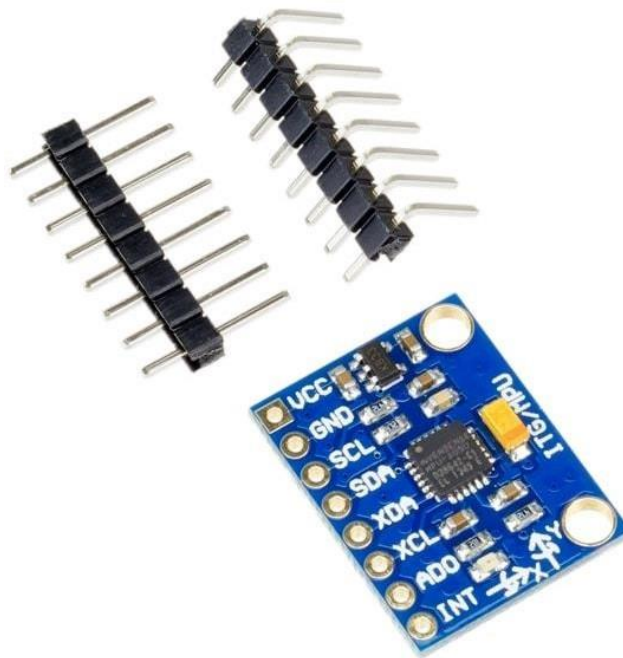


Fig 4.1.4 Accelerometer

4.1.5 Alcohol Sensor MQ-6

This is a simple-to-use liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC. The MQ-6 sensor module comes

with a Digital Pin which makes this sensor to operate even without a microcontroller and that comes in handy when you are only trying to detect one particular gas. For Digital output the threshold value can be easily set by an on-board potentiometer. Using this module you can easily interface MQ-6 LPG gas Sensor to any Microcontroller, Arduino. The sensor can operate at temperatures from -10 to 50°C and consumes less than 150 mA at 5 V.



Fig 4.1.5 Alcohol Sensor MQ6

4.1.6 GSM Module (SIM800L)

SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls. Low cost and small footprint and quad band frequency support make this module perfect solution for any project that require long range connectivity. After connecting power module boots up, searches for cellular network and login automatically. On board LED displays connection state (no network coverage - fast blinking, logged in - slow blinking).

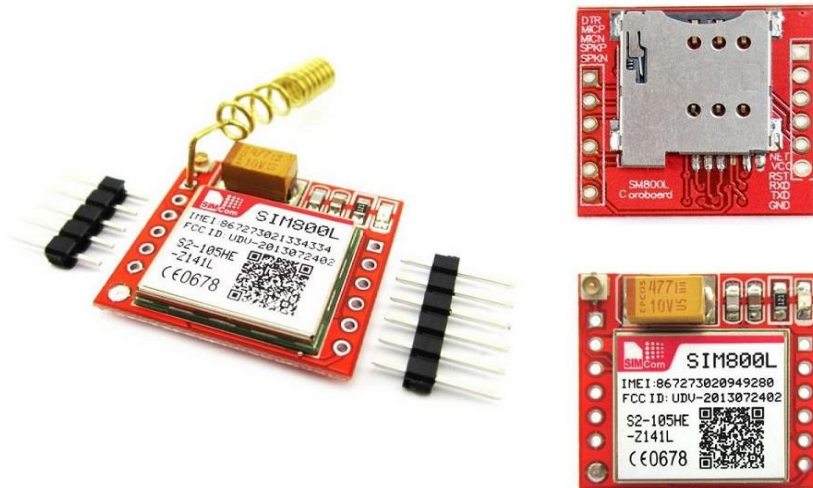


Fig 4.1.6 GSM Module (SIM800L)

4.1.7 LCD Display

LCD1602, or 1602 character-type liquid crystal display, is a kind of dot matrix module to show letters, numbers, and characters and so on. It's composed of 5x7 or 5x11 dot matrix positions; each position can display one character. There's a dot pitch between two characters and a space between lines, thus separating characters and lines. The model 1602 means it displays 2 lines of 16 characters. Generally, LCD1602 has parallel ports, that is, it would control several pins at the same time. LCD1602 can be categorized into eight-port and four-port connections. If the eight-port connection is used, then all the digital ports of the SunFounder Uno board are almost completely occupied. If you want to connect more sensors, there will be no ports available. Therefore, the four-port connection is used here for better application.



Fig 4.1.7 LCD Display

4.1.8 12V Rechargeable Battery

The Amptek AT12-1-3 12V is a high quality rechargeable sealed lead acid battery with a battery capacity of 1.3 Ah. This 12v battery is also rechargeable battery designed to provide excellent performance, Amptek lead acid battery are very low in price, high efficiency battery, and good comfortable usage in toy cars, medical, electrical and communication equipment. Amptek lead acid battery good high efficiency 12V battery 1.2 Ah can be used in the race and war robotics competitions.



Fig 4.1.8 12V Rechargeable Battery

4.2 BLOCK DIAGRAM OF PROPOSED WORK

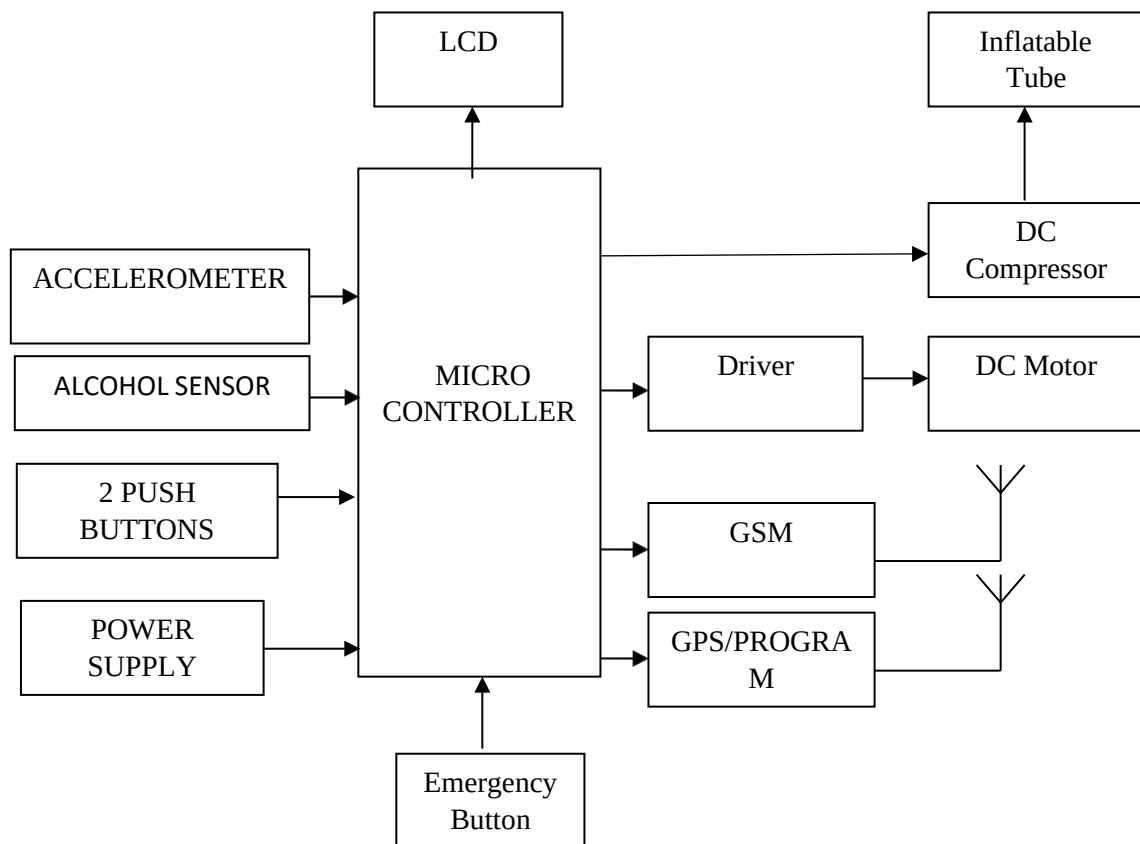


Fig 4.2 Block diagram of proposed work

4.2.1 Steps

Step 1: All connections are made according to the block diagram.

Step 2: The circuit is turned ON.

Step 3: The LED Display starts to glow with the message indicating us to wear the helmet.

Step 4: the driver should wear the helmet after which the bike turns on.

Step 5: Any kind of alcoholic solution is brought near to the alcohol sensor.

Step 6: The sensor detects the alcohol and hence does not allow the motorbike to start.

Step 7: Accident is detected using the accelerometer.

Step 8: The fall is detected by the inclination in the angle of the accelerometer

placed.

Step 9: If the driver presses the emergency button within 10 seconds, no message will be passed to their concerned person

Step 10: The DC Compressor senses the accident and starts to fill the inflatory tube.

Step 11: The tube starts to inflate around the driver's neck to prevent the condition from worsening.

Step 12: If the driver fails to press that button, a message with the accident alert and location of accident will be sent to their relative.

Step 13: This alert message is passed with the GSM module

Step 14: Entire set-up is switched off, and the driver can be taken to the nearby hospital immediately.



Fig 4.3 Hardware Set-Up

CHAPTER 5

RESULTS AND DISCUSSION

5.1 RESULT

Providing safety to a person while riding the bike is of prime concern. One of the way to do this is by making it mandatory to wear helmet while riding a bike. This is difficult to implement as every time the concerned people can't keep an eye on everybody. So detecting whether the driver has worn a helmet or not, as well whether he has consumed alcohol or not is the main problem. The device what we have planned to design provides solution to this problem. The device makes it mandatory for the rider to wear helmet before starting the vehicle and also he shouldn't have consumed alcohol. If the rider fails to do so then the vehicle cannot be started. This device also provides security to the vehicle as every bike will have an unique helmet and without which a person fails to start that particular bike. This project consists of a helmet body and an integrated electronic device disposed in the helmet body. It is operated through a wireless control device. The components of the electronic device are sufficiently small and rugged for use in the helmet, ensuring that the helmet is lightweight and durable. Moreover, the components are spaced about the helmet to provide even weight distribution to promote overall balance and safety.

A portable protection for two-wheeler fatality using a helmet is provided with our project. The aim is to provide protection with the similar working strategy of airbags in cars. Although in the last few years helmets have been made mandatory, bike riders face around 500-600 accidents every year in our country out of which approximately 80% are fatal. Our project aims at the compulsion of the rider wearing the helmet at all times. The vehicle module affixed on the bike, such that, it will sync with the module affixed in the helmet and will also ensure that the biker has worn Helmet. Additional propertyts are: accident detection module, signboard detection module and temperature sensor will be installed on the bike. Once the person wears the helmet the signals get transmitted. The module in the bike allows the rider to start the vehicle once the module receives signals from the helmet unit. RF transmitters will be attached in sign boards across highways so that the driver gets prior intimation about obstacles earlier through voice output through speakers and displays on LCD screens.

Through this project we intend to present an improvement in existing bike helmet device with speed indication. Device is made more efficient with addition of intelligence in term of artificial vision using micro controller techniques to estimate actual vehicle situation. To achieve this, the device can transmit the information in real time also device is very clever enough to provide information which bike getting high speed then GSM device send a message to government. So, this device resemblance for user or rider and government who takes better decision every time for decreasing accident additional the proposed work is an attempt to Helmet. Helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this two-wheeler or bike safety inflatable helmet to provide safety for rider. It mandatory to wear Helmet without Helmet ignition switch cannot ON. It consists of RF transmitter and RF receiver device. As user wear Helmet RF signal radiate from transmitter and once these RF signal get sensed by the attached in the ignition switch of the bike. Bike will get start. The project is expected to improve safety and decrease accident and restricted the high speed by government especially fatal to the motorcyclist. With the increasing buying power of common man today the number of vehicles we are used but today's era, especially in the young generation, the craze of motorbikes is remarkable.

The middle-class families prefer to buy motorbikes over four-wheeler s because of their low prices. As the biker in our country are increasing the road mishaps are also increasing day by day due to which many deaths occur most of them are caused due to most common negligence of not wearing the Helmets and reaching the high speed. This motivates us to think about making a device which ensures safety of biker by making it necessary to wear Helmet as per government guidelines. Presented a device on micro controller-based circuitry is used with using GSM (Global Device for Mobile Communication) GSM perform two-way communication with bike and rider using GSM modem is used for sending SMS as on rider regular cellphone also the device used siren and stand sensor in case someone try to bike steal the siren is ON even if user used very high speed at that time GSM send the SMS to government to avoid an accident.

The proposed two-wheeler or bike safety inflatable helmet supports variety of functions. First it checks whether the driver is wearing a helmet using a magnetic clip. It also checks if the driver is in an abbreviated state or not. MQ6 sensor is used for this purpose. Only if the driver is sober and wearing a helmet the bike starts. This helps decrease chances of rash and drunk driving. The helmet also employs various sensors. A LDR (light detection resistor) is used to detect the presence of fog. An accelerometer is employed to detect accidents by measuring the tilt of the helmet. The data from the accelerometer is also transmitted to the Arduino microcontroller. All the data from the sensors is fed into comparators to check against pre-set threshold values. If a breach is detected the microcontroller 89S52 issues commands to switch off the engine in case of an accident otherwise to sound a buzzer to caution the driver.



Fig 5.1 Indicating To Wear The Helmet



Fig 5.2 After Wearing Helmet

The other properties are implemented via the Arduino Uno microcontroller which is connected to a LCD to provide information to the user. Data from the RF tags of speed boards is fed into the Arduino. These values are used to set threshold values used for speed tracking and keeping a check on speeding on roads in different settings for example highways, alleys etc. If speed values from the potentiometer are found to be exceeding the speed limits a warning sign appears on the LCD with sounding of the buzzer. A toll booth is also provided with a unique RF tag. As soon as the helmet comes in range of the booth, toll is deducted from the user's virtual wallet. Arduino has been programmed to show the remaining balance on the screen and give a low balance warning if funds reach a predefined minimum value. A recharge point has also been provided within the circuit to load the wallet with money. The updated value is fed back in the Arduino for future use. In case of accidents a GPS module sends emergency messages to 2 preloaded contacts informing them of the dire situation. This helps in mobilizing quick relief operations for the person involved in the accident. This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breath analyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

The proposed device model provides a safe, smooth and enjoyable riding experience which it makes it highly desirable in today's conditions. All the components are assembled and tested successfully. The circuit is designed in such a manner that bike does not start until and unless rider wears the helmet. Also, the bike will not start if the rider is drunk, this helmet alarms the rider if he crosses a certain speed limit by buzzing an alarm. If an accident occurs the engine automatically shuts off to avoid further injuries. Thus, the experimental phase was completed. This study was conducted in a controlled manner. Thus, there is no pressing need for further experimentation in real life conditions but before full time deployment more simulations need to be performed. In the future, a GSM module and a GPS module can be applied to a device in which the sensor reports an emergency to relatives and nearby police personnel. This can be achieved by encoding GSM, GPS modules to transmit the exact GPS coordinates of the accident to responsible authorities making them aware of the dire situation for quick action which may help in saving lives.



Fig 5.3 After Alcohol is Detected



Fig 5.4 When Fall is Detected

5.2 DISCUSSION

As times change, technology evolves and people migrate from fieldwork to deskwork, a new health threat arises: the sedentary lifestyle. To fight this phenomenon, fitness seems like a handy solution, especially for the advantage of having a personal trainer that can monitor the activity and offer guidance throughout the training. The electric bicycle is a trendy solution, as it is presented in. However, most cyclists either amateur or professionals do not have this opportunity, making it harder to improve and reach specific goals. This project proposes a technical solution meant to overcome this issue, by using sensors, microcontrollers and microcomputers to read, send, save, and display data. Therefore, any trainer can monitor relevant cycling data gathered from the bike in real time (George et.al., 2020).

The project aims to provide total safety for bike riders. Recently helmets have been made mandatory, but still people drive without helmets. Pune City has approx. 35 lakh two-wheeler riders, which consists of 500-600 accidents every year out of which 300-400 are fatal. Pune ranks first in the city when it comes to two-wheeler or bikes riders. In the last few years, there has been rapid increase in number of road accidents. Due

to rise in road accidents, it has now become necessary to generate a device to limit accidental deaths. With respect to vehicle safety, India meets only two out of the seven vehicle safety standards by the World Health Organization (WHO). Two-wheeler or bikes account for 25% of total road crash deaths. Nearly 75% motorcycle riders involved in accidents continued to wear helmets, crash records show. The main cause of these fatalities is people riding two-wheeler or bikes under the influence of alcohol results and violation of traffic rules which later results in serious accidents. "The likelihood of survival of fatalities wearing helmets is high as compared to those not wearing helmets". In our project sensor module, will be attached in the helmet to detect whether a person worn helmet are not, once the person wears the helmet the signals get transmitted. The module in the bike allows the rider to start the vehicle once the module receive signals from helmet unit and RF transmitter will be attached in sign boards across highways so that the driver get prior intimation about obstacles earlier through voice output (Nataraja et.al., 2018)

We came across various methods used to improve "Two-wheeler or bike safety inflatable helmet". The helmet consists of alcohol sensor and eye blink sensor and acts as accident prevention device. The intelligent helmet consists of sensors that detects the occurrence of an accident and makes provisions to sound an alert using GSM device. The "Two-wheeler or bike safety inflatable helmet" automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. The relay does not ON the vehicle unit if these two conditions are not satisfied. The ALCHO-LOCK function is used to prevent drink and drive scenarios and accelerometer detects accidents. There is a switch used to ensure the wearing of helmet on the head. The ON condition of the switch ensures the placing of the helmet in proper manner. An alcohol sensor is attached near to the mouth of the driver in the helmet to detect the presence of alcohol. The accident detection device communicates the accelerometer values to the processor which continuously monitors for erratic variations. Message transmitting sensors are equipped in the speedometer of bike and in the bike's helmet. The most important property of the bike is that the bike's engine gets start only when the person wears helmet. The device uses advance properties like alcohol detection, accident identification, and uses hands free device, solar powered, fall detection. This makes not only two-wheeler or bike safety inflatable

helmet but also property of smart bike. The vehicle location is obtained by making use of the global positioning device (Arpitha et.al., 2018).

It is a well-known fact that young generation prefers bikes and motorcycle over four wheelers. A survey indicates that more than 70% of the riders avoid wearing helmet without any specific reason. Moreover, speeding, and drunk driving have become common issues. Due to lack of experience or focus and violation of traffic rules, result in severe accidents. So, with the help of technology, we made sure that traffic rules are followed, problems mentioned above are avoided and their effects are minimized. The concept of developing this work comes from our social responsibility towards society. In many accidents that occur around us, there is a huge loss of life. According to a survey, about "7500" people die on roads per year that occur due to bike accidents. And detail functionality of each of hardware and software components used are, for example, the radio transceiver is taken from and the information and operation of the sensor. The main component used is microcontroller. The principles of operation of the circuits and connections, etc. are taken from references. Therefore, all references have contributed to the development of the project. Two-wheeler or bike safety inflatable helmet is an effective solution to many problems. Wearing the helmet and being sober are necessary conditions for the bike to start, reducing the possibilities of accidents. Even if a person takes caution sometimes accidents do occur. Here our engine cut off property decreases the chances of fatalities significantly. The two-wheeler or bike safety inflatable helmet acts as a virtual policeman keeping the drivers in check and making roads safer (Rashmi et.al., 2017).

CHAPTER 6

SUMMARY AND CONCLUSION

6.1 SUMMARY

In our project, we have reviewed the recent trends in developing Two-wheeler or bike safety inflatable helmet device. The two-wheeler or bike safety inflatable helmet device is used to prevent the accidents in motor bikes and to identify the bike accidents on time for wellness of human being. Also, the two-wheeler or bike safety inflatable helmet device analyzed in our project can also be used in mining industry for safeguarding the miners from hazardous events in the mine and to alert the miners from hazardous gas emissions inside it. The research also helps to understand the two-wheeler or bike safety inflatable helmet device evolved over the period and currently by using emerging technology like Internet of Things (IoT).

There are various reasons for accidents such as not having adequate ability to drive, defective two-wheeler or bikes, rash driving, "drinking and driving", etc. But the main reason was the absence of helmet on that person which leads to immediate death due to brain damage. Therefore, it is important that there should be a facility to minimize the aftereffects of these accidents. However, the main goal of our work is to make it mandatory for the rider to wear a helmet during the ride meanwhile providing solutions to other major issues for accidents. Therefore, this sense of moral responsibility towards society, laid the foundation for our "Two-wheeler or bike safety inflatable helmet" project. So, the basic concept for the development of this project "Two-wheeler or bike safety inflatable helmet" is taken from.

Two-wheeler or bike safety inflatable helmet is a cost-effective assistive technology to provide security and safety of the biker against road accidents. The proposed smart helmet prevents road accident and detects alcohol consumption, and this will be able to track the biker and sends GPS coordinates to pre-defined number. Also, it detects crash and will be able to send notification to the predefined number. This device consists of micro controller, Accelerometer, Alcohol sensor, GPS receiver, Power supply.

The proposed device model also aims at reducing the probability of accidents. The device consists of helmet unit and bike unit where the helmet unit consists of Push Buttons, Inflating tube that acts as an airbag, Alcohol sensor integrated with Arduino UNO microcontroller. The Bike unit consists of DC Motor, Accelerometer sensor, GPS and GSM Module and an emergency button.

Here we design a device which always checks two conditions before rider starts the ignition of the bike. The first condition is whether the rider wearing a helmet or not and it is detected by 2 push buttons fitted inside the helmet. The second condition is detection of alcohol content in rider's breath with the help of alcohol sensor. Micro controller unit in the helmet collects and process the data by using radio frequency transmitter to the bike section. If either of these conditions mentioned above are not met, then the bike engine will not start, and this will also be indicated on the LCD display. If the rider is wearing a helmet and the alcohol content is not detected, then ignition of the engine starts. If any accident occurs, then a accelerometer sensor detects the crash then an alert message will be sent to pre- defined number. The project aims to provide total safety for bike riders.

In Helmet, the sensor module is built using sensors like alcohol sensor, and it is connected to RF transmitter to detect whether a person has worn helmet or not. Once the person wear the helmet the signals get transmitted. The unit in the bike allows the rider to start the vehicle once the module receives signal from helmet unit. In case of alcohol consumption, the vehicle remains OFF though helmet is worn.

The main objective of this project is to detect whether the helmet is worn or not which comes under this module. If the helmet is worn, helmet module sends the digitally encrypted data to RF receiver which decrypts the data and gives to the microcontroller which is affixed on bike on validation the device gives access to start engine.

A device for two-wheeler or bike safety inflatable helmet has thus been developed which, through communication between a unit in the helmet and one on the vehicle. Two-wheeler or bike safety inflatable helmet ensures the safety of the delivery boy, by making it necessary to wear helmet, and ensures that the rider has not consumed any alcohol. This device aims in providing a low-cost safety device mainly focusing on the importance of human life. Device confirms the safety of riders, by obligatory use of safety equipment. Additionally, it provides certainty of non-absorption of alcohol

throughout ride. The ignition device avert rider to start a bike when rider violate any of security rules. Furthermore, reporting device helps to inform family member for immediate treatment via SMS with location in case if accident has occurred.

6.2 CONCLUSION

The proposed helmet should accommodate all the needed facilities in a compact manner. In parallel, the selection of microcontroller and sensors are being taken care. The proposed design will give a solution in terms of cost effective and updated technology front for all kinds of helmets. The aim is to target the two-wheeler or bikes segment and then bicycle users with lighter version. This cost-effective solution can be integrated with engine start and other needed safety aspects.

In our project, we developed a two-wheeler or bike safety inflatable helmet-based device which was successfully able to detect whether the rider as worn the helmet or not. It also notifies if the rider has consumed alcohol beyond a limit. This helmet can decrease number of road accidents that takes place every day. It ensures the safety of the biker as well as sends the victim's location to family. Also, death rate can drastically be decreased by implementing this circuit as mandatory while driving and make everyone's life easier and smoother. The project can be enhanced by adding Google Glass Technology. Through this technology, biker can see the upcoming road before reaching that place. It can prevent biker from pits and pitiful condition of roads. Also, biker can see navigation on it and can alert him while taking sharp turns. Further, it can be implemented on cars also. People can use car seat belt to start ignition of car which can enhance the safety of the driver. The two-wheeler or bike safety inflatable helmet is described in our project which is based on one single concept i.e., to make it somehow mandatory to wear it while riding a motorbike by the help of some technology. This helmet in practice acts as a second key to the vehicle and in turn increases security. Moreover, as the rider can neither starts nor run the vehicle without wearing the helmet it ensures that the rider must always wear the helmet while riding the vehicle. At the same time, as each helmet is unique to the receiver on board the vehicle so there will not be any interference from usage of similar units even at close range. This system also comes with a safety feature which is taken care by the accelerometer. It can save the life of the rider from grave danger but inflating a tube around the neck after the fall is detected. This tends to be a distinct unique feature implemented in the project.

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APPENDICES

```
#include<LiquidCrystal.h>
#include <SoftwareSerial.h>
#include <Wire.h>
LiquidCrystal lcd(13, 12, 11, 10, 9, 8);

SoftwareSerial gsm_g(2, 3);

#define splash splash1
#define acl A0
#define key1 A1
#define key2 A2
#define key3 A3
#define eng 5
#define comp 6

int C_Status;
int C_tim = 10;
float em_tim, en_tim;
const int ACC = 0x68; // I2C address of the MPU-6050
unsigned int AcX, AcY, AcZ;
int fStatus, f_Status;

int acl_Status, key_Status;
int acl_r, k1_r, k2_r, k3_r;
int alert_Status;

String latout = "12.872473", lonout = "80.2177386"; //12.872473,80.2177386
String smsmsg, gpsval, text;
String usernum = "+918778003626";
```

```

void setup() {

    // put your setup code here, to run once:
    Serial.begin(9600);
    pinMode(key1, INPUT_PULLUP);
    pinMode(key2, INPUT_PULLUP);
    pinMode(key3, INPUT_PULLUP);
    pinMode(acl, INPUT);
    pinMode(eng, OUTPUT);
    pinMode(comp, OUTPUT);
    digitalWrite(eng, LOW);
    digitalWrite(comp, LOW);
    gsm_g.begin(9600);
    Wire.begin();
    Wire.beginTransmission(0x68);
    Wire.write(0x6B); // PWR_MGMT_1 register
    Wire.write(0);    // set to zero (wakes up the MPU-6050)
    Wire.endTransmission(true);
    LcdSet();
    SendSmS( usernum, "GSM Initialized!!!", "", "Sending SMS .... ");

    //  SendSmS( usernum1, "GSM Initialized!!!", "", "Sending SMS .... ");

}

void LcdSet() {

    lcd.begin(16, 2);
    splash(0, "Two Wheeler");
    splash(1, "Safety");

```

```

delay(2000);
lcd.clear();

}

void(* resetFunc) (void) = 0;
void loop() {
    // put your main code here, to run repeatedly://<500>800
    f_Status = getAcc();

    acl_r = analogRead(acl);
    k1_r = digitalRead(key1);
    k2_r = digitalRead(key2);
    k3_r = digitalRead(key3);

    if (k1_r == 0 and k2_r == 0) {
        key_Status = 1;
    }
    else {
        key_Status = 0;
    }

    if (acl_r > 700) {
        acl_Status = 1;
    } else {
        acl_Status = 0;
    }

    if (acl_Status == 1) {
        digitalWrite(eng, LOW);
        splash (1, "Alcohol Detected");
    }
}

```

```

}
else if (key_Status == 0) {
    digitalWrite(eng, LOW);
    splash(0, "Please Wear");
    splash(1, "YouR Helmet");
}
else if (key_Status == 1 and en_tim == 0 ) {
    analogWrite(eng, 180);
    analogWrite(eng, 200);
//  analogWrite(eng, 250);
    splash(0, "Have A");
    splash(1, "Safe Ride");
    if (f_Status == 1) {
        splash(0, "Fall Detected");

        analogWrite(comp, 150);
        analogWrite(comp, 200);
        splash(0, "");
        en_tim = 1;
        delay(100);

    }
}
if (k3_r == 0) {
    splash(0, "Glad You're");
    splash(1, "Safe");
    en_tim = 0;
    em_tim = 0;
    analogWrite(comp, 0);
    delay(1000);
}

```

```

    resetFunc();
}
if (en_tim == 1) {
    analogWrite(eng, 0);
    lcd.setCursor(12, 1);
    lcd.print(em_tim);
    em_tim += 0.20;
    if (em_tim > C_tim) {
        alert("Accident Detected");
    }
}

```

```

// lcd.setCursor(0, 0);
// lcd.print("A : ");
// lcd.setCursor(4, 0);
// lcd.print(acl_r);
//
// lcd.setCursor(8, 0);
// lcd.print("H : ");
// lcd.setCursor(12, 0);
// lcd.print(key_Status);

```

```

    delay(100);
}

```

```

void alert(String msg) {
    if (alert_Status == 0) {

        gpsval = " https://maps.google.com/maps?q=";

```

```
gpsval += latout;
gpsval += ",";
gpsval += lonout;
smsmsg = "Emergency ";
smsmsg += msg;
Serial.println(smsmsg + gpsval);
SendSmS( usernum, smsmsg, gpsval, "Sending SMS ....");
alert_Status = 1;

}
}
```