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Vehicle Theft Detecting System using GPS Tracking

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Abstract: ***Nowadays, automobile thefts and the production of vehicle are increasing in yearly throughout the world. So, vehicle theft is a universal problem. Yearly around 10 million property and automobile cases are reporting. There are so many recent technologies evolving and new methods are being upgraded to overcome this issue. The methods involved in vehicle theft detection have become aware to everyone including the burglars and they try to break the system and steal the vehicle.It is important to keep our properties secure. Ofcourse as the technology increases the thieves are looking for better plans.Prevention of accidents is better than facing them later. Today we have many approaches to prevent the accidents. prevention is nothing but allowing people to do things under limit. This paper work presents an model which can solve the addressed problem.***

Keywords: GPS; Embedded systems; GPRS; NMEA; contact sensor; mobile application; PCB design; Proteus.

I. INTRODUCTION

In recent years vehicle theft has become a major issue which should be traced and detected. The safety and security of the vehicle is essential. Even there are many existing mechanisms they have some limitations and high cost. So, an efficient security mechanism is needed. This project detects vehicle theft. Arduino is the main component which is used to interface dc motor and GPS, GSM. The place of the vehicle identified using Global positioning system (GPS) and Global system mobile communication (GSM) with the help of Wi-Fi module ESP 8266. GPS is a space-based navigation system used to track the vehicle and it gives the location of the robbed device in all weather conditions. It gives the latitude and longitude of the device using GPS antenna. GSM is a specialized type of modem which accepts a SIM card, and operates just like a mobile phone. It is used to provide information to the owner and alert him with a message having latitude and longitude of the vehicle. This total system is operated with a switch which is made on when we park the vehicles out. Now if the vehicle theft happened, dc motor starts and the above procedure continues and the information is posted using internet of things. This vehicle theft prevention and tracking system is used in client's vehicle as a theft prevention and rescue device.

II. RELATED WORK

Now a days vehicle security has became a very popular problem to solve so many researchers are working with many new technologies like IoT, Deep learning, Artificial intelligence to design a system which can solve this problem effectively. Many research activities designed models for this but majority of the models are not able to detect the vehicle theft status rather they only used to alert the user when the user notices that the vehicle is missing, with this model it takes lot of time to recover the vehicle.[1]

Mohamed A. A bousalem and Edward J. Krakiwsky [2] has involved the engine for processing kinematic data collected from positioning sensors and widely used for multi sensor navigation system and also for the performance of sensor for constituting an integrated system. All these are used with the theory of federated architecture. They use a type of decentralized filters for vehicle navigation using GPS the main goal is required accurate and reliable systems with fault detection and isolation and recovery capabilities.

Arghavan Amini1, Reza Monir Vaghefi, Jesus M. de la Garza1, and R. Michael Buehrer[4] has examined that in request to feature the exhibition and nature of transportation organization, a strategy for Intelligence Transportation System(ITS).ITS is expected to give a precise area and data about the vehicle. It additionally gives the incorporated confinement calculation which required information from various assets including GPS, radio-recurrence ID, vehicle-to-vehicle and so on This limitation calculation is exceptionally helpful just if all the assets are accessible. This proposed calculation will improve the precision regardless of whether the GPS is frail. The ITS includes the significant calculation called the Integrated and Shrewd situating calculations[6]. The principle thought is to ascertain the precise area of the vehicles that are acquired from the RFID labels and GPS satellites.P.Bagavathy,R.Dhaya&T.Devakumar[5], have focused on GPS(Global Positioning System) based tracking system for vehicles.

This system provides the method to the user to track their vehicle remotely through the mobile network. Global Positioning System (GPS), Global System for Mobile communication (GSM) modem and micro-controller are provided with the aim of the

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users to locate their vehicles with ease and in a convenient manner. The exact position of the vehicle will be displayed using a GUI application. Vehicle Tracking System was used in many ways to track and display the location time in real time. To overcome the above issues, anti-theft and tracking mechanism can be implemented to .avoid the theft of vehicles by sending the alert message to the user at the time of theft.

III. PROPOSED METHOD

A. *Principle*

Our main motivation is to eliminate the draw backs in the existing approaches and build a sustainable model to solve the above addressed problem. In the process of this project we are believing in this, "Complex problems can be solved with simple solutions". The principle used in this project is first detecting the vehicle theft status then alerting the user.this model need to prevent the accidents in a best way possible by preventing the users from rash driving, drunk and drive.

B. *Approach*

The proposed model can be explained in two phases one is vehicle security and another one is accident prevention. In case of vehicle security this model will improve the security of vehicle and prevents the vehicle thefts. Today most of the vehicle theft projects/ devices in the market are known to the thieves I.e they all got to know the secret things related to those devices o they easily steal the vehicles. So a model need to more realistic rather any suspicious. In this model we are detecting the vehicle theft by motion detection of vehicle. This approach can be used to any kind of vehicles irrespective of their weights. This will prevent the unknown person to steal the vehicle. Speed calculation is done by the GPS module which NEO-6M, it works based on Doppler effect. Doppler effect states that," the frequency of a wave will change in relation to an observer who is moving towards or far wards to source object.The formula of Doppler effect is shown in the equation (1). When the motion is detected in the Watch mode, an alert short message service(SMS) will sent to the user's mobile through GSM modem. It consists of a sim card with unique IMEI number. Switching of the vehicle is left for the user's choice.

$$fo = \frac{V+Vo}{V+Vs} fs \qquad (1)$$

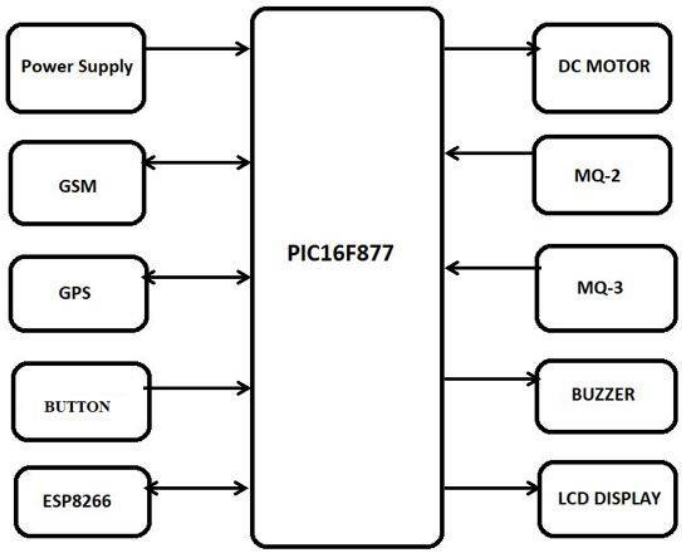

Fig.1 block diagram.

IV. METHODOLOGY

A. *Vehicle Security System*

The major functional blocks in this project are Micro-controller, we are using PIC16F877 as our controlling part. It is a 8 bit µc, consisting of 40 pins. Manufacture of this controller is microchip. PIC controllers are more fast than other basic controllers. Here we are connected TX and RX of GPS module to TX and RX of the PIC16F877 so serial communication is established. GPS module has an antenna to transmit and receive the data from satellites. GSM modem is connected to controller. In every project power management is very important which effects the performance of the project. Here the components when they are not been used then they are kept as idle state where they don't consume any power.

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Fig.2 GSM modem with LCD display and Buzzer

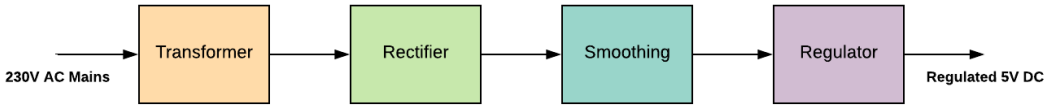

Fig.3 Power supply unit.

Power supply unit consists of a transformer which step downs the high voltage to low voltage after that rectifier is used to convert the AC wave to a pulsating DC wave. Output of rectifier consists of some ripples to eliminate them we have to use filter. We are using CLC filter which consists of two capacitors and one inductor. After filtering the signal is given to voltage regulator(7805) which maintains the amplitude to constant value I.e 5v. output of the voltage regulator is pure DC form which can be safely connected to PIC16F877. from the i/o pins one pin is connected to Buzzer to generate alert and one pin is connected to DC motor to show the movement of vehicle. TX and RX of ESP8266 is connected to PIC TX and RX to achieve the real time tracking of vehicle. Turn ratio is given by the equation (2).

$$\frac{Primary\ Voltage}{Secondary\ voltage} = \frac{no.of\ primany\ turns}{no.of\ secondary\ turns} \qquad (2)$$

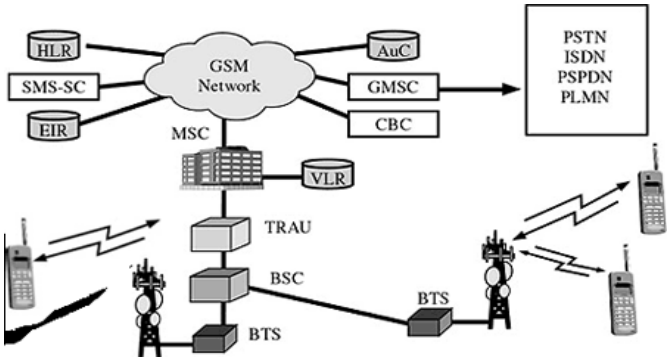

Fig.4 elements in GSM architecture.

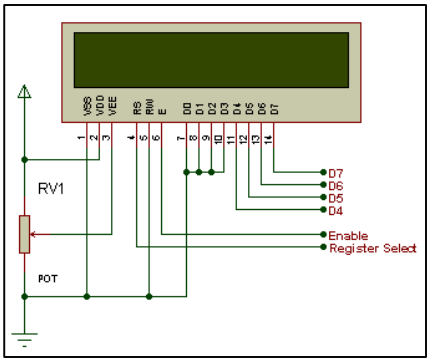

Fig.5 LCD pin diagram.

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B. Accident Prevention System

In this approach major blocks are PIC16F877, GSM modem, GPS module, gas sensor, alcohol sensor, accelerometer, button. Alcohol sensor is connected to I/o pin of the PIC16F877, where the alcohol sensor sends analog data which is converted into digital inside the controller, or an ADC is required. Similarly the smoke sensor is connected to detect the smoke. An emergency button is connected to I/o pin which act as command from air bag controller. In case of accidents smoke sensor is used to detect the smoke if it is detected then the controller will release the CO_2 gas. Accelerometer used in this model is ADXL335 or MPU6050. it is an 6 axis module which is used to measure the tilt of the vehicle, when the user drives the vehicle rashly then the tilt angle will change and alert message is sent if limit exceeds. MQ-2 and MQ-3 sensors have heaters to detect the output and an analog data is sent by using a formula the final value will be known by the controller and by referring to the data set we can know the actual content.

C. ESP8266

The ESP8266 Wi-Fi Module is a self-contained SOC that can give any microcontroller access to your Wi-Fi network. Each ESP8266 module comes pre programmed with an AT command set firmware, that is, it can simply have hooked up to Arduino device and get Wi-Fi ability. The ESP8266 module is an extremely cost-effective board with a huge, and ever growing, community.

D. DC Motor

Most common type of motor. DC motors normally have just two leads, one positive and one negative. If you connect these two leads directly to a battery, the motor will rotate. If you switch the leads, the motor will rotate in the opposite direction.

E. GPS (Global Positioning System)

Global Positioning System (GPS) is a satellite-based navigation system. We use NEO-6M GPS module as it is compatible with a variety of GPS receivers. It has a built-in ceramic antenna. Integrates with a 3V button battery. Normally GPS works in any weather conditions at anywhere in the world. A GPS receiver must be locked on to signal of at least 3 satellites to estimate 2D position (Latitude and longitude).

F. GSM

GSM is a specialized type of modem which accepts a SIM card, and operates just like a mobile phone. Here we are using SIM 900A GSM module. SIM900A Modem is built with Dual Band GSM. It works on frequencies 900/ 1800 MHz. SIM900A is a compact and reliable wireless module. Here as soon as the motor initializes an alert message having latitude and longitude of the vehicle is sent to the owner using GSM module.

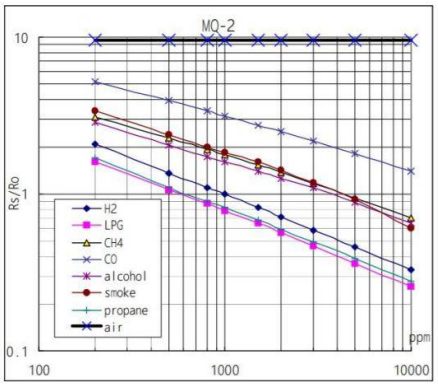

Fig.6 Sensitivity characteristics of MQ-2 sensor

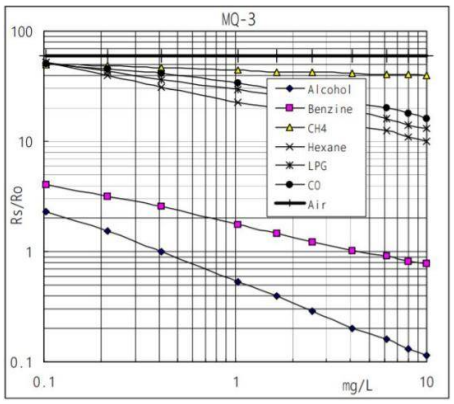

Fig.7 Sensitivity characteristics of MQ-3 sensor.

VI. RESULTS

In this methodology the outcome will be known from the client's versatile and to exhibit the venture we are utilizing a LCD show which will shows the movement of the task. The alarm message will be shipped off the client's portable and ringer will gives alert. In the event that the portable is associated with web, a notice message will likewise shipped off versatile application. The alarm message comprises of area subtleties of vehicle and status of vehicle. At the point when the speed of vehicle is

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surpassed then an alarm message is shipped off portable and it shows the speed of the vehicle comparably liquor substance and smoke substance will be shown on LCD show and in alarm message. This inventive thoughts will forestall the obscure individual to take the vehicle, with the goal that the security of the properties is improved at this point. Alongside the proposed highlights this model has some beneficial highlights like,

- Preventing the driver to enter into restricted area.
- Preventing the driver to cross the speed limit.
- Real time monitoring of vehicle.

The following figure shows the watch ode activation and deactivation. When the vehicle moves more than 5kmph during the watch mode ON then the alert message will be sent along with location details which is shown in fig.9. then user can switch off the vehicle.

In case of accident prevention the system monitors the alcohol content in the vehicle when the value exceeds the threshold then the alert message is sent to the user's mobile and buzzer will be ON. Along with this to monitor the rash driving the system will monitor the speed of the vehicle, if the speed exceeds the threshold which is 20kmph then an alert message will be sent to the user mobile and with buzzer alert with LCD display.

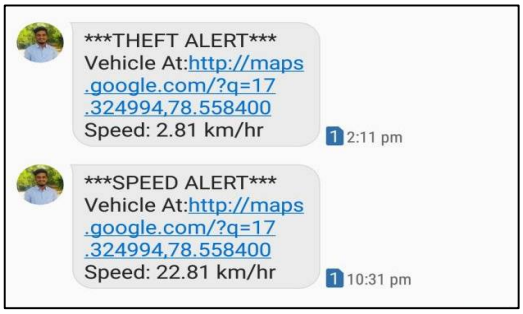

Fig.8 Speed alert SMS.

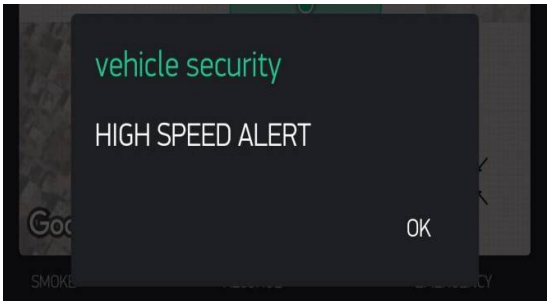

Fig.9 Speed alert notification in blynk application.

To detect the accidents the system will take a command from air bag controller. Here we are using a button which will represent the command from air bag controller. When it is pressed an alert message consisting vehicle location, status, speed, will be sent to the user's mobile.

Fig.10 Current location of the vehicle in Google maps.

VII. OBSERVATIONS

The distinction in anticipated that values should the real qualities will be disposed of progressively item where the speed of vehicle can be imported straightforwardly from the vehicle speedometer itself. Essentially the order signal from airbag regulator can likewise done continuously item.

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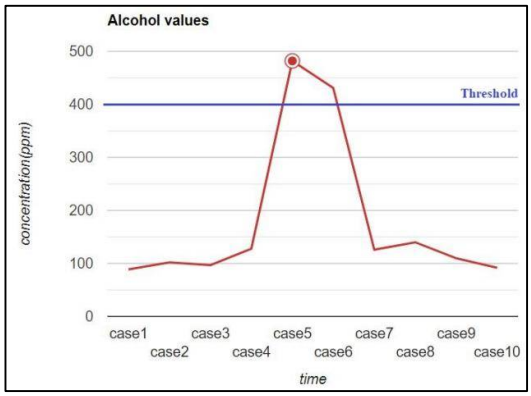

Fig.11 MQ-3 sensor values vs time.

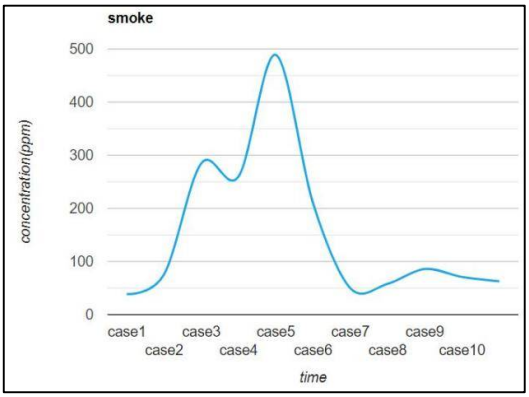

Fig.12 MQ-2 sensor values vs time.

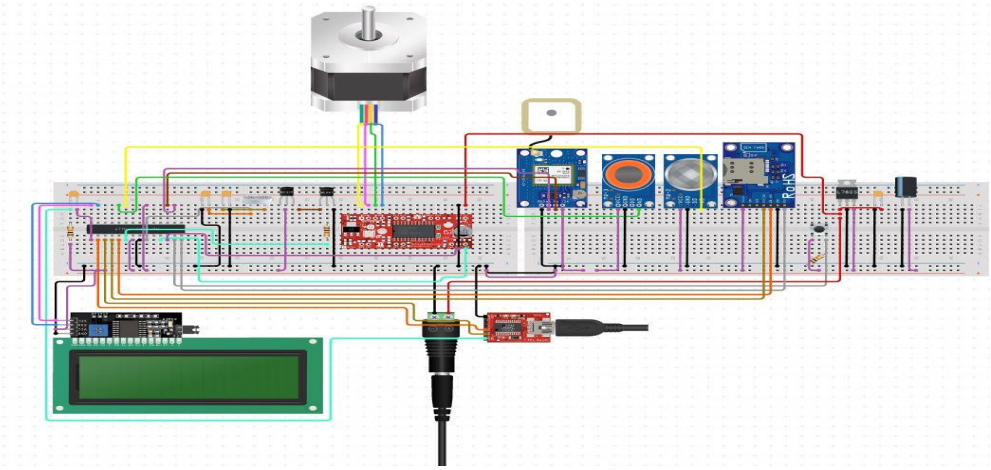

Fig. 13 Implementation of proposed model on bread board.

VIII. FUTURE SCOPE

This project can be extended using high efficiency GPS receiver and a GSM module. The GSM module gives the intimation of the person with this system through SMS. The project can be extended using GPS module using which the live tracking of the vehicle can be viewed on Google maps. By interfacing MMC/SD card to the system we can log the path of the vehicle being traveled. A camera module can be used for face recognition and it will detect the unknown persons. Block chain tool can also produce an effective model for this problem.

IX. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested. This project can be used for improving the security of the vehicle.prevention of it from theft with fingerprint verification is done with minimum cost in quasi real-time mode. Fingerprint technology is very effective security check technology and also in lower cost to avoid stealing of vehicles. In future, smartphone (i.e.android, windows) application can be made and interfacing a dedicated smart-phone installed in vehicle with fingerprint device can be done to get real-time vehicle tracking with inter-active mapping.

X. ACKNOWLEDGEMENT

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REFERENCES

[1] K. A. Mamun , Z. Ashraf,"Anti-theft vehicle security system with preventive action".
[2] Ioan Lita, Ion Bogdan Cioc, Daniel Alexandru Visan,"A New Approach of Automobile Localization System Using GPS and GSM/GPRS Transmission".
[3] Sayma Shammi, Sayeed Islam, Hafiz Abdur Rahman, Hasan U. Zaman,"An Automated Way of Vehicle Theft Detection in Parking Facilities by Identifying Moving Vehicles in CCTV Video Stream.
[4] Dr.M.Geetha, Priyadarhini, Sangeetha, Sanjana,"Anti-theft and Tracking Mechanism for Vehicles using GSM and GPS",2017Third International Conference on Science Technology Engineering & Management (ICONSTEM).
[5] M. POUSHYA1, K. RUPASRI2, N. SUPRITHA3, K. HEMA4 , R.TEJASWINI,"IoT Based Vehicle Theft Detection",IRE Journals | Volume 1 Issue 8 | ISSN: 2456-8880.
[6] B.G. Nagaraja, Ravi Rayappa , M Mahesh, Chandrasekhar M Patil, Dr. T.C.Manjunath,"Design & Development of a GSM Based Vehicle Theft Control System",International Conference on Advanced Computer Control 2008 IEEE.
[7] Kreadtisak Lappanitchayaku,"Anti-theft device for car : Alert system using radio wave",ICIIBMS 2019.
[8] M.F. Saaid, M.A. Kamaludin, M.S.A. Megat Ali, "Vehicle Location Finder Using Global Position System and Global System for Mobile,"in*ICSGRC'14,2014,*p. 279-284.
[9] Md. Syedul Amin et al., "GPS and Map Matching Based Vehicle Accident Detection System".
[10] S.Sonika, Dr.K.Sathiyasekar, S.Jaishree, Intelligent Accident Identification System using GPS, GSM modem, IJARCCE,Vol 3, Issue 2.
[11] V Ramya, B Palaniappan, K Karthick,"Embedded Controller for Vehicle In-Front Obstacle Detection and Cabin Safety Alert System", IJCSIT,Vol4,Issue2.
[12] https://en.wikipedia.org/wiki/Doppler_effect.

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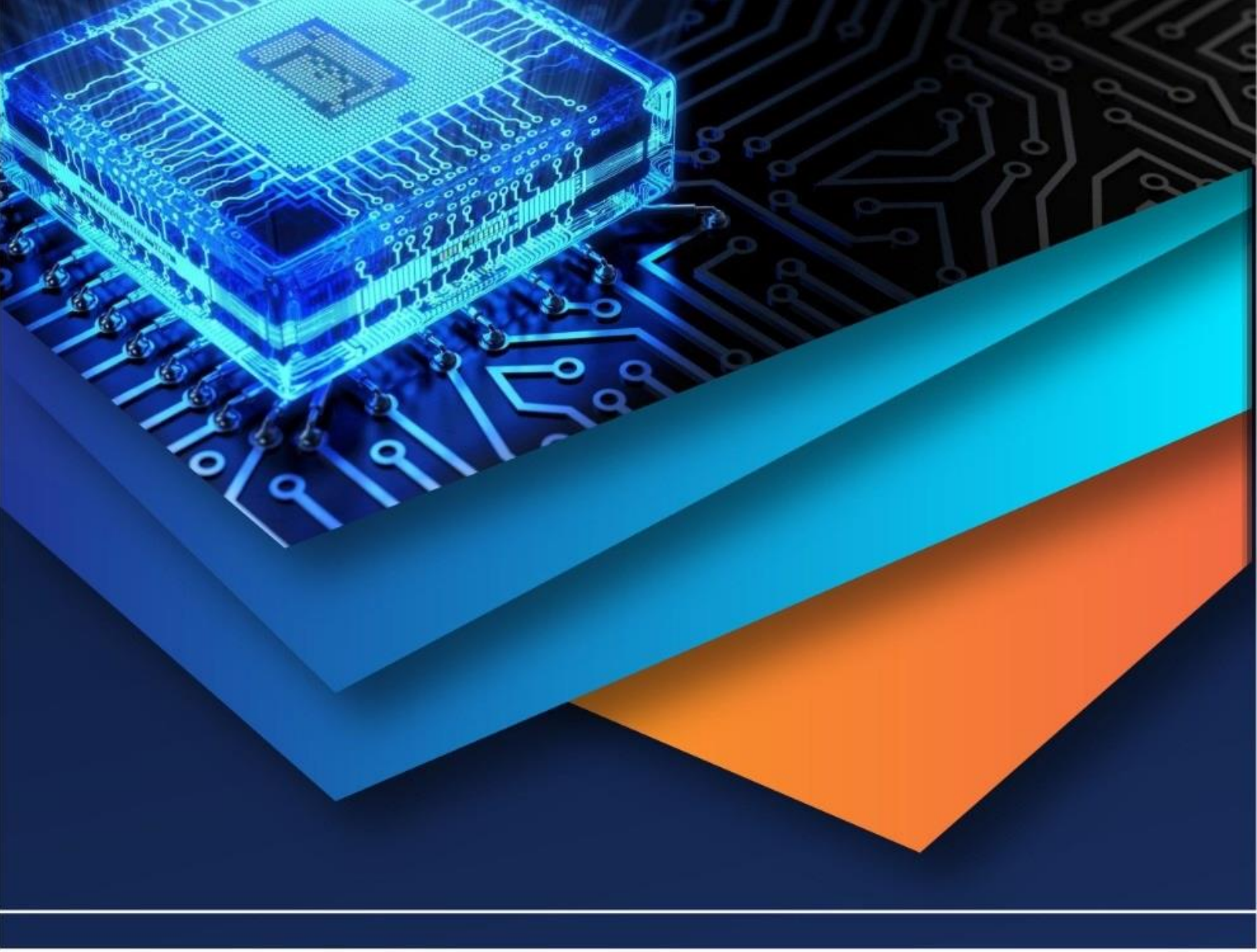

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