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Smart Helmet

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Abstract: ***Road accidents are increasing day by day because the riders are not using the helmet and due to consumption of alcohol. In today's world, huge numbers of people are dying on road accidents. By using smart helmet, the accidents can be detected. The main target of the project is designing a smart helmet for accident avoidance and alcohol detection. The features of the Smart Helmet are wearing helmet, detection of alcohol, detection of accident. If the person is not wearing helmet the bike will not start and it displays on the LCD. The alcohol sensor recognizes the alcoholic substance in the rider's breath. If the person is drunk then alcohol sensor detects it and displays on the LCD and the bike will not start. If there is no detection of alcohol then the bike starts. If there is no sign of alcoholic substance present and helmet is used, only then the bike will start. The bike will not start if any of the two conditions is violated. If an accident is occurred then it is detected by Vibration sensor and alarm is activated. If the person is in conscious state, then the person can off the alarm and no message is sent to the saved numbers. If the person is in unconscious state, then message will be sent to the saved numbers in GSM module and sends the location to them by GPS. With the use of Smart Helmet, accident rate can be reduced.***

I. INTRODUCTION

A. Introduction

Any car collision that occurs on a public route is considered a traffic accident. Any fender bender that happens on a public course is viewed as a car crash (for example beginning on, ending on, or including a vehicle part of the way on the interstate). Vehicle-creature crashes, vehicle-passer by impacts, and vehicle-fixed-hindrance crashes are largely instances of these episodes. Street auto collisions are as of now among the best ten primary driver of death in big league salary nations. DALYs (Disease-Adjusted Life Years) were utilized to assess illness trouble in 1998. (Handicap changed life years). Street auto collisions were the main wellspring of injury in non-industrial nations, positioning twelfth among the main sources of lost long periods of sound life. In India's street framework, augmenting the street isn't a possibility for keeping away from gridlock in such urban areas.

The state's alcoholic specialist driving control measures can be improved in an assortment of ways. The best will stick to the accompanying rules: Because plastered driving control requires activity at all levels, they will put authority and duty in individuals and associations at all levels, from neighbourhood to public. Since ultimate choices on needs and assets to restrict plastered driving should have public help, they will work in the public spotlight, utilizing the media to cover issues and arrangements. They won't ensure quick outcomes dependent on a solitary movement, yet rather take slow measures toward long haul progress. They'll likewise set up measures for recognizing and settling issues. What's more, rather of endeavouring to apply one-size-fits-all arrangements, they will assemble measures for perceiving and taking care of issues. The utilization of gadgets in autos is getting progressively mainstream. In light of the minimal expense and wide assortment of choices advertised. Individuals like to purchase cruisers more than four-wheeler. Accordingly, street security has become a significant wellspring of concern. Subsequently, it gets crucial to apply an approach that makes it hard to get around the fundamental prerequisite of wearing a head protector and staying away from inebriated driving. We made a component that checks the two measures prior to turning on the bicycle's motor.

A liquor sensor and a head protector detecting switch are remembered for our framework. A switch distinguishes if the rider is wearing a cap. The yield of the liquor sensor is communicated to the MCU, which identifies if the cyclist is intoxicated. The switch just as the liquor sensor are both included inside the protective cap. On the off chance that both of the two essentials aren’t met, the motor won't turn over. The MQ3 liquor sensor is utilized to identify the liquor focus in the driver's breath. In view of the liquor focus, the sensor creates a simple resistive yield. MCU represents miniature regulator unit, and it is liable for controlling the elements of different squares in this framework.

The recommended project work incorporates a brilliant head protector, which guarantees that the rider can't begin the bicycle without it. When riding a bicycle, this protective cap utilizes a straight-forward link trade to guarantee that the bicycle doesn't stall out without both the key and the cap. Moreover, at whatever point the driver begins Ignition, the liquor sensor estimates the measure of liquor in his breath and turns off the bicycle on the off chance that he is inebriated. The innovations of GSM and GPS are being utilized to expand driving wellbeing. Vibration sensors are coupled to a miniature regulator board and put in different segments of the protective cap where they are destined to be hit. At the point when the rider crashes into the ground and the protective cap contacts it, these sensors distinguish it and convey it to the miniature regulator board, which separates

GPS information from the GPS module associated with it. The GSM module makes an impression on an emergency vehicle or relatives when the information arrives at a specific level of pressure.

Just if the two prerequisites are met, the MCU gets information from these sensors and sends advanced information coordinating to the sensor yield to the encoder. Most of mishaps that happen outside of urban communities are brought about by inebriated driving, and there is no trying framework set up to forestall these fatalities on expressways. The pace of traffic in metropolitan urban communities is expanded by drivers leaving their vehicles in no leaving regions. In the Indian street framework, extending the street isn't a possibility for keeping away from gridlock in such urban communities.

This task discloses how to develop a compelling security framework for a bike to forestall mishaps and different disasters. Liquor related vehicle mishaps are on the ascent nowadays, and wearing a head protector decreases the seriousness of the impacts. These two objectives are consolidated in a solitary inserted framework in our undertaking. A liquor sensor, cap detecting switch, MCU, encoder, and RF transmitter make up this part. The switch just as the liquor sensor are both included inside the cap. The MCU peruses information from the sensors, decides if the driver has non-alcoholic breath and the cap sensor switch is shut, and possibly gives a computerized yield to an encoder if the two conditions are met. It changes over one of the dynamic contributions to a paired coded yield. The encoder's coded twofold yield is sent through a RF transmitter. We will utilize the notable ASK tweak procedure here. The computerized information is addressed as changes in the abundancy of the transporter wave in this RF framework. Adequacy Shift Keying is the name for this kind of regulation (ASK).

B. Objective

Helmet wellbeing is getting progressively significant, and riders should be aware of any dangers they may experience, regardless of whether they are not noticeable. With the Smart Helmet, the rider will be more mindful of peril while additionally presenting to a lesser extent a danger to other street clients. Motorcyclists can enormously build street wellbeing by continually having the option to keep up their eyes out and about and perceiving whether vehicles are moving toward them without looking. The Smart Helmet will incorporate a Heads-Up Display (HUD) that will speak with the bicycle and show bicycle data to the rider, permitting them to keep their eyes out and about consistently. The HUD will be appended to the head protector by means of the visor, deterring as little perceivability as could really be expected. This permits the rider to see the data while keeping their eyes out and about ahead. The visual showcase will be adequately splendid and have sufficient differentiation to be seen during the day. Helmet wellbeing is getting progressively significant, and riders should be aware of any dangers they may experience, regardless of whether they are not noticeable.

With the Smart Helmet, the rider will be more mindful of peril while additionally presenting to a lesser extent a danger to other street clients. Motorcyclists can enormously build street wellbeing by continually having the option to keep up their eyes out and about and perceiving whether vehicles are moving toward them without looking. The Smart Helmet will incorporate a Heads-Up Display (HUD) that will speak with the bicycle and show bicycle data to the rider, permitting them to keep their eyes out and about consistently. The HUD will be appended to the head protector by means of the visor, deterring as little perceivability as could really be expected. This permits the rider to see the data while keeping their eyes out and about ahead. The visual showcase will be adequately splendid and have sufficient differentiation to be seen during the day.

II. LITERATURE SURVEY

Devendra Itole, Aakash Menon, "Insightful Helmet". The creator clarified Nowadays practically all nations are utilizing protective caps required and getting serious stringently on intoxicated driving. Yet at the same time in numerous spots, the principles are being abused. To defeat this issue, a framework named ―Intelligent Helmet‖ is proposed in this paper. A savvy cap is an exceptional thought which makes cruiser driving more secure.

The proposed framework depicts the cooperation between modules mounted on the vehicle and cap to guarantee the vehicle can be begun just when the client is wearing a head protector and isn't affected by liquor. Another component of the proposed framework is the capacity to identify a mishap and send the relating topographical directions of the mishap spot to predefined numbers utilizing a GPS and GSM framework separately. In the wake of giving an outline of the framework, the paper portrays the framework design, explicit segments utilized, rationale stream utilized and advantages of the framework.

This proposed framework targets making wellbeing the standard and not a decision. A framework for clever cap has consequently been created which, through correspondence between a module in the protective cap and one on the vehicle guarantees different wellbeing perspectives. This framework likewise identifies the event of a mishap and makes arrangements to sound a caution using a GPS and GSM framework. This framework guarantees the pre-essential conditions to ride securely, to be specific, wearing a protective cap and not riding affected by liquor, are satisfied. The mishap ready element additionally masterminds convenient assistance to be given. The utilization of GPS framework explicitly benefits if a mishap happens in an

isolated region or at an odd hour. The highlights of the proposed framework can be additionally stretched out to ring a rescue vehicle when a mishap happens and play a voice message showing the area. This can lessen the time needed for crisis help.

III. PROBLEM STATEMENT

A. Problem Formulation

Street mishaps murder roughly 1.3 million individuals every year and harm 2 to 5 million more. The yearly number of street traffic passing is still at a deplorable degree of 1.24 million, as indicated by the 2013 Global Status Report on Road Safety. Just 28 nations, or 7% of the total populace, have total street security enactment that location five significant danger factors: plastered driving, speeding, and inability to utilize cruiser head protectors, safety belts, and kid limitations.

Numerous individuals bite the dust because of not wearing bike caps in nations like India, where bicycles are more boundless. Regardless of the way that the public authority has more than once articulate the need of wearing a cap and wearing a safety belt, most of drivers don't feel they are required. Customary protective caps are worn by most of individuals basically to try not to be punished by traffic light officials, not for wellbeing reasons. Thus, the driver's wellbeing isn't ensured by these head protectors. Head protectors are the most fundamental kind of insurance for cyclists on two wheels. It doesn't, in any case, ensure that the rider is keeping all transit regulations. Therefore, the brilliant protective cap can be utilized to resolve this issue.

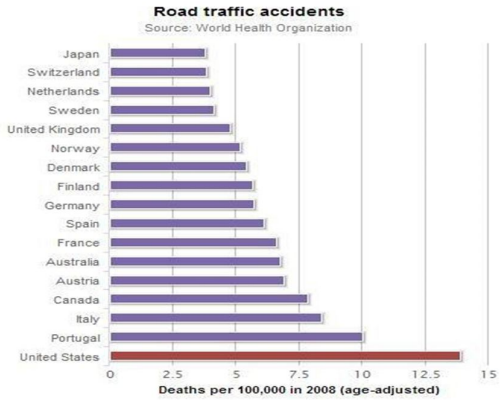

Fig 3.1 Number of deaths from road accidents

B. Problem Statement

One for the gathering and one for the transmitter, the Smart Helmet have two working modules. The transmitter is coordinated inside the head protector, while the beneficiary might be mounted on any bike. Subsequently, two gadgets can impart remotely. A pressing factor transducer in the transmitter module of the head protector identifies the pressing factor signal. A comparator changes a simple sign over to a computerized signal and sends it as rationale level 1 to the transmitter's information, while the transducer creates the yield.

The yield of the transducer becomes zero when the client eliminates the protective cap, and the transmitter's information rationale level gets 0. The measure of liquor in the driver's inhale is likewise identified utilizing a MQ-3 gas locator (liquor sensor). It tends to be situated somewhat behind the face safeguard for simple recognition. When a biker is plastered, the impedance worth will drop, causing an abrupt change in voltage. From that point forward, the outcome is shipped off the microchip, which keeps the bike from beginning in the present circumstance. Till the rider puts on his cap, the collector's module's yield pin creates significant level yield information, and the start unit circuit of the bicycle is finished when this sign activates the information hand-off. The hand-off begins when the rider removes their head protector, and the circuit's associations are broken. On the off chance that somebody is harmed, the vibration sensor will recognize it, and the area of that particular district will be transferred to his family members and the closest police division through GSM and GPS module as longitude and scope information.

C. Project Motivation and Goals

Riders ought not to need to turn their whole body and head away from their line of movement to check whether there are vehicles aside, back, or even in their visually impaired regions if a Heads-Up Display (HUD) is incorporated into the front of the cap. With our framework, the driver will have a successful method of seeing (and hearing in basic circumstances) cars moving toward the bicycle, conceivably saving the rider's life.

In spite of the fact that our device isn't proposed to be an all-out trade for truly checking dangers, it will aid circumstances when a little mistake may have brought about a deadly end. The gadget will be little and lightweight, making it simple to move. It will be parted into two sections: a remote head protector HUD and a back mounted region identification sensor that will be connected to a cruiser interface. The whole contraption should be put on and utilized by any motorbike with supported standard associations, despite the fact that it is intended to interface with the motorbike (to recognize blinkers and other data about the bike).

The sensor and bicycle interface will be filled by the vehicle's battery and will remotely send significant information to the head protector HUD. While riding, the protective cap will continually tune in for data sent from the bicycle and will refresh routinely, permitting the rider to see the most forward-thinking bicycle data. Low-range remote is implied to save battery life as well as to stay away from conceivable correspondence interference. The head protector HUD will be battery-controlled and designed to work at a low force utilization. On a full charge, it can keep going for quite a long time, and with sunlight based force, it will last any longer. At the point when the protective cap isn't being used, home charging will be accessible. Since the solitary bit of the gadget that requires charging is the head protector HUD, client administration will be fast and speedy. Others have attempted to imitate the capacity, yet they are either excessively insecure or excessively costly for the normal client. Our item endeavors to be a savvy, dependable, and straightforward arrangement. Our venture's expected clients will be merchants hoping to sell cutting edge bike wellbeing gadgets. In outline, our drive expects to achieve the accompanying targets.

Create, test, and convey a minimal expense motorbike closeness discovery framework. Consolidate distance detecting philosophies to recognize objects from a far.

- While driving, effectively distinguish approaching cars.
- To send closeness information, fuse correspondence frameworks between miniature regulators.
- Implement the thought so it very well may be just applied to different vehicle frameworks.
- Design the Smart Helmet so it very well might be utilized by a wide scope of individuals with next to zero preparing.
- Follow industry norms to guarantee security, dependability and natural consideration.

Expecting the entirety of the above objectives are met, our task will likewise endeavor to meet the accompanying expanded objectives:

- Incorporate an adaptable, straightforward presentation for the head protector module
- Utilize a Global Positioning System (GPS) gadget to incorporate route information to the client.
- Implement a live visual feed so the client can perceive what is behind them.
- Include a brilliance dimmer so the utilization can diminish or light up the visual presentation
- Provide customization settings for the visual presentation that the client can arrange.
- Integrate portable innovation, like a mobile , into the task to control and analyze the Smart Helmet
- Implement a temperature sensor to give climate subtleties to the client.

IV. PRINCIPLE AND WORKING

A. Working Principle

The point of our smart helmet is to give the security to the bicycle rider and give data area of the mishap to the rescue vehicle and relative. This is finished by utilizing the GSM module. We are utilizing SIM808 as the GSM module. However, sending the message of that mishap isn't sufficient. We need to send the area of the mishap. So we are utilizing the SIM 808 as the GPS module it accompanies the GNSS collector. At the point when the mishap has happened the piezoelectric sensors sense the mishap and offer sign to the Arduino. At that point Arduino will take area from the GPS and it will send the area of mishap as the scope and longitude yet ordinary client can't see how get area from the scope and longitude so we have executed our framework to send the google map interface. Which will open in google guides and relatives and the rescue vehicle can make certain moves to save the bicycle rider life. However, we don't have to consider rescue vehicle each time in some cases the bicycle rider has minor wounds yet piezo electric sensor will detect that as mishap.

All things considered bicycle rider can quit sending of the SMS this is finished by utilizing the change to stop mishap. Prior to sending the mishap message to the emergency vehicle and relatives the bell will ring for the 40 seconds if the bicycle rider has minor wounds he/she can stop the sending of the SMS basically by squeezing the switch on protective cap. On the off chance that he/she will not press switch the SMS will be ship off emergency vehicle and relatives. Above framework referenced was for the mishap detailing. Our framework can likewise be utilized as mishap counteraction framework. This is finished by utilizing the Alcoholic sensor and the Rider discovery switch. Our framework is intended to check the rider has worn cap and he/she has

non-alcoholic breath. On the off chance that the two conditions are fulfilled the Arduino will convey message to vehicle unit to begin or stop vehicle by means of Bluetooth. The vehicle part contains the miniature regulator and the transfer to begin or stop the start.

B. Working

1) *Transmitter Section:* If the switch is pressed after wearing the helmet, it feeds a logic level 1 to the input of the transmitter through an encoder. If alcohol is detected in MQ3 alcohol sensor, it feeds a logic level 0 and that 0 logic level is received by the receiver.
2) *Receiver Section:* When the biker wears the helmet and ON the s witch, the logic level 1 is received by the receiver which gets decoded by the decoder and triggers the microcontroller and the motor gets on.
3) When alcohol is detected the logic level 0, received and motor gets off. When the vibration sensor gets triggered for an accident, GPS and GSM both gets ON and SMS is sent along with the biker's location.
4) *Microcontroller:* In microcontroller, when logic signal 1 is triggered the motor driver makes the motor ON. When vibration sensor is triggered, the microcontroller is executed. GPS and GSM then get ON and the buzzer produces sound.

C. Implementation

The project Smart helmet for motorcyclists is the best option for achieving the following goals:
Helmet wearing Rider's Status.
Test for Alcohol Content.
Detection of an Accident.
The Location of the Accident.

1) *Status of Rider Wearing Helmet:* If the rider wears the helmet and press the switch, only then the motor will start. Without wearing the helmet, the motor will fill to start.
2) *Alcohol Content Test:* Illegal consumption of alcohol at the time of driving is 0.08 mg /L as per govt act. But for demonstration purpose it is programmed to the threshold limit 0.04 mg /L. If the sensitivity of MQ-3 is more than 0.0 4 mg / L in breathe then the driver can't drive the bike.
3) *Accident Detection:* A frequency range that is formed as a result of vibrations caused by an accident or an impediment. If the frequency exceeds the threshold, the vehicle unit displays "accident detected."
4) *Accident Location:* Once the bike unit indicates that an accident has been detected, GSM uses GPS to relay the location of the accident. It sends longitude and latitude coordinates to save SIM numbers indefinitely till the ignition system is turned off.

V. FLOW CHART AND BLOCK DIAGRAM

A. Block Diagram

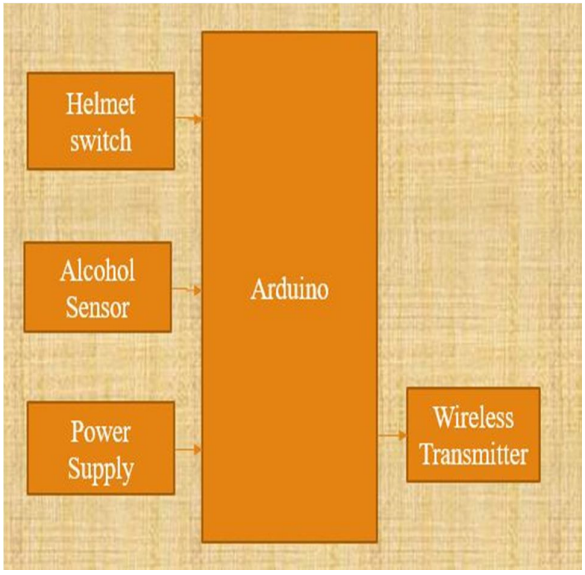

Fig 5.1: Transmitter unit

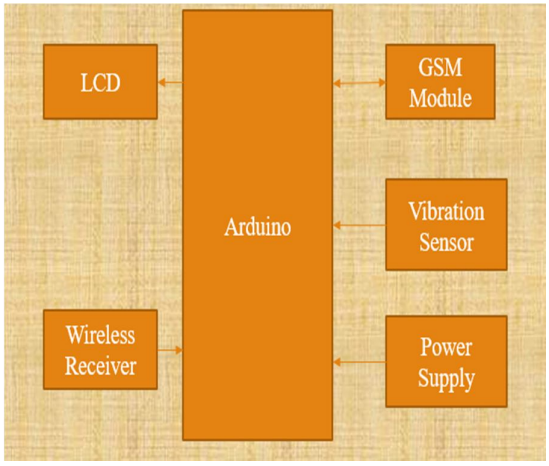

Fig 5.2: Receiver unit

B. Flow Chart

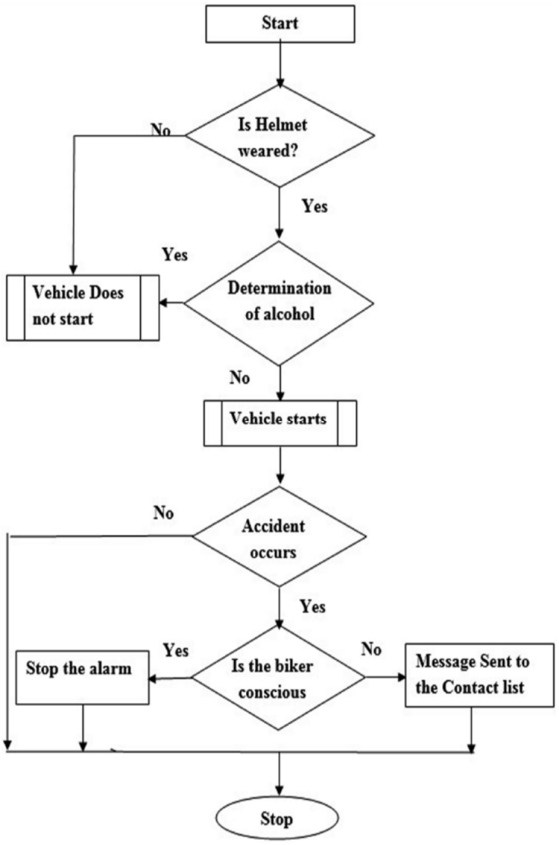

Fig 5.3 Flow chart

VI. SOFTWARE AND HARDWARE DETAILS

A. Introduction

A PC framework having a devoted part inside a bigger mechanical or electrical framework, oftentimes with continuous processing limits, is known as an inserted framework. It is right now fused as a feature of a generally utilized contraption. 98% of all chip are made as implanted framework parts.

1) *Embedded Systems:* Inserted innovation has arrived at its apex, and the measure of information accessible is dumbfounding. The expression "inserted framework" alludes to a framework that joins equipment and programming. Implanted innovation is essential for incorporating the entirety of the capacities that accompany it. This should give a shut circle component between the Department's various sources. This idea fundamentally diminishes staffing necessities, saves time, and runs proficiently without the requirement for human intercession. This drive addresses the initial move toward achieving the objective. Existing frameworks are being created to have implicit insight because of mechanical headways. Installed frameworks aren't really discrete squares; as a rule, they're genuinely coordinated into the gadget they're managing. Embedded code, often known as firmware, is stored in read-only memory or on convector chips rather than on a hard drive. It oftentimes works on a PC with restricted equipment assets, like a little or non-existent console, a little screen, and deficient memory. We need a microchip and a microcontroller in an implanted framework to run any application. In a microchip, an outside memory is associated, which expands the size of the chip and permits it to play out various activities, while in a microcontroller, the memory is inherent, and we can utilize this regulator just for explicit applications where speed is expanded, so microcontrollers are in all likelihood utilized in an assortment of uses.

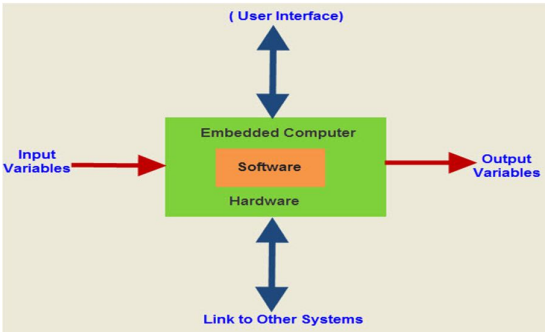

Fig 6.1 Block diagram of embedded systems

B. *Hardware Components Description*

1) *MQ-3 Alcohol Sensor:* A liquor sensor detects the presence of liquor gas in the air, and the yield is calculated using a simple voltage. The sensor can operate at temperatures ranging from - 10 to 50° C with a force supply of less than 150 Ma to 5V.The detecting range is 0.04 to 4 mg/L, which is fitting for breath analysers. The MQ-3 gas sensor is ideal for distinguishing liquor levels in breath. It tends to be set straightforwardly before the face. The sensor responds to an assortment of gases. The head protector unit decides if the cyclist is intoxicated. The MQ-3 sensor consolidates a potentiometer for directing gas focuses. We adjusted the indicator for a convergence of 0.4 mg/L of liquor in air and utilized an opposition worth of 200 K. Both simple and advanced are upheld by MQ-3. GND, VCC, An out, and D out are the four pins on the MQ-3. We will utilize the sensor's computerized yield, which is either high or low. Our cap unit decides if the rider is intoxicated. MQ303A is an alcohol detection semiconductor sensor. It is appropriate for use in portable alcohol detectors because of its high sensitivity and quick reactivity to alcohol.

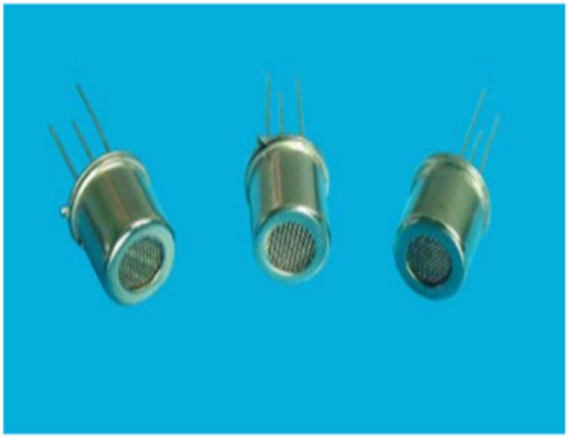

Fig 6.2: Alcohol sensor

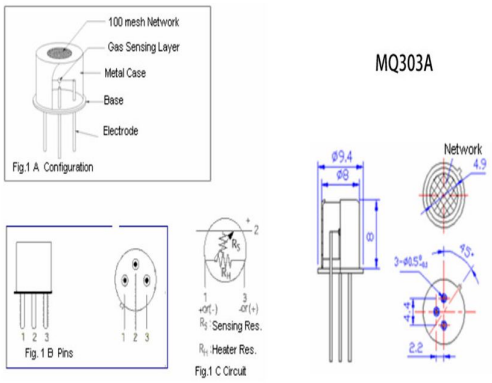

Fig 6.3: MQ303A sensor

The MQ-3 is a liquor sensor that distinguishes ethanol noticeable all around. It's perhaps the most essential gas sensors, consequently it works likewise to different gas sensors. It'll hamper you $6.90. It is regularly utilized in breathalysers or breath analysers to identify ethanol in human breath.

2) *Power Supply:* The force supply segment is liable for giving +5V to the parts with the goal for them to work. The IC LM7805 is utilized to keep a predictable voltage of +5V. The air conditioner voltage, which is ordinarily 220V, is connected to a transformer, which lessens the air conditioner voltage to the fundamental dc yield level. A diode rectifier then delivers a full-wave redressed voltage, which is first sifted by a basic capacitor channel to form a dc voltage. The ensuing dc voltage frequently shows some wave or ac voltage variation. The ensuing dc voltage frequently shows some wave or ac voltage variation. A controller circuit removes waves and maintains a constant dc value regardless of whether the information dc voltage varies or the heap associated with the yield dc voltage varies. One of the most common voltage controller IC devices is used to obtain this voltage guideline.
3) *Buzzer:* A loudspeaker is an electroacoustic device that reproduces sound. One or more speakers can make up a baffle. Sound is transmitted via sound waves, which are sound waves travelling through the air in this case. The ear detects these waves and converts them into nerve impulses, which are then transferred to the brain, where they form signs associated with music, sounds, and onomatopoeia. If you have a voice recording, music on magnetic or digital media, or these radio signals, they will be available at the output of the electrical signal processing apparatus, which must be converted into sounds using a speaker.
4) *Liquid Crystal Display (LCD):* LCD screens are electrical showcase modules that can be utilized in an assortment of ways. A 16x2 LCD show is a moderately fundamental module that can be found in an assortment of devices and circuits. These modules are preferable to seven-section and other multi-portion LEDs. The explanations behind this are as per the following: LCDs are cheap; they are easy to program; they have no limitations on showing novel and surprisingly bespoke characters (in contrast to seven fragments), activities, etc.

A fluid gem show (LCD) is a display that makes use of the light-adjustment abilities of fluid precious stones, a substance that combines the properties of fluids and jewels. The pixel thickness of a presentation determines how much content may be exhibited, ranging from a simple 7-fragment show to a more jumbled picture or realistic image.

The LCD has completely supplanted the cathode beam tube (CRT) show in basically all applications, and is frequently utilized in PC shows, TVs, computerized cameras, and other versatile gadgets. The LCD show depends only on a backdrop illumination as its light source, as opposed to singular light producing segments like a LED show. In the event that the showcase is seen in direct daylight, this may cause issues, albeit this can be moderated by utilizing a matte-based surface with a light-dissipating hostile to reflection layer to make seeing simpler.

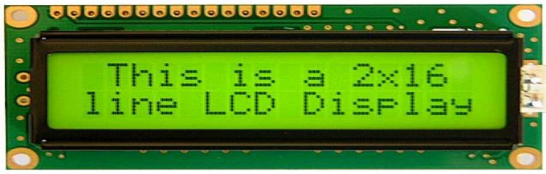

Fig 6.4: 16x2 LCD display

The regularly utilized. Character-based LCDs utilize Hitachi's HD44780 regulator or others that are HD44580 viable. A 16x2 LCD can show 16 characters for every line on every one of its two lines. Each character is introduced in a 5x7 pixel framework on this LCD. Order and Data are the two registers on this LCD. The LCD order directions are put away in the order register. An order advises the LCD to play out a specific movement, for example, initialising it, cleaning its screen, setting the cursor area, dealing with the presentation, etc. The information to be shown on the LCD is put away in the information register.
An information signal and a control signal are both acknowledged by LCDs. The LCD module perceives these signs dependent on the RS pin's condition. By bringing the R/W pin high, information may now be perused from the LCD show also. When the E pin is beat, the LCD show scans information and executes it, and the equivalent is valid for transmission.
It takes 39-43 seconds to write a character or execute an order on an LCD board. Cleaning the presentation and looking for the cursor to the home area takes 1.53ms to 1.64ms. Any attempt to transport information before this time frame may cause some devices to fail to grasp or execute current information.

C. Commands and Instruction Set

The only registers that the MCU can manage are the LCD's guiding register (IR) and information register (DR). Control data is temporarily stored in these registers before the LCD's interior working begins in order to cooperate with interfacing with several MCUs or fringe control gadgets that operate at different speeds. The MCU sends commands to the LCD, which govern the LCD's inner activity. These indicators, which include the register choice signal (RS), the read/compose signal (R/W), and the information transfer signal (IT), make up the LCD directions (DB0 to DB7).
There are 4 classifications of directions that:
Designate LCD capacities, for example, show design, information length, and so on
Set inside RAM addresses
Perform information move with inner RAM
Perform random capacities
While taking a gander at the table, you can make and test your own orders. A short assortment of significant directions that are routinely utilized while chipping away at the LCD is given underneath.

D. Interfacing Liquid Crystal Displays With Controller

For the data bus, the LCD standard specifies three control lines and eight I/O lines..

Fig 6.5: Pins of LCD

8 pins for data Bidirectional data/command pins D7:D0
ASCII format is used to send alphanumeric characters.
RS: Select Register RS=0-> The Command Register option is chosen.
RS = 1 indicates that the Data Register is active.
R/W (Read/Write): 0 -> Write, 1 -> Read
E: Enable (Latch data) This command is used to latch the data on the data pins. To latch the data, a high-to-low edge is required.

E. Force Sensing Resistor

The Force Sensing Resister can be found inside the protective cap, where it detects human touch. The protective cap unit chooses whether or not a cap is worn. In the event that this condition is fulfilled or not, the sign is shipped off the bicycle unit. FSRs are vigorous polymer thick film (PTF) gadgets with an opposition that is contrarily corresponding to the power applied to the sensor's face. This sensor is utilized to manage human touch in an assortment of uses. Clinical frameworks, auto gadgets, mechanical technology, and modern applications are only a couple models. The power versus obstruction trademark portrayed

in Fig. 1 (b) gives an unpleasant thought of the common reaction of a Force detecting resister. The power versus obstruction information is appeared in a semi-log style for effortlessness. A power detecting resister is a two-wire sensor whose opposition shifts relying upon the applied power. The resistor RM is picked to expand the ideal power affectability range while additionally restricting current utilization. An estimating resister of 10 k is utilized in this model.
A numerical condition portrays the yield voltage:

$$Vout = \frac{RmV +}{(Rm + Rfsr)}$$

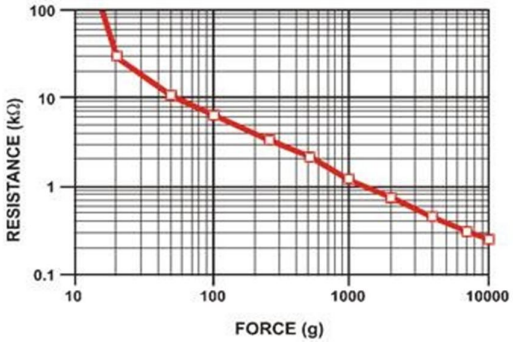

Fig 6.6: Resistance vs. Force graph

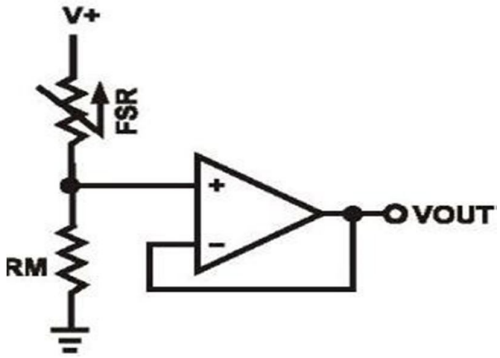

Fig 6.7: Circuit diagram of FSR

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F. Vibration Sensor

A piezoelectric sensor is a gadget that proselytes changes in pressure, speed increase, temperature, strain, or power to an electrical charge utilizing the piezoelectric impact. The prefix piezo-signifies 'push' or 'press' in Greek. Piezoelectric sensors can be utilized to gauge a wide scope of activities. They are used for quality assurance, measurement control, and inventive work in a variety of fields. Pierre Curie discovered the piezoelectric effect in 1880, but it wasn't until the 1950s that manufacturers began to use it in mechanical detecting applications. From that point forward, this strategy for estimation has gotten all the more generally utilized, and it has advanced into a fullgrown innovation with high intrinsic dependability.
They've been used effectively in an assortment of utilizations, including clinical, aviation, and atomic instruments, just as a slant sensor in purchaser gadgets and a pressing factor sensor in cell phone contact cushions. While developing inner ignition motors, piezoelectric segments are used to screen burning in the auto area. The sensors are either straightforwardly mounted into extra openings in the chamber head or have an implicit little piezoelectric sensor in the sparkle/shine plug.

G. Motor

The attractive power applied by an attractive field on an electric flow drives rotating loops of wire in electric engines. Electrical energy is changed over into mechanical energy by them. Electric engines arrive in an assortment of shapes and sizes. The accompanying layout gives an outline of a couple of the most well-known.

AC and DC engines are the two essential kinds of engines. To work, AC engines require an exchanging current or voltage source (like the force from your home's divider outlets). To work, DC engines require an immediate current or voltage source, (for example, the voltage created by batteries). General engines may run on a force source. Not exclusively are the engines built in an unexpected way, however the strategies used to deal with the speed and force produced by every one of these engines likewise vary, regardless of the way that the force change standards are something very similar in both RF Communication circuit.

H. GSM Module

A GSM modem, sometimes known as a GSM module, is a hardware device that uses GSM phone technology to provide an inaccessible data interface. From the standpoint of the wireless network, they are nearly indistinguishable from ordinary phones, including the requirement for a SIM to connect to the network.

Fig 6.8: GSM module

GSM stands for Global System for Mobile Communications, and it is an open, automated cell technology that provides for the transmission of convenient voice and data services.

GSM (Global System for Mobile Communications) is a mechanised cell structure that is widely used throughout Europe and the world. The most extensively utilised of the three sophisticated long-distance telephone networks is GSM, which uses a variety of Time Division Multiple Access (TDMA) techniques (TDMA, GSM, and CDMA).

GSM digitises and bundles data before sending it via a channel with two separate floods of consumer data, each of which is opened on purpose. It may use the 900 MHz or 1,800 MHz repetition bands to function. It can make phone calls and send data at up to 9.6 Kbit/s, as well as send SMS messages (Short Message Service). GSM stands for Global System for Mobile Communications, and it is a small communications modem that provides a flexible communication framework (GSM).In 1970, Bell Laboratories came up with the idea for GSM. It is the world's most widely used flexible correspondence structure. GSM is an open and automated cell advancement that works at the 850MHz, 900MHz, 1800MHz, and 1900MHz repetition gatherings for conveying compact voice and data organisations.

For correspondence reasons, GSM was developed as an automated structure using the time division different access (TDMA) methodology. A GSM converts and compresses data before passing it across a channel that simultaneously handles two huge floods of client data, each with its own timetable. The automated system can transmit data at speeds ranging from 64 kbps to 120 Mbps.

In a GSM system, there are many cell sizes such as full scale, small, and umbrella cells. Depending on the execution space, each cell changes. In a GSM network, there are five different cell sizes: large, medium, small, and umbrella cells. The execution environment alters the consideration space of each cell. The time division multiple entrance (TDMA) technique works by allocating different scheduling openings to each customer on a regular basis. It can surely adapt to data transfer and voice communication, with data rates ranging from 64kbps to 120Mbps.

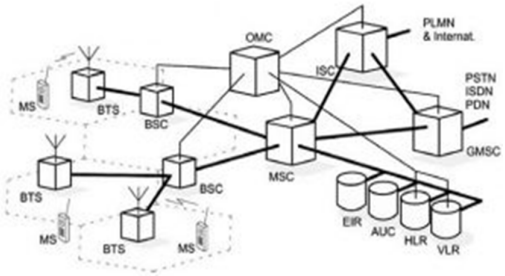


Fig 6.9: GSM connections

1) Highlights of GSM Module:

The GSM module's characteristics make the journey easier.

- Increased ability to reach
- Traveling throughout the world
- Organizational compatibility with consolidated and modernised enterprises (ISDN)
- Assistance to new organisations.
- The board's SIM phonebook
- A fixed phone number (FDN)
- A real-time clock with a ready-to-use organisation system
- High-quality conversation. Encryption is used to make phone selections more secure.
- Message organisation for short messages (SMS)

I. GPS Technology

The Global Positioning System (GPS) is a radio signal-transmitting and receiving satellite-based navigation system. A GPS receiver collects these signs and sends the information to the client. With GPS technology, one may choose their own position, speed, and time at any time of day, in any weather condition, and from any location on the planet. The official term for GPS was NAVSTAR (Navigation Satellite Timing and Ranging).

The initial purpose of the Global Positioning System was to serve the military. The government made the framework available for non-military personnel to utilize because to its common route capabilities and the fact that GPS innovation may be gotten to using small, affordable gear. The United States claims GPS innovation, which is overseen by the Department of Defense.

1) GPS Operation:

- GPS sends out individually coded satellite signals that may be processed by a GPS receiver, allowing the recipient to record position, speed, and time.
- To process positions in three measurements and the time balance in the collector clock, four GPS satellite signs are used.
- The United States Department of Defense funds and regulates GPS (DOD). While there are many common GPS clients around the world, the framework was designed for and is used by the United States military.

The structural segments of GPS are normally alluded to as the control section (ground stations), the space fragment (satellites) and the client portion (beneficiaries).

2) Deciding Position: After taking in all accessible satellite signals, the recipient thinks about the time that the satellite conveyed the message to the time it was gotten for every one of the accessible signs. Trilateralisation (like triangulation) at that point computes the situation by looking at the distinction among the signs.

Fig 6.10: GPS Module

J. Arduino

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microprocessor, designed by Arduino.cc. A number of digital and analogue input/output (I/O) pins on the board can be utilised to connect to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six of which are capable of PWM output) and 6 analogue I/O pins, and it can be programmed using the Arduino IDE and a type B USB connector (Integrated Development Environment). With voltages ranging from 7 to 20 volts, it can be powered by a USB cable or an external 9-volt battery. It's a microcontroller that's similar to the Arduino Nano and Leonardo.

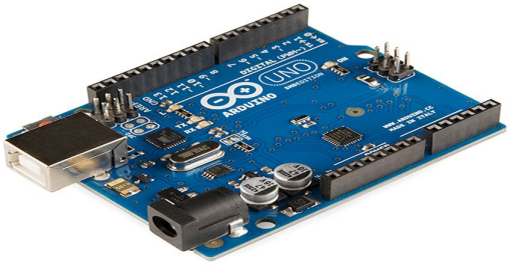


Fig 6.11: Arduino

K. RF Communication

A radio frequency (RF) remote connection connects the Helmet and Bike units. The encoder and decoder circuits are important for the RF correspondence circuit. On the cap's side, an encoder changes over equal information into sequential information. The encoder can encode kneads with 12N information pieces and N address bits. There are two sensible states that each address/information can be set to. Rosc picks the recurrence of the oscillator. The recurrence of the oscillator is set to 3 kHz, and the obstruction is set to 1 million ohms. The base measure of information that can be sent is four words. The decoder is mounted on the side of the bicycle and is used to analyze sequential data. The order of this data is modified from sequential to resemble. Decoders are capable of receiving and comprehending information sent by an encoder.

Radio recurrence (RF) is a recurrence or rate of swaying that occurs between the frequencies of 3 Hz and 300 GHz. This range is comparable to the frequency with which flow electrical indications are substituted to make and distinguish radio waves. Because the majority of this range is beyond the vibration rate that most mechanical structures can withstand, RF usually refers to electrical circuit vibrations or electromagnetic radiation..

1) RF Advantages :

- There is no requirement for a view.
- It can enter most solids and pass through walls without being hampered by ordinary materials.
- Greater range.
- It isn't sensitive to light.
- It is not particularly sensitive to natural changes and climate conditions.

The RF collector obtains information from the radio wire pin, which is then available on the information pins. In the recipient module, there are two data pins. In this vein, this data can be used for a variety of other purposes.

VII. RESULTS AND DISCUSSIONS

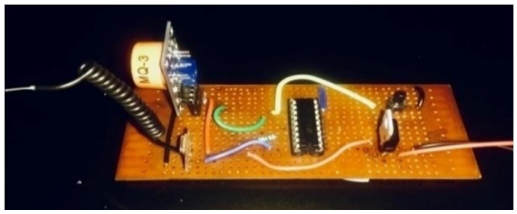


Fig 7.1: Circuit showing transmitter circuit

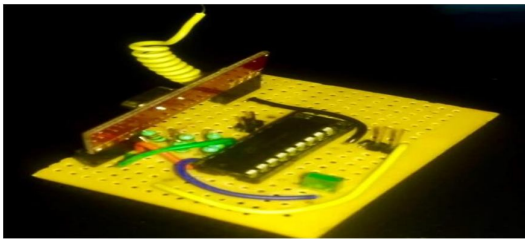


Fig 7.2: Circuit showing receiver circuit

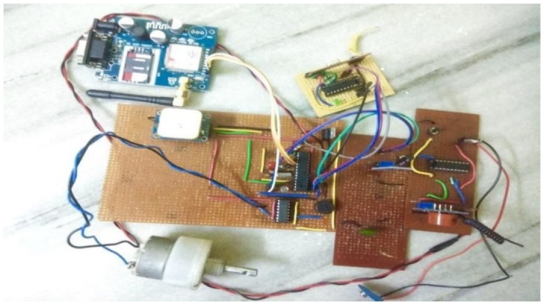


Fig 7.3: A complete circuit showing transmitter and receiver units

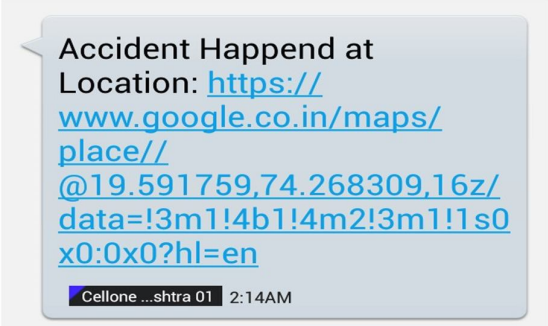
If the RF module is out of range or the helmet's RF module is turned off.

If the rider is not wearing a helmet, the message "No Helmet, Please Wear It" appears.

If there is an alcohol concentration in a person's breath, the device will display a notice on the LCD. It also sends an SMS to the registered phone number with their current location.

If an accident occurs, the bike will be damaged. The message is displayed on the LCD. It also sends an SMS to the registered phone number with their current location.

When accident occurs



VIII. ADVANTAGES

A. Detection of mishap in distant region can be handily recognized and clinical benefits gave in brief time frame.
B. Simply staying away from smashed drive by utilizing liquor locator. it will diminish the likelihood of mishap

C. Operates on sun based just as battery supply.
D. If head protector was taken then we can begin the bicycle by the secret word

IX. APPLICATIONS

A. It can be utilized progressively security framework.
B. We can eventually turn the complete circuit into a little module.
C. Security framework that consumes less force.
D. This wellbeing framework innovation can additionally be upgraded in vehicle and furthermore by supplanting the protective cap with safety belt.

X. CONCLUSION AND FUTURE SCOPE

A. Conclusion

The Smart Helmet framework is intended to be a solution for any cruiser rider who wants to increase their awareness and wellbeing while driving. Closeness detection in automobiles is unquestionably not a new concept, and it has been recognized in a variety of endeavors and business goods prior to this one. Nonetheless, such acknowledgements will typically come with their own set of advantages and disadvantages. The Smart Helmet framework's design and implementation aims to maximize the benefits of comparable products while avoiding or eliminating the barriers. What separates the Smart Helmet from existing items is the lower cost and convenience to guarantee any bike rider can bear and utilize it. The Smart Helmet stands out from other helmets because of its low cost and eases of use, making it suitable for any bike rider.

The Smart Helmet system will need to collect location data from surrounding articles using proximity sensors in order to filter a large field behind the rider and determine whether other cars are nearby. The framework will be powered by the cruiser and will be able to read electrical signals from the bicycle, such as flagging, speed, and other tachometer data. The protective cap module will receive information supplied remotely from the bike mounted module. If a vehicle approaches the bike too closely, the cap show will warn the rider with an audible tone.

To carry out these highlights and bring the concept to fruition, careful consideration was given to each piece of equipment. Because this venture did not receive any outside funding, cost was a limiting factor in our strategy. This financial consideration directly influenced the type of proximity sensor and visual display that were ultimately chosen, despite the fact that the item's stability was not compromised in our decision to save money. Because operating an engine vehicle at high speeds is inherently dangerous, extra precautions were made to ensure that the Smart Helmet arrangement did not interfere with the rider's ability to safely drive. The front and center consoles must not obstruct the rider's view of the road ahead of them. Furthermore, several modules, particularly the proximity sensors and the bicycle-mounted module, must be situated in such a way that they do not obstruct or burden the rider's progress.

The most recent Smart Helmet configuration incorporates all of the previously discussed plan components to create a comprehensive item capable of supporting the average biker in being more secure when out and about. It is our hope that the sharp head protector would reduce collisions, reduce traffic congestion, and make the road a safer place for all drivers.

The completed project effectively ensures:

- Throughout the trip, the rider wears a helmet.
- Liquor should not affect the rider.
- The detection of an accident.

B. Future Scope

The helmet's bioelectric sensors can be used to track a variety of actions. We can record the driver's motions with a tiny camera. It is commonly used to send messages from one vehicle to another using a remote transmitter.

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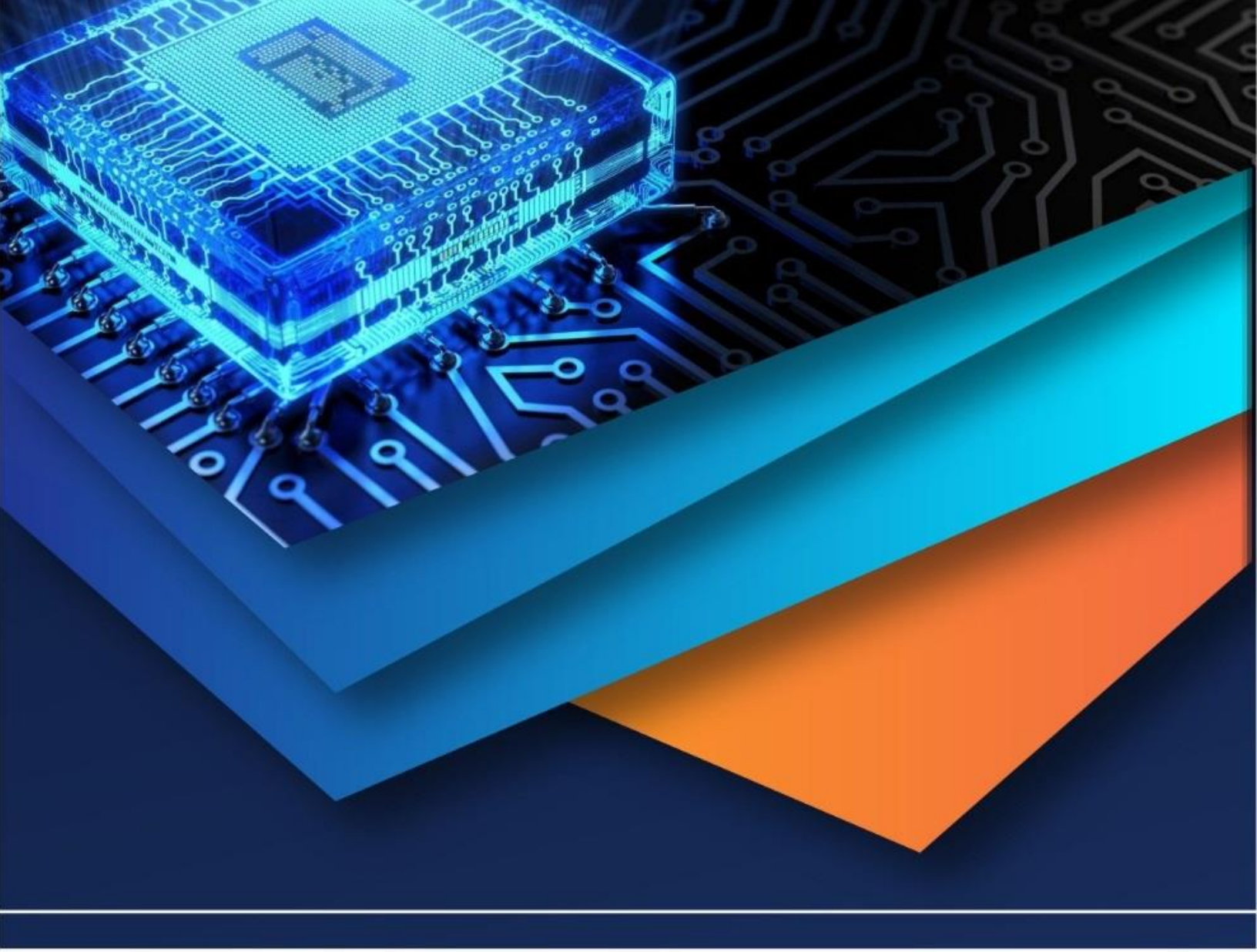

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