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A Smart Baby Monitoring System an IOT based Smart Cradle System

Swati Dhake[1], Swapnil Nevse[2], Shriram Bahirat[3], Mahesh Gaikwad[4], Atul Kathole[5]
[1, 2, 3, 4]*Students,* [5]*Asst. Professor, Dept of Computer, Zeal College of Engineering and Research, Pune, India*

Abstract: ***Availability of high speed web and wide use of mobile phones ends up in gain the recognition to IOT. The current variety of operating mothers has greatly exaggerated. This paper presents the planning of good Cradle that supports the planning of good Cradle that supports such Video observation. The Cradle swings mechanically on detection of baby cry sound. later on, baby care has become a daily challenge for several families. Thus, most parents send their babies to their grandparent's house or to baby care homes. However, the oldsters cannot ceaselessly monitor their babies' conditions either in traditional or abnormal things. Therefore, a web of Things-based Baby Monitoring System is projected as Associate in Nursing economical and low-priced IOT-based system for observation in real time. We also providing a live video police work for our system that plays a key role in providing higher baby care whereas oldsters square measure away. within the designed system. The projected system exploits sensors to watch the baby's very important parameters, such as ambient temperature and wetness sensing, moisture, and crying, vaccination remainder, the system design consists of a baby cradle that may mechanically swing employing a motor once the baby cries. oldsters can even monitor their babies condition through Associate in Nursing external internet camera and turn on the lullaby toy situated on the baby cradle remotely. The proposed system paradigm is invented and tested to prove its effectiveness in terms of price and ease and to ensure safe operation to change the baby-parenting anyplace and anytime through the network. projected system provides Associate in Nursing alarm once the smoke is detected, therefore if there's fireplace then oldsters will reach to their infants. Finally, the baby observation system is tried to figure effectively in observation the baby's state of affairs and encompassing conditions according to the paradigm***

Keywords: cradle management, Sensors.

I. INTRODUCTION

Monitoring a baby ceaselessly is absolutely robust job moreover because it is feasible for the fogeys to hold out them baby all the time with them particularly whereas operating. Hiring a caregiver for the nonstop observation of babies is associate option once folks are busy reception or within the operating places or as an alternate answer is day care center. At present, feminine participation within the workforce within the industrialized nations has greatly exaggerated, thereby poignant infant care in several families. each folk are needed to figure because of the high value of living and oldsters realize a touch difficult to manage work alongside tending. they can't keep an eye fixed on their kid all the time and is tough when long operating hours. To truthfulness the baby by Manually swinging the cradle may not be attainable in such case. However, they still have to be compelled to take care of their babies, thereby increasing work and stress, particularly of the mother. Working parents cannot forever take care of their babies. They either send their babies to their folks or rent a baby caregiver whereas they are operating. Some folks worry regarding the protection of their babies within the care of others. Thus, they are going home to check on their babies throughout their free time, like lunch or bite. A baby observation system which will monitor the babies' condition real time is projected to resolve these issues. web of things(IOT)simply refers to network of objects that are connected to the net. A baby observation system consisting of a video camera and mike without limitations of coverage. It will send information and like a shot advise the fogeys regarding pressing things, thereby shortening the time required to handle such situations. Generally, babies cry as a result of they're hungry, tired, unwell, or need their diaper modified. IoT is integrated into our baby observation system to attain a speedy interval and to produce a bigger sense of security for folks. Node Micro-Controller Unit (NodeMCU) Wi- Fi-Based Controller Board is associate ASCII text file a platform for IoT applications and is employed because the main micro-controller during this project. NodeMCU consists of a physical programmable board almost like that of the other development board, like Arduino board and Raspberry Pi. The programming of NodeMCU is performed mistreatment Arduino software package, that is associate Integrated Development Environment(IDE), wherever the code of instruction is written and therefore the micro-controller is uploaded, Generally, the baby cradle is employed in numerous hospital and maternity homes for infants to sleep in and for soothing them. In this paper, we've got designed a baby observation system mistreatment NodeMCU whereas all the previous systems were developed mistreatment either Microcontroller or Arduino.

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II. LITERATURE SURVEY

A baby observation system is introducing in by Waheb A. Jabbar, Hiew Kuet Shang dynasty and Saidatul N.I.S. Hamid, this method is projected associate increased noise-canceling system to beat the sound pollution so as to form baby's rooms more well-off. A new approach of associate automatic observation system for baby's care has been bestowed in another paper which may be a microcontroller-based project.

The Authors have designed a cheap baby observation system that may detect sound once a baby cries and is hooked up to a cradle that swings mechanically once the system sights a sound and the cradle doesn't stop till the baby stops crying. A camera conjointly mounted on the highest of the cradle to induce the video output of the environment of the baby. The output of the sensors is displayed through LEDs associated an alarm is attached to the system to allow associate alert. to stop sudden infant death syndrome of a baby.

III. MOTIVATION

1) We cannot believe that nobody has come up with an innovative idea of designing better infant care systems at a reasonable cost to monitor the condition of a baby continuously and inform parents.
2) There are systems to monitor, but no system completely gives the health status of baby to the parents. The solution to this problem could be design of a special monitoring system, especially for infants i.e., from (0- 3) years.
3) The system should continuously monitor the external conditions of the baby and it should be reasonably inexpensive.
4) Main aim of our project:
a) Save the time
b) Provides maximum security
c) Provides safety

IV. OBJECTIVE

1) The main objective of this project is to implement a IoT based Baby Monitoring System.
2) The system is based on GSM network to send alert messages to the parents when any of these parameters exceeds the saved values.
3) The main objectives are as follows:
a) Provide baby safety.
b) Continues Monitor from Anywhere.

V. COMPONENT REQUIREMENTS

A. Mq2 flammable gas Sensor
B. Esp32 cam module
C. Esp8266 Wi-Fi module
D. Moisture Sensor
E. Mic
F. Buzzer
G. Arduino Uno
H. Stepper Motor 5V DC
I. DHT 22 temperature and Humidity Sensor
J. Temperature Sensor
K. Sound Sensor
L. Connecting Wires
M. Breadboard
N. Power Supply

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VI. COMPONENT DESCRIPTION

A. Mq2 Flammable Gas Sensor

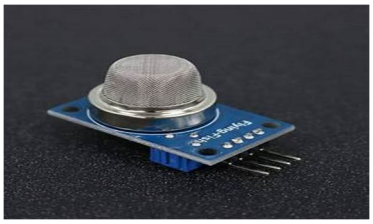

Fig 5: Mq2 Flammable gas sensor (Hardware Module)

It detects the concentrations of combustible gas in the air and outputs its reading as an analog voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm.

B. Esp32 Cam Module

Fig 6. ESP32 cam module (Hardware Module)

The AI-Thinker ESP32-CAM module features an ESP32-S chip, an OV2640 camera and a microSD card slot. They have them on AliExpress here. There are other ESP32 based camera modules available that should work if the pins are set in the sketch.

C. Esp8266 Wi-Fi Module

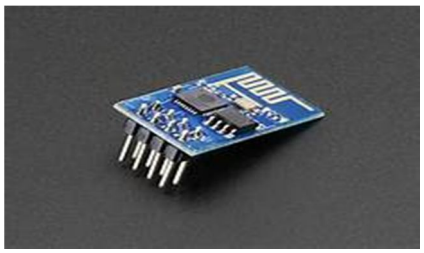

Fig 7. Esp8266 Wi-Fi Module(Hardware Module)

ESP8266 is one of the most practical modules for wireless connection (WIFI). These modules can be used in both server and client operating modes. You can use this module easily using AT Command.

D. Moisture Sensor

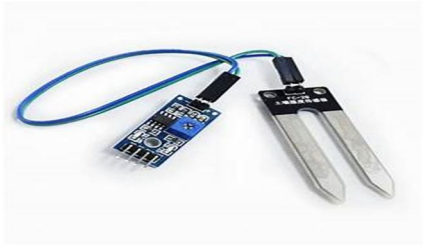

Fig 8. Moisture Sensor (Hardware Module)

Here we are monitoring the baby in the cradle, when the system senses the moisture in the cradle then it alerts the parents.

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E. Mic

Fig 9. Mic (Hardware Module)

The microphone simply serves to detect whether there is sound. The Arduino also has the capability of measuring the level of the sound, so that only sounds above a certain threshold can a certain circuit action (if desired). An application of using a microphone with an Arduino is if you want to build some type of sound alarm circuit.

F. Buzzer

Fig 10. Buzzer (hardware Module)

A buzzer transducer is interfaced with the Arduino UNO. When the square wave is input to the positive terminal of the buzzer, it will generate a sound of the same frequency.

G. Arduino Uno

Fig 11. Arduino Uno(Hardware Sensor)

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

H. Stepper Motor 5V DC

Fig 12. Stepper Motor 5V DC

A stepper motor is an electromechanical device which converts electrical pulses into discrete mechanical movements. The shaft or spindle of a stepper motor rotates indiscrete step increments when electrical command pulses are applied to it in the proper sequence. The motors rotation has several direct relationships to these applied input pulses. The sequence of the applied pulses is directly related to the direction of motor shafts rotation.

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I. DHT 22 Temperature and Humidity Sensor

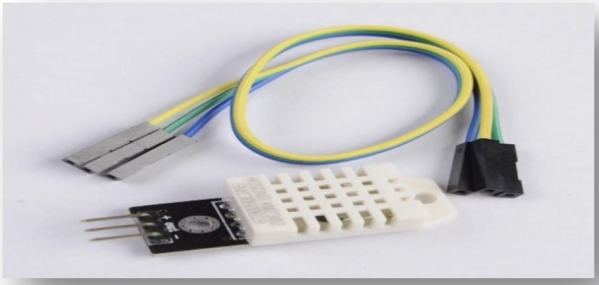

Fig 13. DHT22 Temperature and Humidity Sensor

The DHT22 is a basic, low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data.

J. Sound Sensor

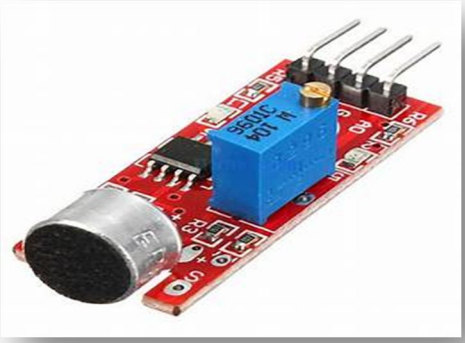

Fig 14. Sound Sensor

Arduino Sound Detection Sensor This module allows you to detect when sound has exceeded a set point you select. Sound is detected via a microphone and fed into an LM393 op amp. The sound level set point is adjusted via an on board potentiometer.

K. Connecting Wires

Fig 15. Connecting Wires

Connecting wires allows an electrical current to travel from one point on a circuit to another, because electricity needs a medium through which to move.

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L. Breadboard

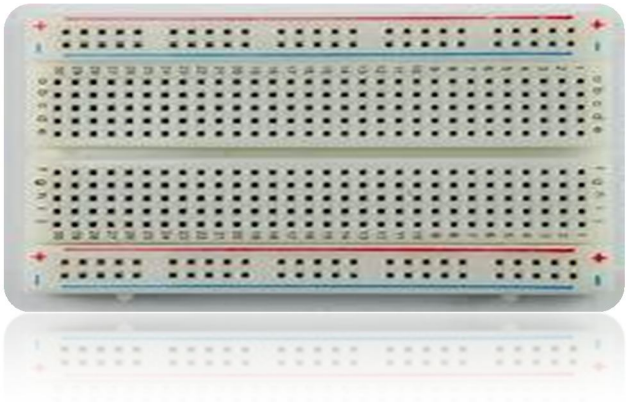

Fig 16. Breadboard

These boards are compatible with the Arduino software, but they do not accept standard shields. They have different connectors for power and I/O, such as a series of pins on the underside of the board for use with breadboards for prototyping, or more specific connectors.

VII. PROPOSED MODELING

A. Live Video Monitoring

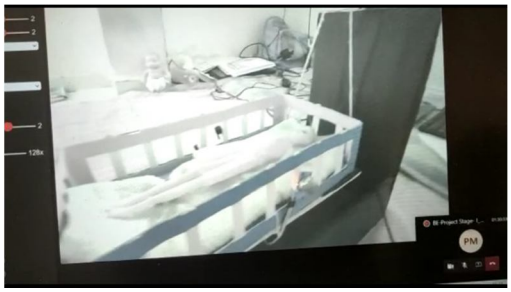

Fig 17. Live Video Monitor Snapshot

In this, we Monitors Babies Present condition.

B. E-mail Notification

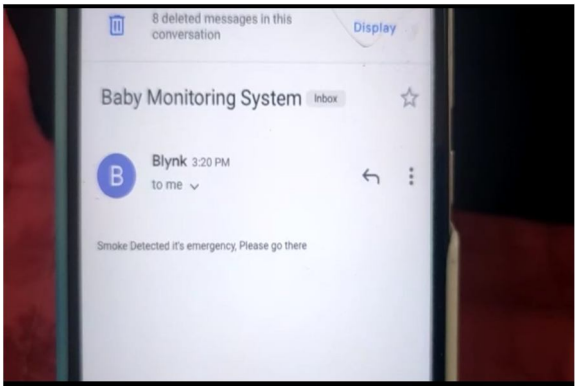

Fig 18. E-mail Notification Snapshot

From E-mail Notification Parents quickly understood the babies condition whether Baby is in danger, if moisture detect, if cry detected likewise, all the notifications are sends to through the E-mail.

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C. Temperature and Humidity of the Room

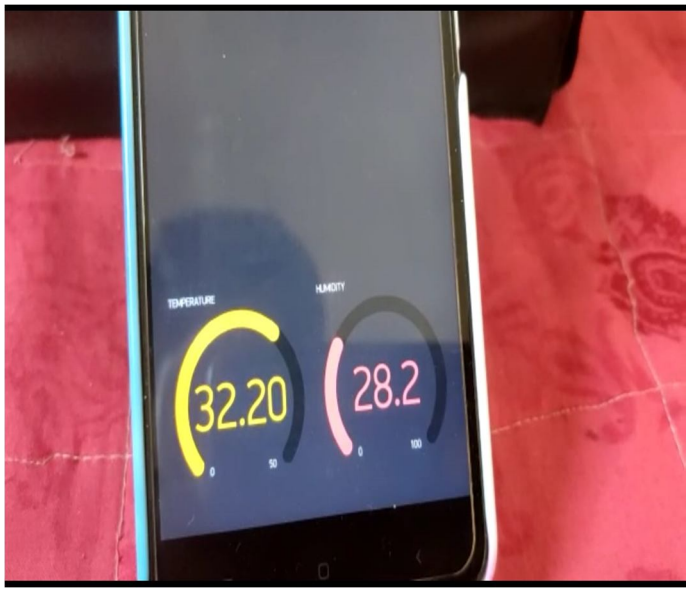

Fig 19. Temperature and Humidity of Room Snapshot

From this, Parents understood temperature and humidity of the room.

D. Smoke Detection

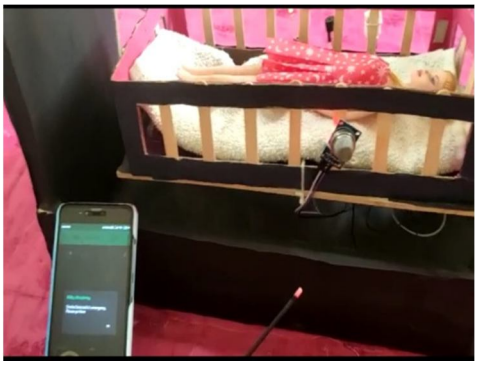

Fig 20. Smoke Detection Snapshot

From this, Parents understood that Smoke is there in their babies' room.

VIII. TECHNOLOGY USED

1) PyCharm IDE: PyCharm IDE is used in the programming work. It is mainly used for Python programming projects. The IDE is developed by Jet Brains.

IX. ADVANTAGES

A. It provides security
B. Due to use of Wi-Fi technology easy to monitor all parameters at any place
C. Small in Size and cost efficient.
D. Easily portable from one place to another place.

X. DISADVANTAGES

A. If Hardware is failed, then no alert will be generated.
B. If Sensors fails, then sensor not detects any activity.

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XI. SYSTEM OPERATION MECHANISM

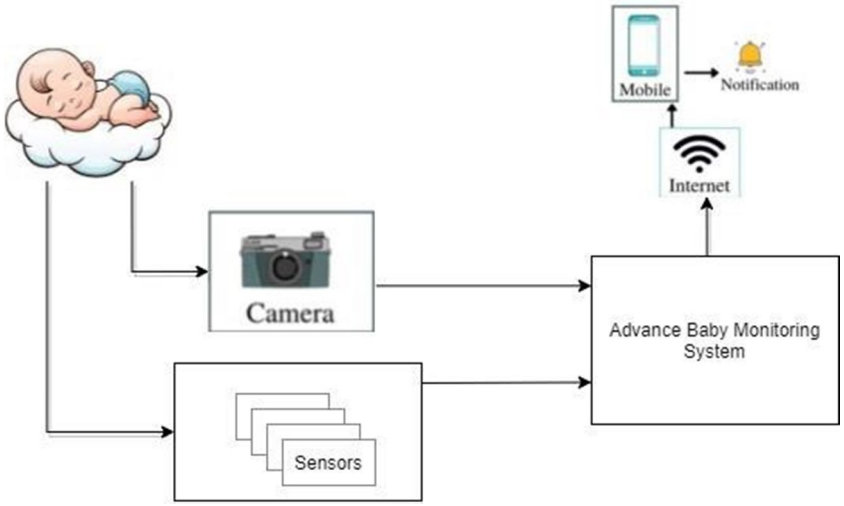

Fig 21. System operation mechanism

XII. APPLICATION

A. The proposed system uses the cloud service for remotely monitoring the child.
B. The baby cradle is used for to make sleep and soothe to baby.
C. Provide a smart solution for child care industry
D. Help working women balance their work and domestic chores. Can be used in day care centers for the aid of human beings.
E.

XIII. CONCLUSION

Looking after babies could be an exhausting downside worldwide. this method emphasizes the importance of kid care. The on top of style is economical and user friendly and really helpful for operating mothers and nurses. They can manage their work expeditiously. the current work reduces the human effort and significantly mother's stresses in operating times. The instrumentality Baby care includes a motor, sensors, and periodical carriage. The overall mechanism is mobile that permits straightforward movement from area to area. the electrical battery-powered motor can actuate the links by shaft and therefore the links actuates the bed in an exceedingly constant speed that is connected to the carriage. The advantage of this device is its low initial value, and has allowed disbursement. The device affords many scope for modifications for more enhancements and operational potency, which ought to create it commercially offered and engaging.

XIV. FUTURE WORK

In future we are able to add additional options to create additional economical and easy. The feature we are able to increase this device such like oldsters will monitor their baby live via 3G, rotating flirt with music and camera, and the sound sighted to detect sound of the baby may well be additional to boost the system options. With the development of technology daily routine has been alleviated for the fogeys alongside the baby care. Otherwise mother laps are the simplest cradle for a baby.

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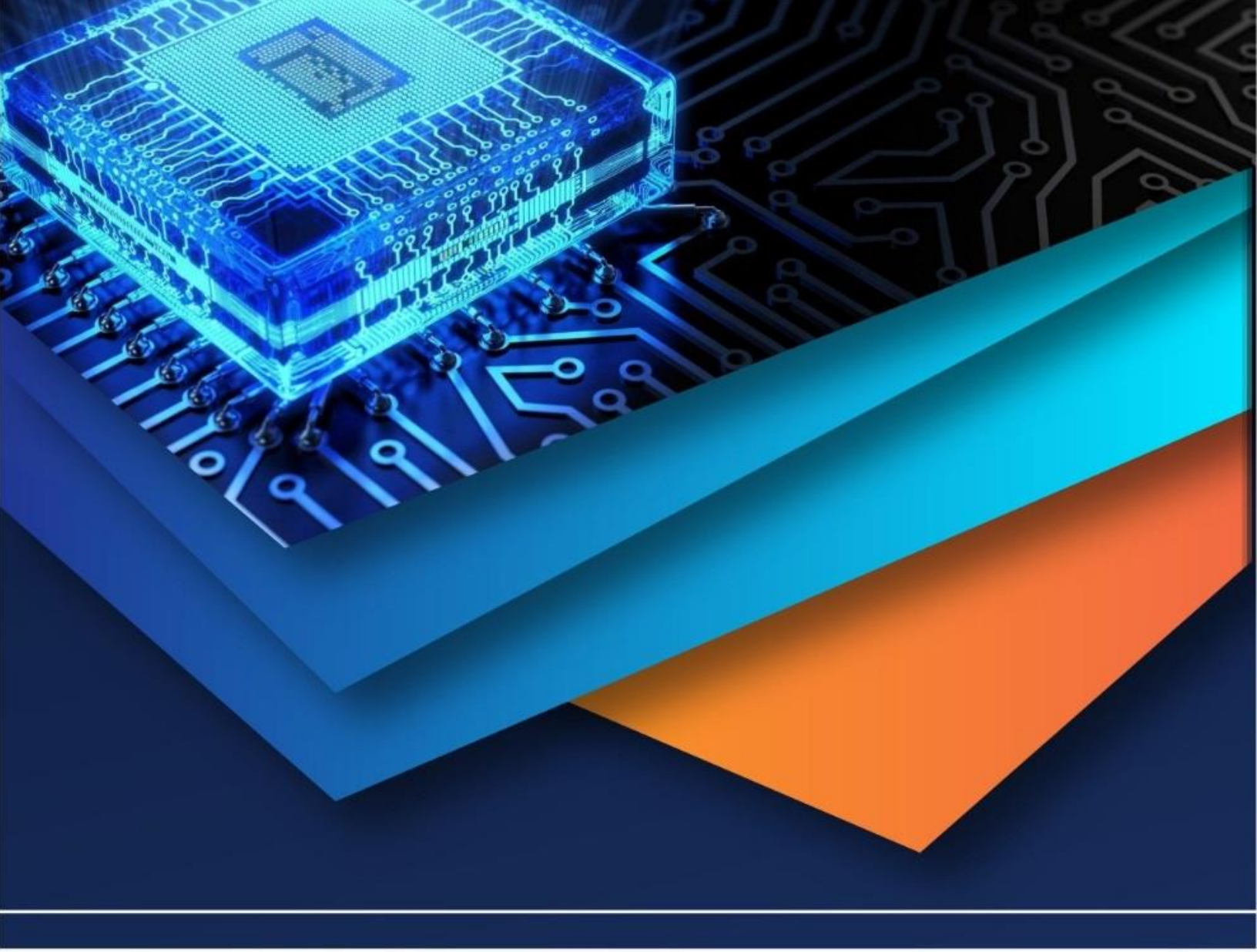

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