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Smart Helmet: A Review

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Abstract: In this review paper we are simply going to review some research papers related to the smart helmet. As wearing a helmet is necessary and can reduce the road accidents and may save a life. By studying all these papers we will came to know that the systems which are already implemented are using various sensors such as FSR sensor, Alcohol sensor, Vibration sensor, LED. Also the microcontrollers such as Arduino, ZigBee, PIC microcontrollers are used .In some papers for detecting the road accidents and locating the address GSM & GPS techniques are used. Some of the papers consists of bioelectric sensors for monitoring Brain, Cardiac and Respiratory Activity. Hence smart helmet is a special idea which makes motorcycle driving safer than before.

Keywords: Road Accident, Vibration sensor, microcontrollers.

I. INTRODUCTION

In present day scenario we encounter numerous cases of two wheeler road accidents leading to death. The main reason for severe head injuries is despite of the fact that helmets are available everywhere, people are not wearing them for protection. So a smart helmet is a special idea which makes motorcycle driving much safer than the existing system i.e. helmet. This is implemented using Arduino Uno development kit. By using Arduino the overall system becomes simple and this system consists of RF transmitter and RF receiver system. The bike will not get start without wearing helmet by the user or rider, as user wear helmet a RF signal radiate from transmitter and once these RF signal get sensed by the receiver is connected to the ignition of the bike and the bike will get start. An alcohol sensor is placed near to the mouth of the driver in the helmet to detect the presence of alcohol breath. If the breath of the driver is non-alcoholic then these two conditions are satisfied and the bike will get started. Here LDR sensor is used which can turn the headlights of the bike ON and OFF automatically.

Also the vibration sensors are used in different places of helmet where the probability of hitting is more which are connected to Arduino. So when the rider crashes and the helmet hits the ground, the sensors sense and the Arduino extract data using the GSM module that is interfaced with Arduino. When the data exceeds minimum stress limit then GSM module automatically send message to ambulance or police or family members. Security system applied in this paper meet the characteristics of a perfect rider and the application should be highlighted. This paper will improve safety and reduce accidents, especially fatal to the motorcyclist.

II. LITERATURE SURVEY

An Optimal Driving System by Using Wireless Helmet by K. Rambabu1, B. Premalatha and C. Veeranjaneyulu, they have used a wireless communication between bike to helmet and bike to traffic signal and speed breaker. The system will be comprised of a helmet module including stereo speakers and microphone, and a bike mounted base unit. The system will make use of different wireless communication protocols including ZigBee and another radio frequency (RF) protocol and they developed another one also i.e. when the rider or driver driving a bike he don't know where the speed breakers are there. By using RF technology they will find out where the speed breakers are there. Here they have used Arm-7 Microcontroller which is placed in the bike module. Along with the voice recognition unit which records the left, right & stop. It includes four block diagrams such as Helmet Section, Bike Section, traffic Signal Section & Speed Breaker Section.[1]Smart Helmet with Sensors for Accident Prevention by Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari, in this paper microcontroller is used in this paper to control the system. The microcontroller used to operate the paper is Peripheral Interface Controller (PIC) 16F84a.Other than that, Force Sensing Resistance (FSR) and the speed sensor (BLDC Fan) are used as sensors to operate this paper. Signal transmission between the two circuits is using a radio frequency concept. 315 MHz Radio Frequency Module is used since the range between the circuits is short. While the microcontroller Peripheral Interface Controller (PIC) 16F84A is used to control the system. Drawback of this work as the motorcycle's engine will only start is the helmet is worn and the belt has been buckled. And another type of wireless communication can be used because RF module has some limitations which only provide one way data transmission. [2]

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Alcohol Detection using Smart Helmet System by Sudharsana Vijayan, et al, here they used a switch is used to detect whether the biker is wearing helmet. Alcohol sensor is used to detect the biker is drunk, the output is fed to the MCU. Both the switch and the alcohol sensor are fitted in the helmet. If any of the two conditions are violated the engine will not turned ON. [3]Smart Helmet Using GSM& GPS Technology for Accident Detection and Reporting System by Manjesh N, et al The idea of this work is to give information about the rider wearing the helmet or not, whether the rider drunken or not and also, he met with an accident it gives an information about location where he is met with an accident through GSM & GPS module to mobile numbers family members. In this system P89V51RD2 microcontroller is used. In this paper they have used Vibration sensor, Alcohol Sensor, Temperature Sensor & Solar Cell as power supply. It includes block diagram of smart helmet. [4]A Smart Safety Helmet using IMU and EEG sensors for worker fatigue detection by Ping Li, et al, This paper proposes an inexpensive, non-intrusive and non-invasive Smart Safety Helmet (SSH) system, which is non-vision-based. The SSH includes mechanical components, electronic hardware for sensing human behaviours, an embedded real-time artificial intelligence module, a wireless transmission to communicate with the machine tool, and an electronic medical records (EMR). As an essential step, the risk level estimation with electroencephalography (EEG) and the Inertial Measurement Unit (IMU) is presented in this paper. This paper includes Block diagram of the SSH system. [5]Smart-Tec Helmet by R. Prudhvi Raj, et al the prototype has three inputs and as many outputs routed to and fro the P89V51RD2Microcontroller respectively. The two sensors incorporated in the prototype i.e. LM35D temperature sensor and ADXL3 tilt sensor, along with the GSM and Global Positioning System (GPS) module comprise the input circuitry while the Peltier module, the Liquid Cristal Display (LCD) module and the Global System for Mobile communications(GSM) module forms the output circuitry. The LM35D temperature sensor senses the temperature in the area enclosed between the scalp of the rider and the interior of the helmet. The ADXL3 Accelerometer Sensor incorporated in the helmet senses shocks, if at all they occur, received by the helmet with the help of GSM and GPS, in case of accident it locates the place of accident and intimates it to emergency service. They can manufacture the whole circuit in printed circuit board, so that circuit becomes smaller and can be easily fitted into helmet. The circuit can also be powered by solar energy so that it uses green energy and does no harm to environment. [6] A Solar Powered Smart Helmet with Multifeatures by Mr. P. Dileep Kumar, et al in this proposed system one inbuilt Bluetooth will be arranged so whenever the person gets the call means they can continue the call without removing of helmet. And another main feature ignition control using helmet. Whenever the rider where these helmet then only the engine will be started unless they can't start the bike. In this system hardware implementation of RF Transmitter and RF Receiver is done. In this paper they have designed the vibration sensor unit for any accident detection, and also they designed a ignition controlled circuit. It includes block diagram for Helmet as well as Bike system. In this paper they have discussed about developing of the "a solar powered smart helmet with multi features" like inbuilt Bluetooth, cooling fan ,cell phone charging are help for comfort driving to the rider and ignition control, accident detection and navigation system are help safety to the rider.[7] Smart Helmet by Kajal Thakare, et all the working of this smart helmet using Microcontroller is very simple, here they place the vibration sensors in different places of helmet where the probability of hitting is more which are connected to Microcontroller. So when the rider crashes and the helmet hits the ground, the sensors sense and the Microcontroller extract data using the GSM module that is interfaced with Microcontroller. When the data exceeds minimum stress limit then GSM module automatically send message to ambulance or police or family members. [8]Safety Helmets for Coal Miners Using Zigbee Technology by Monika Prasad, et al this technology is planned to be simpler and less expensive than the other WPANs, such as Bluetooth. This paper presents a study on how ZigBee is used for the transmission between the hardware circuit fitted with the coal mine workers and the ground control system through some routers. In this paper temperature sensor, smoke sensor and humidity sensor are used. Also it includes block diagrams of Transmitter section of Zigbee and Receiver Section of Zigbee. With easy installation system can be easily extended too, using ZigBee Wireless positioning devices. [9]Smart Helmet by Nitin Agarwal, et al In which Microcontroller 8051 based circuitry is use based on RF link simple working and operation. By using RF transmitter and RF receiver, the motorcycle can be moved if it receive signal from the helmet. This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz It includes block diagram of transmitter section and receiver section. It has drawback of stopping bike working as helmet keep out from head. [10]Smart-Helmet system by Anshu Singh Gautam, et al Alcohol sensor MQ6 is used here for detecting the alcohol concentration present in the driver's breath. Sensor provides an Analog resistive output based on the alcohol concentration. For switching purpose they used two wires. When the helmet is properly placed, the wires are short circuited and the engine turns ON. MCU is the controller unit, which controls all the functions of other blocks in this system. MCU takes or read data from the sensors and controls all the functions of the whole system by manipulating these data. The GSM module used here is SIMCOM SIM900A.It includes block diagrams for both helmet as well as for bike unit. [11]

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Smart Helmet to Avoid Road Kills (SHARK) by Ashwinkumar T. Limbanee, et al In this paper Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Here HC-05 module is easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. FSR is a device used to measure force or pressure acting on a body. Switch is a very basic device in electrical field. It is used either to complete or break the connection or circuit. ZigBee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios. Here the drawback is that Alcohol detection sensor can be added to the system, and if driver is drunk then the bike will not start. [12] Development of Helmet Detection System & Smart Seat Belt S. Anil Babu, et al, This paper shows the Block diagram of DOHDSSSB system, initially the transmitter in the ultrasonic sensor sends ultrasonic waves, which gets reflected from the helmet and is received at the receiver. Initially the transmitter in the ultrasonic sensor sends ultrasonic waves, which gets reflected from the helmet and is received at the receiver. Time of flight is calculated and is used to measure the distance between the helmet and the sensor module. Data from sensing module is sent for processing to the processing module. With reference to distance between the sensor and helmet, the decision making algorithm is executed at the control module. The processing module takes Yesor Nodecision based on sensor signals. If the condition is No then warning light emitting diode (LED) will glow and engine will not start. If the condition is Yes then LED will be turned off and actuation takes place in the ignition switch will be ready for starting the engine. [13]Safety measures for “Two wheelers by Smart Helmet and Four wheelers by Vehicular Communication” Manjesh N, et al here they used VANET as network which has self-organizing, movable, more efficient, and communication establishes in decentralized manner. Here GSM and GPS are used for sending the data. It includes Block diagram of smart helmet. [14]Smart Helmet: Monitoring Brain, Cardiac and Respiratory Activity by Wilhelm von Rosenberg, et al In this paper they have obtained a ballistocardiogram and a single lead ECG from sensors is placed behind the ear showed the possibility to collect cardiac data non-invasively from head locations. Additionally, the ECG and electrooculogram (EOG) were recorded from an army helmet equipped with electrodes attached to straps, and the ECG between both ears from modified earphones. Another ear-based recording technique is in-the-ear EEG where an EEG is obtained from electrodes inside the ear canals. There is no Block diagram and no drawback in this system. [15]Smart Helmet by Prof. N. B. Kodam .The thought of this work is to give data about the rider wearing the cap or not, whether the rider smashed or not furthermore, he met with a mishap it gives a data about area where he is met with a mischance through GSM & GPS module to versatile numbers relatives. It includes block diagrams of bike unit and helmet unit. [16]Intelligent Helmet by DevendraItole, et al, It is similar to the above paper work. It includes block diagram of helmet side and vehicle side. [17]Hi-Tec Helmet and Accidental free transportation system by Aviral Ajay, et al In this paper GSM module is used with microcontroller and transmitter circuit. Piezo sensor is used to sense the vibration. Microcontroller sends signals to the GSM & GPS with the current location of the person in the form of co ordinates. It includes the block diagram of GPS and GSM module and also block diagram of accidental free transportation system. [18]Smart Helmet by Saravana Kumar K, Anjana.B.S. This paper on “Smart Helmet” basically stands upon three main modules, namely: Helmet module, Voice module, Bike module. The helmet would be used to communicate with the motor bike all the time during the initiation of the ride to detect if the person is wearing the helmet or not and then the rider is asked for a password in the form of speech to unlock and ignite the bike by matching a user-independent password just like any other personal computers, and to stop the engine as well. For this purpose, they are using an ultrasonic sensor for detection. To run the Ultrasonic and radio modules they use Arduino NANO board which has ATmega328 microcontroller. [19]
Intelligent Helmet by Jennifer William, Kaustubh Padwal The proposed system is an intelligent helmet. The system ensures the safety of the biker. The system will bear following functionalities,

A. It will ensure that the rider has worn the helmet. If he fails to do so, the bike won’t start.
B. It will also ensure that biker has not consumed alcohol. If the rider is drunk, the bike won’t start.
C. An accident detection module will be installed on the bike, which will be able to detect accident and will be able to notify quickly the accident to police control room and in case if the accident is minor, rider can abort message sending by pressing the abort switch. It will consist of two parts:

Safemate using arduino by Mrs. K.V. Archana (Asst. Prof.), M. Abirami, T. Abiseha Aruna, V. Aishwarya, C.N.Suchitra. This system consists of two parts (1) helmet part and (2) bike part. The engine is ignited only under two conditions,
A push button is used to detect whether the rider is wearing the helmet
Alcohol sensor is used to detect non-alcoholic breath of the rider. It also include block diagram of both Helmet unit and Bike unit. [21]

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Smart Helmet system using alcohol detection for vehicle protection by Sivakumar A, Dhivya P, et al In this paper they are introducing a smart helmet which is used to detect alcohol consumption, usage of mobile phones while driving. In this they are insisting that every bike riders must wear the helmet. The existing system is used to detect the alcohol consumption if accident occurs the information conveyed to relative via SMS or Short Message Service. If the driver is drunk then the engine will not get started. In proposed method a smart helmet system which detects that, the person wearing helmet or not and also the system detect the person is drunk, If the driver using cell phone during driving means the bike will be jammed slowly. If a vehicle across this system, then the head light is automatically dimmed and dipped. They are using alcohol sensor to detect the person is drunk and they fix it in helmet. It includes block diagram of transmitter and receiver. [22]Accident alerting system to save bikers using smart helmets by R S Saravanakumar Mr. Muniraj, et al Making use of the Shock and vibration data logger, the high energy impact made to helmet during accidents is detected. Once the shock waveform is detected, the warning about the occurrence of accident is sent to the concerned persons and emergency along with the details of the location of the injured person. Here Arduino is used as a controller along with GSM & GPS. It includes block diagram of the system. [23] Cloud Incorporated Smart Helmet Integrated with Two-wheeler Communication Setup by A. Srikrishnan, K. Senthil Kumar and S. Ravi. The entire system can be divided into two halves:(a) Helmet System(b) Vehicular SystemReported works in the field of Helmets include, the usage of RF technology to detect crash and notify to the control room .Vibration Sensors placed on the Helmet detects the vibrations that are created when the helmet hits the ground and the intrinsic microcontroller process it and sends information about location. It includes block diagram of the proposed system based on IOT. It has drawback like advanced sensors can be used that will detect over speeding of bike and it can also be enhanced as a vehicular vanet system. [24]Smart Helmet & Intelligent Bike System by Prof. Chitte P.P. 1, Mr. Salunke Akshay S., The aim of this paper is to make a protection system in a helmet for a good safety of bike rider. The smart helmet that they made is fixed with sensors which act as to detect wear helmet or not. There are two different microcontroller is used in this paper. Each unit has used a separate microcontroller, for bike unit they use Arduino Lilypad and for helmet unit they use ARM7 lpc2148. Signal transmission between the helmet unit and bike unit is using a RF concept. In this paper Bioelectric sensors, use of solar panel and camera can be implemented. [25]

III.CONCLUSION

By referring all these different papers we came to know that Smart Helmet can be very important and very effective for the safety purpose of the user by using various sensors such as BLDC Fan, FSR sensor, Alcohol sensor, Vibration sensor, LED, bioelectric sensors along with the microcontrollers such as Arduino, Zigbee, PIC microcontrollers. It is providing a better security to the biker by using GSM & GPS techniques. We are working towards an idea that can contribute some part towards a developing India to become secure & safe. Where the society has to take just one step forward i.e. by wearing a smart helmet.

REFERENCES

[1] K. Rambabu, B. Premalatha, C. Veeranjaneyulu, “AN OPTIMAL DRIVING SYSTEM BY USING WIRELESS HELMET”, International Journal of Science, Engineering and Technology Research (IJSETR) Volume 2, Issue 9, September 2013
[2] MohdKhairulAfiqMohdRasli, Nina KorlinaMadzhi, Juliana Johari, “SMART HELMET WITH SENSORS FOR ACCIDENT PREVENTION” international Conference on Electrical, Electronics and System Engineering 2013 IEEE
[3] Sudharsana Vijayan, Vineed T Govind, Merin Mathews, SimnaSurendran, Muhammed Sabah, “ALCOHOL DETECTION USING SMART HELMET SYSTEM”, International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 volume 8 issue 1 –APRIL 2014.
[4] Manjesh N,Prof. Sudarshan Raj ,”SMART HELMET USING GSM & GPS TECHNOLOGY FOR ACCIDENT DETECTION AND REPORTING SYSTEM” International Journal of Electrical and Electronics Research ISSN 2348-6988 Vol. 2, Issue 4, pp: (122-127), Month: October - December 2014, Research Publish Journals
[5] Ping Li, Ramy Meziane, Martin J.-D. Otis, Hassan Ezzaidi, “A SMART SAFETY HELMET USING IMU and EEG SENSORS FOR WORKER FATIGUE DETECTION” ,REPARTI Center, University of Quebec at Chicoutimi Chicoutimi, Canada.
[6] R. Prudhvi Raj, Ch. Sri Krishna Kanth, A. BhargavAdityaand K. Bharath, “SMART-TECH HELMET”Advance in Electronic and Electric Engineering ,ISSN 2231-1297, Volume 4, Number 5 (2014).
[7] P.Dileepkumar, G.N.Kodandaramaiah, A.Subramanyam, M.Dharani, “A SOLAR POWERED SMART HELMET WITH MULTIFEATURES” International Journal of Engineering Inventions e-issn: 2278-7461, p-issn: 2319-6491 volume 4, issue 10 June 2015
[8] Kajalthakre, ,Pranaliwaskar, Poojasawant, Suchitanaik, Sumitachandak “SMART HELMET”,volume 5, issue 2, february 2015 issn: 2277 128x International Journal of Advanced Research
[9] Monika prasad1, Deovratsingh, Rishabhsachdeva, Priyankasingh, Mr.Manojvishnoi “SAFETY HELMETS FOR COAL MINERS USING ZIGBEE TECHNOLOGY ”volume 3, issue 2, april-may, 2015 ISSN: 2320 – 8791
[10] Nitinagarwal, Anshulkumarsingh, Pushpendrapratapsingh, Rajesh sahani “SMART HELMET” International Research Journal of Engineering and Technology (IRJET) e-issn: 2395 -0056 volume: 02 issue: 02 , may-201
[11] AnshusinghGautam, Gulshankumardubey, Mayank Mishra, Mohitaprabhat. 1165 “SMART HELMET SYSTEM” april 2015, volume 2, issue 4 JETIR (ISSN-2349-5162) JETIR1504059 Journal of Emerging Technologies and Innovative Research (JETIR

©IJRASET (UGC Approved Journal): All Rights are Reserved

[12] Ashwinkumar T. Limbanee, angraj G. Kad, swapnil N. Jagtap, komal S. Lonari, prof. Shiv sutar "SMART HELMET TO AVOID ROAD KILLS (SHARK)" ,IOSR journal of electronics and communication engineering (IOSR-JECE) e-issn: 2278-2834,p- ISSN: 2278-8735.Volume 10, issue 4, ver. II (jul - aug .2015

[13] S. Anil Babu , SumathiAyyalusamy, RejinRanjit Singh , SreejinDharmarijan, Jason James , Mohamed Anas, "DEVELOPMENT OF HELMET DETECTION SYSTEM AND SMART SEAT BELT" IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 10, Issue 4, Ver. II (Jul - Aug .2015).

[14] Manjesh N , Prof. Sudarshan raju C H " SAFETY MEASURES FOR TWO WHEELERS BY SMART HELMET AND FOUR WHEELERS BY VEHICULAR COMMUNICATION" ,International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 NATIONAL CONFERENCE on Developments, Advances & Trends in Engineering Sciences (NCDATES- 09th & 10th January 2015)

[15] Wilhelm von Rosenberg, Theerasakhanwimalueang, Valentin Goverdovsky, Danilo P. Mandic "SMART HELMET : MONITERING BRAIN, CARDIAC AND RESPIRATORY ACTIVITY" ,IEEE 2015.

[16] N. B. Kodam "SMART HELMET (NO BIKE RIDING WITHOUT HELMET)"(IRJI) International Research Journal Of India ISSN 2454-8707 VOLUME-I, ISSUE-I, SEPT-2015

[17] DevendraItole,DnyaneshwarAvatirak,OmkarKale,NikhilDeshpande,AakashMenon, "INTELLIGENT HELMET", International Journal Of P2P Network Trends and Technology (IJPTT)-volume 17 Number 1 March 2015

[18] Aviral Vijay, Ajay Singh, AbhimanyuYadav, Blessy Varghese And Ankit Vijay, "HI-TECH HELMET AND ACCIDENTAL FREE TRANSPORTATION SYSTEM",International Journal of Advanced Technology and Engineering Exploration ,ISSN 2394-5443 VOLUME-2 ISSUE-6 MAY-2015.

[19] Saravana Kumar K, Anjana.B.S, Litto.Thomas, Rahul.K.V, "SMART HELMET", International Journal of Scientific & Engineering Research, Volume 7, Issue 3, March-2016

[20] Jennifer william, Kaustubhpadwal, Nexonsamuel, Akshaybawkar, smitarukhande "INTELLIGENT HELMET", International Journal of Science, Engineering and Technology Research (IJSETR), volume 5, issue 3, march 2016

[21] Mrs.K.V.Archana (Asst.Prof.), M.Abirami, T.AbisehaAruna, V.Aishwarya, C.N.Suchitra "SAFEMATE USING ARDUINO" International journal of advanced research in electronics and communication engineering (IJARECE) volume 5, issue 3, march 2016

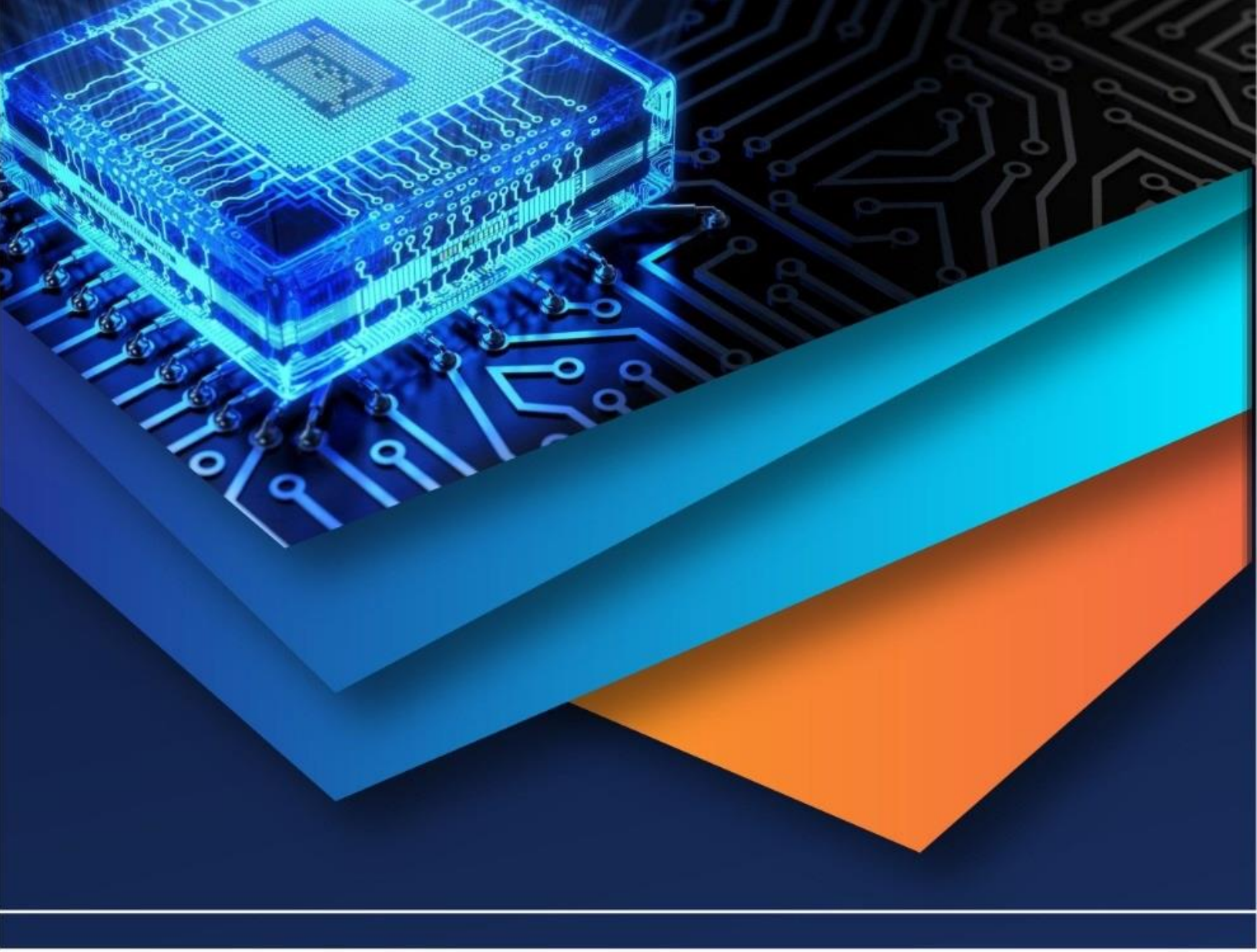
[22] Sivakumar, DHIVYA,"SMART HELMET SYSTEM USING ALCOHOL DETECTION FOR VEHICLE PROTECTION" ,international journal of advanced science and engineering research www.Ijaser.In volume: 1, issue: 1, june 2016 ISSN: 2455-928

[23] R S Saravanakkumar, Mr.Muniraj "ACCIDENT ALERTING SYSTEM TO SAVE BIKERS USING SMART HELMETS" international journal of advanced research trends in engineering and technology (IJARTET) Vol. 3, special issue 3, april 201

[24] A. Srikrishnan, K. Senthil Kumar and S. Ravi CLOUD INCORPORATED SMART HELMET INTEGRATED WITH TWO-WHEELER COMMUNICATION SETUP,I J C T A, 2016, pp. 251-261

[25] Prof. Chitte P.P. , Mr.SalunkeAkshay S. , Mr. ThoratAniruddha N. ,Mr. BhosaleNilesh T,"SMART HELMET AND INTELLIGENT BIKE SYSTEM",International Research Journal of Engineering and Technology (IRJET) , Volume: 03 Issue: 05,May-2016 e-ISSN: 2395 -0056.

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