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Bank Security System using GSM Technology with Arm 7 Processor

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Abstract: ***In this paper an advanced design system has been proposed to control the electrical devices in industries, homes and banks by using GSM technology. A GSM modem provides the communication interface. It transmits the protocols of the system through wireless network. The GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem is that its RS232 port can be used to communicate and develop embedded applications. Applications like SMS Control and logging can be developed easily. This modem can be connected either to PC serial port directly or to any microcontroller. This paper gives the best solution for avoiding wastage of electrical power. Also the manual operation is completely eliminated. This project is implemented on wireless technology using GSM as it is very cheap and very easy to implement. This paper is designed to provide security for banks. In this a PIR sensor is used for identifying thieves at night time. An SMS will be sent if anyone breaks the door. If smoke is more, then the same is intimated through SMS. Keypad is used to access the door. For three wrong entries of password a buzzer will be triggered and an SMS will be sent. This project uses regulated 5V, 500mA power supply.12V dc is used for relay, 7805IC is three terminal voltage regulator which is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.***

I. INTRODUCTION

Security is alarming nowadays. Every individual will be interested to safeguard his belongings and properties. The theft chances are increasing with the advancement in technology. Theft attempt may warn the nearby security people by triggering the buzzer automatically and also by sending the message through GSM module quickly to the concerned persons to make them alert with the support of GSM technology. This automation in the security monitoring system using electronics assembly which are connected, is to develop a mechanism to identify the theft chances at any desired points. This system uses GSM Technology which sends the information to the desired manager or security staff about any unauthorized entry to the bank during night times.

II. EXISTING SYSTEM

Bengali and Shaligram (2013) proposed a traditional banking security system which gives the signal in the form of alarm . However, the GSM based security systems provides enhanced security as whenever a sensor detects the the signals a message is sent to the defined mobile number. Nandeesh *et al.* (2014) projected a mechanism that protects people from leaking of raw gas and fire at home and industries. Agarwal and Nayak (2012) proposed construction of a banking security system which has that password protected door lock with an LED based resistive screen input panel which is set to detect any obstacle while monitoring the windows and doors at night using IR sensors. Fire alarm system uses smoke sensor which senses sudden considerable change in density of surrounding air and raises alarm .Lee *et al.* (2013) described a multilevel home security system which consists of different sensors nodes, priority interrupt controller (PIC) and universal asynchronous

Proposed system

This project is aimed to design a system to control the electrical devices in banks, industries and homes by using GSM technology Which is a combination of all the sensors and GSM module for interacting with user automatically for any theft and risk management.

A GSM modem provides the communication interface. It transports device protocols transparently over the network through a serial interface. A GSM module is a wireless circuit which works without any medium. This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own single phone number. Applications like SMS Control, data transfer .

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III. PROPOSED METHOD

The project is designed to provide security for banks at night times and at homes when no one is present at home. In this we are using PIR sensor for identifying thieves at night time, we will get an SMS if anyone breaks the door and if smoke is more then also we will get an SMS. Keypad is used to access the door for three wrong entries of password buzzer will be ON and again we will receive an SMS.

This project uses regulated 5V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator which is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer. Developed easily. The modem can be connected either to PC serial port directly or to any microcontroller.

This project gives the best solution for waste of electrical power. Also the manual operation is completely eliminated. This project is implemented on wireless technology. One of wireless communication system is GSM as it is very cheap and very easy to implement.

A. The Scope of this Study Which Needs for the Completion of this Project Involves the Following Criteria

1) Architecture of LPC2148 knowledge
2) ARM7 programming in C language.
3) The study of modem functions which involves AT commands.
4) The circuitry and devices that is needed to construct the devices and establish the necessary communication.

IV. HARDWARE DESIGN

Hardware of this system contains sensors, LPC2148 microcontroller, Buzzer, In system programmer (ISP) and relays to control the functional programs of this project. The outputs of all the sensors are connected to ADC. IR is connected either at window or at door. The entry to bank at night times is treated as theft or unauthorized entry and buzzer will be turned ON and an SMS is sent as (IR DOOR BREAK). If there is any unauthorized entry into the bank, PIR detects the body temperature and movements of that person and the buzzer will be turned ON and an SMS will be sent through GSM. In case of fire or any gas leakage, smoke sensor detects the change in density of air and responds in the same way as the IR and PIR do that is it sends the SMS and turns on the buzzer.

A. Design and Implementation

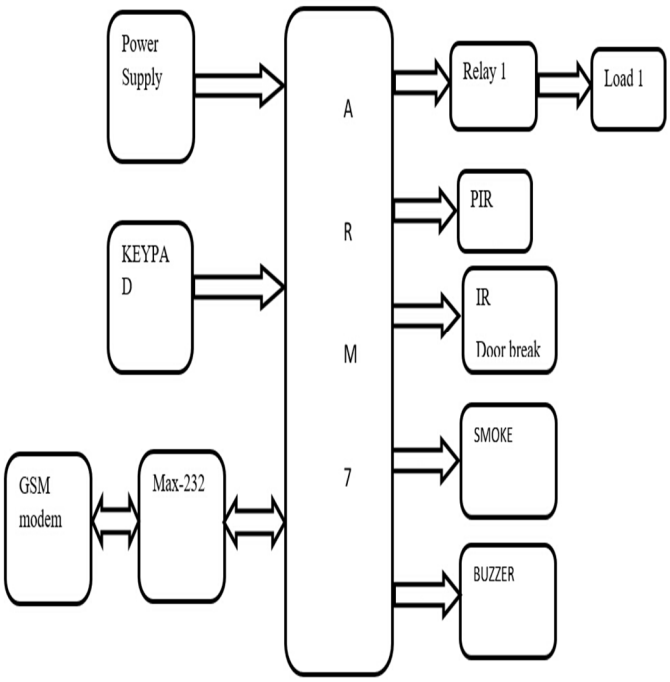

Fig 1: Block diagram

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1) Microcontroller Unit:

Fig 2 :ARM7 development board

The LPC2141/42/44/46/48 microcontroller is based on the 16-bit/32-bit ARM7TDMI-S CPU with an real-time emulation and an embedded trace support, that combines microcontroller with embedded high speed flash memory ranges from 32 kB to 512 kB. A 128-bit wide memory interfaces and an unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces the code by more than 3% with minimum performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 is an unique for applications where miniaturization of a key requirement, such as access control and point-of-sale. Serial communications interface ranges from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB to 40 kB, make these devices very well suited for communication gateway and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high power processesing. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems

B. Sensors Used in the System

1) Infrared Sensor:

Fig 3: IR sensor

Infrared (IR) sensors are used to detect the intruder. They are used at doors and at windows. The IR pair that is IR transmitter and IR receiver detects the obstacle within the range of 5-6 feet.

2) PIR Sensor:

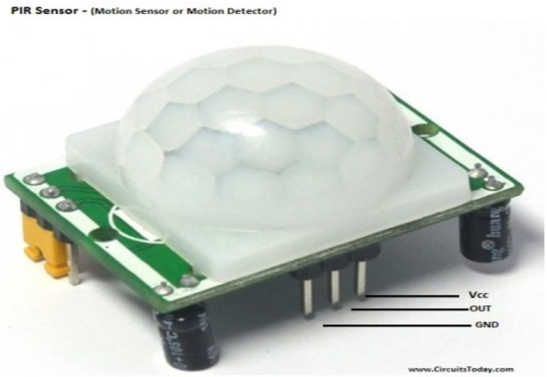

Fig 4: PIR sensor

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A PIR-based motion detector is used to sense movement of a people, animals, or other objects. This iscommonly used in burglar alarms and automatically-activated lighting systems. This is commonly called as an "PIR", or sometimes "PID", for "passive infrared detector". Instead of infrared or laser transmitters and receivers, PIR (Passive Infrared Radial) sensors are used in this circuit. The sensor is basically a pyro- electric device. When the device is exposed to infrared radiation, it generates an electric charge. The device is made up of crystalline material. According to the generated, which is measured by an on-board amplifier. It instead accepts the incoming in change in the amount of infrared striking the element, there will be a changes in a voltage rared radiation passively

3) Smoke Sensor:

Fig 5. Smoke sensor (MQ-2)

MQ-2 gas sensor has high sensitivity to LPG, Propane and Hydrogen, also be used to Methane and other combustible steam, it is with low cost and suitable for different applications used for detecting the gas and smoke before getting caught to fire. Sends an alert message to the subscriber.

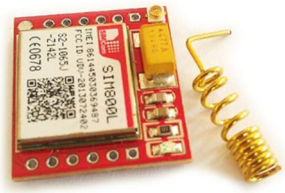

Fig 6: GSM module

C. GSM

GSM was designed with an moderate level of service security. The system was designed to authenticate the subscriber using key and challenge-response. Communication between subscriber and the base station can be corrected. The development of UMTS introduces an optional Universal Subscriber Identity Module (USIM), that uses an longer authentication key for the greater security, as well as mutually authenticating the network and the user – where as the GSM only authenticates the user to network (and not vice versa). The security model therefore it offers an confident and authentication, but limited authorization capabilities, and the no non-repudiation. GSM uses several cryptographic algorithms for the security purpose. Although security issue remain for GSM . New attacks are growing in the wild which take advantage of poor security implementation, architecture and development for smart phone applications.

V. SOFTWARE DESIGN

The LPC2148 is programmed with KeilµVision3. It is window-based software platform that combines a robust and modern editor with a project manager and makes facility tools for development. It integrates all tools to develop embedded applications including a C/C++ compilers, macro assembler, linker/locator, and a HEX file generator ,keil helps expedite the development process of the embedded application by providing the IDE (Integrated Development Environment). KEIL is used to create an source files; automatically compile, link and covert using options set with an easy to use user interface and finally simulates or performs debugging on the hardware with access to C variables and memory. This IDE i.e. KEIL greatly simplifies the process of creating and testing of an embedded applications. The user of KEIL centers on projects. A project is a list of all the source files required to build a single application, all the tool options which specify exactly how to build an application, and if required how the application should be simulated. It would be very tedious to set these options up every time the app lication is being built; therefore they are stored in a project file.

The KeilµVision4 platform put forward the options for assembly language and high level programming language. C language being

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the most convenient language to access different port pins of LPC2148, we programmed this algorithm to control the GSM module and sensors through host controller LPC2148 in C language.

VI. RESULTS AND DISCUSSIONS

The proposed systems are tested on the model of smart bank .The sensors based security system detects the motion and sends message to the subscriber or bank security. The system is very simple and easy to use. There are various parameters which can be adjusted in this software. Streaming of videos is also possible with this software. The developed GSM based security system gives good response to the sensor and sends SMS when it detects the fire or temperature is increased above desired level or detection of intrusion at the doors or at windows. The time taken by the system to deliver the SMS is dependent on the coverage area or range of the specified mobile network. If the mobile is in the range of the system then the SMS is delivered in 25-30 seconds.

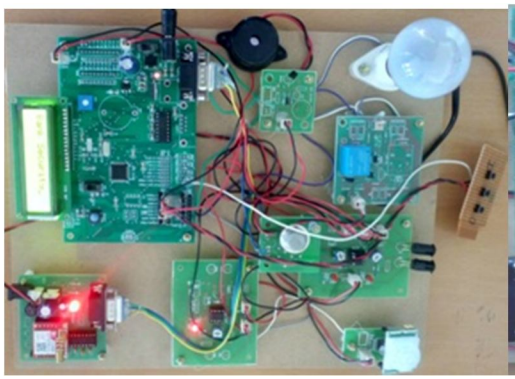

Fig1: Total Kit

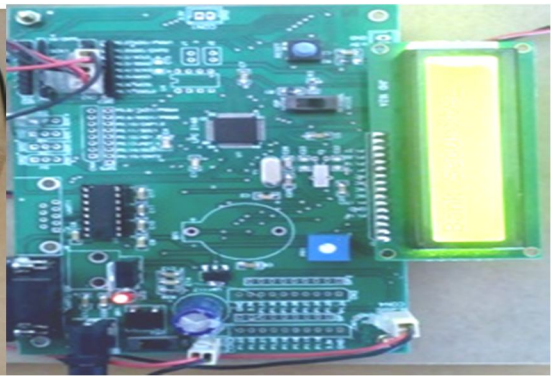

Fig2: Arm7 Module

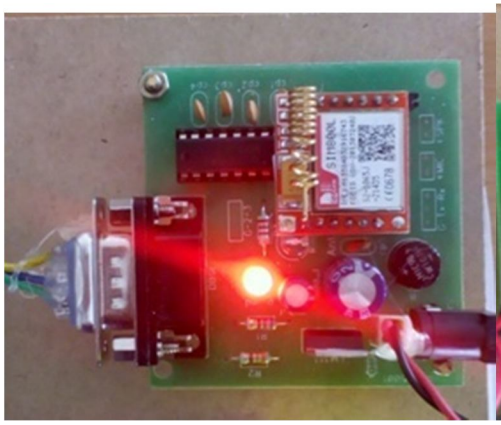

Fig3: GSM Module

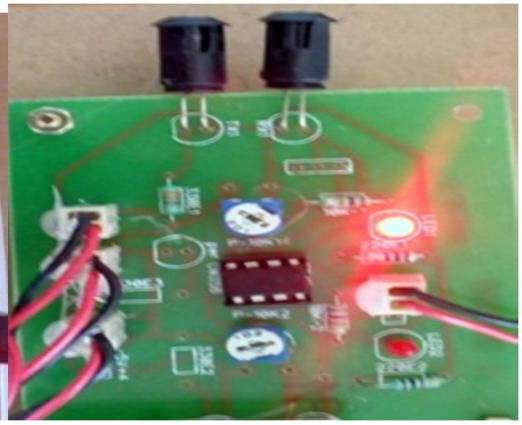

Fig4: IR On

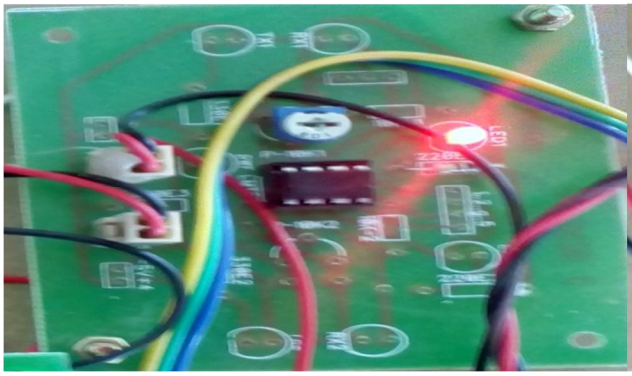

Fig 5: PIR on

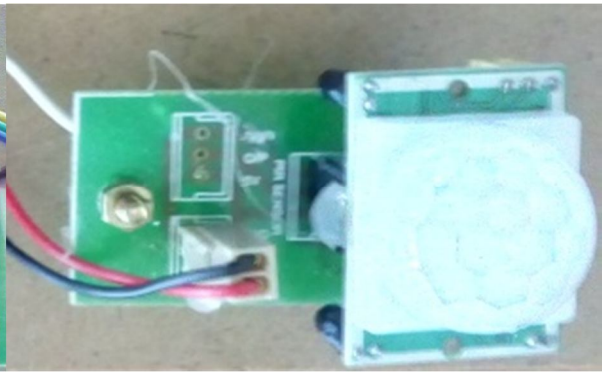

Fig6:warning messages from GSM modules

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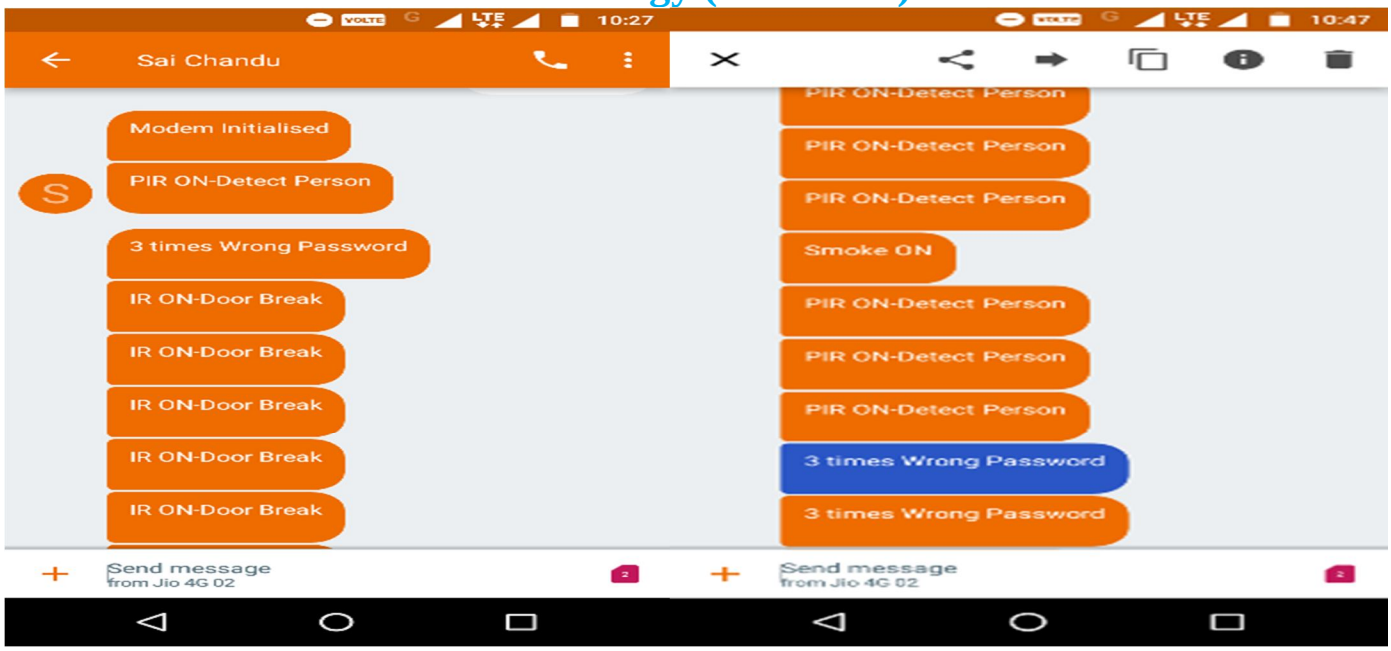

VII. ADVANTAGES OF THE PROPOSED SYSTEM

As the system is SMS based, there is no need to have extra circuitry to transmit SMS. Mobile networks are used for transmission. It is very cost effective, as day by day the cost of SMS is reducing. Confidence in information is achieved. Highly reliable and more convenient.

VIII. CONCLUSIONS

The GSM based bank security system has been designed and tested with the mobile network. The user can get alerts anywhere through the GSM technology thus making the system location independent. This gives us a flexible way to control and explore the services of the mobile. The communication of bank is only through the SMS which has been tested with the mobile networks and is working on any mobile network. This type of system is useful in bank security at nights and when the owner is out of station and the home is locked. By installing this security system, intruder can be detected and owner can receive an SMS informing the intruder's entry in a bank or home. If the nearby police station number is also configured in the system, then the intrusion SMS can be received by police also and necessary action can be taken. The system has tested on the model bank. The complexity of the algorithm of the system can be increased by introducing number of sensors to make the efficient bank.

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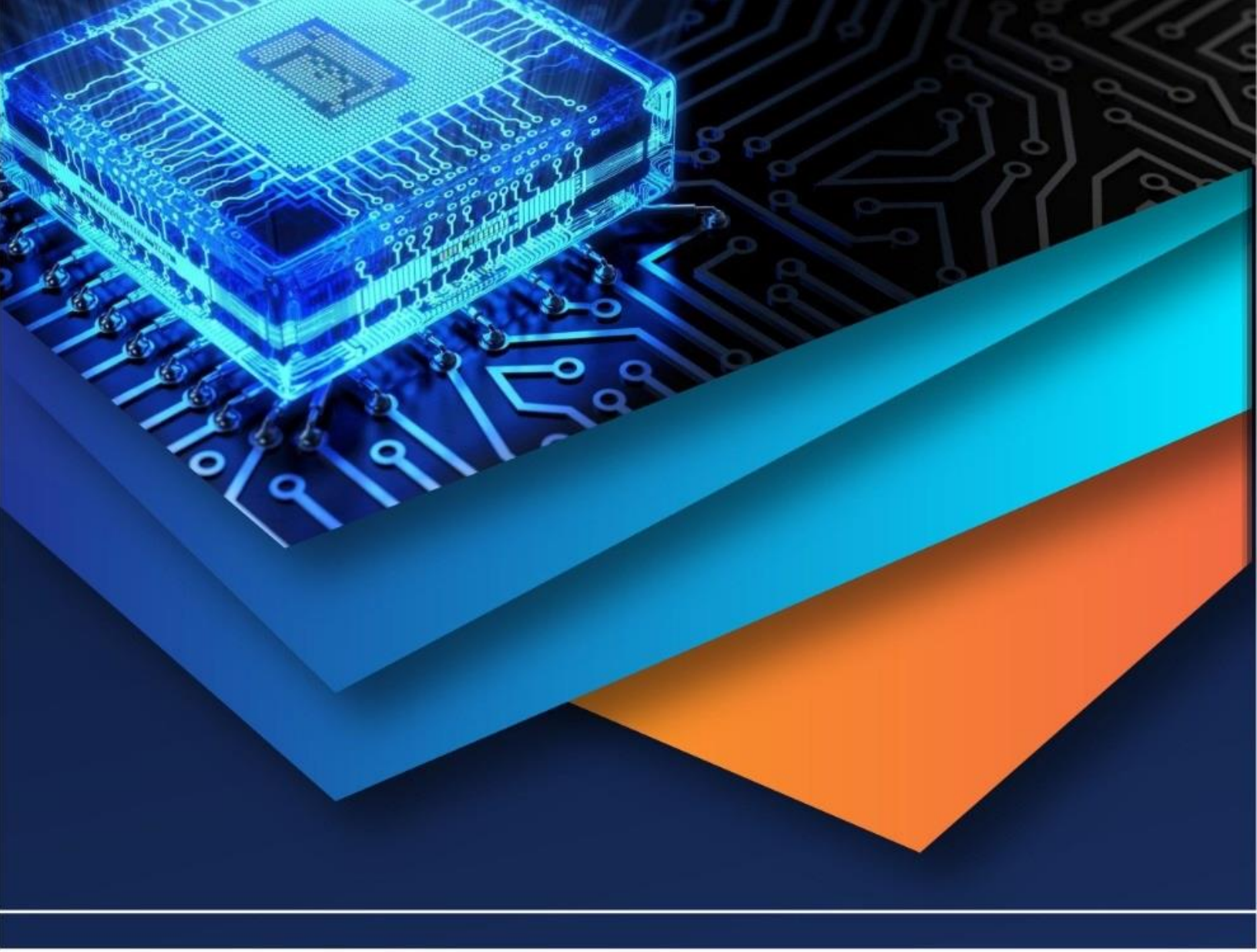

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