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Proctoring and Monitoring-Based Examination System

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Abstract: ***Due to COVID-19, Online Examination hasgained the most popularity over the previous year across all educational sectors. However, the institutions are having a lot of trouble with the proctoring procedures. There must be a solution found if the way we live is to become the new norm.In this project, we put up a plan to create an AI-based integrated system that can aid in avoiding exam cheating, as well as various methods and technologies that would allowthe proctor to be absent from the exam at all times. Our AI- based algorithm will be able to recognize any irregularities in an exam. Our system guarantees a moral examination atmosphere free of unethical behavior. Our technology monitors the activities of students who attend school in distant locations. Our method can aid in the detection and prevention of exam-related cheating. You can conduct your entire exam without using any paper. By switching to our technology, we can significantly reduce the cost of managing and administering exams. Our solution is compatible with the conventional exam method. The emergence of the online examination system (OES) is the best example of these reforms, and the monitoring system is intended to assure the fairness and impartiality of the OES. The growth of modern educational technology has pushed changes in teaching patterns and examination patterns. The paper describes the OES and monitoring system's structure and operation, highlights the major issues with communication and security, and offers remedies. The network examination criteria have been met by the system. In this project, we've suggested a way to stop exam cheating by creating an AI-basedintegrated system. We've also provided several methods and tools that eliminate the need for the proctor to be present during the exam. Any unfairness in a test will be detectable by our AI-based approach. Here, we offer methods and resources that eliminate the requirement for the proctor to be present for the entire exam. Any unfairness in a test will be detectable by our AI-based approach. Here, we offer methods and resources that eliminate the requirement for the proctor to be present for the entire exam. Neural networks and machine learning are the foundation of this. Our AI- based technology will be able to recognize any unethical exam practices. Our tests showed that the suggestedsystem is superior to the ones already in use.***

I. INTRODUCTION

A. Online Examination System Based OnProctoring And Monitoring

This online examination system is a software solution that enables any institution or industry to plan, carry out, and manage examsin a virtual setting [1]. The Internet, an intranet, or a local area network are all viable options. The processing of results is delayed during manual examination systems, filing is a challenge, and filtering of records is challenging. Records are likely to be lost, and finding records is challenging. The system requires a great deal of time and effort to maintain, which is also very tough. One of the essential components of the online educational system is the online test. It is effective, moves quickly enough, and uses fewer substantial resources. On the basis of the web, a testing system is created. This essay explains the system's basic principles, highlights its primary functions, examines the mechanism for automatically creating test papers, and talks about the system's security [1].

B. Need For An Online Examination System

An electronic application is the Online Examination System. This framework will assist the college/institution in evaluating the inquiry with several alternatives and a single correct response. The college/institution can oversee the online test and provide a quick summary of the results. The question paper will be completely safe because it will be created by the examination office [3]. Understudieshave remote access to online examination systems. It helps the inspector by minimizing the workload associated with conducting exams, reviewing answer sheets, and providingresults. The machine completes every step of this work. Here, we use a client-server architecture. Access is provided by the executive to the instructorand students. Students who are familiar with the system will be able to administer exams. Exam segments come in two flavors practice exams and actual tests. Both tests may be taken by understudies. Correct responses will be highlighted in various shades. The results of the test will be generated after

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submission, and exams will be conducted based on the results, which will be sent to each and every understudy [5].

C. Energizing The Project

In the conventional framework, overseeing assessments is very monotonous labor for both the analyzer and the instructor. Upuntil this point, the entire exam scheduling and score evaluation process was carried out physically. The online examination framework is unquestionably an electronic framework, but. The framework aims to reduce costs associated with scheduling exams over time and totally computerize examination framework-related tasks including registration and result dissemination, leading to a high level of framework effectiveness. After encountering a large number of reference papers, we have finally come to the conclusion that we can create one examination framework that can provide simple access to establish directing exams and investigating outcomes.

D. System Proctoring And Monitoring

In the last six years, the number of internet users in India has almost doubled. As a result, many students could continue their studies, which was great for academics. Additionally, this madeit possible for exams to be taken online, which introduced the ideaof online proctoring at the academic level. A proctored exam enables the examiners to supervise remotely. To keep the exam's integrity, they use video, audio, and numerous anti-cheating tools. It is challenging to manually proctor an online exam when it is being taken remotely since multiple students cannot be watched at once. The concept is to develop an AI system that will monitor the student with the webcam and microphone and with that, the teacher will be able to monitor numerous studentsat once. During this, a teacher can physically monitor pupils using all of their senses. Additionally, the system ought to maintain a log of potential malpractices. An online proctored exam is about to start. This instrument assists educational institutions in monitoring the exam procedure and avoiding any form of cheating. Artificial intelligence-enabled technologies are being used by many online exam providers to proctor exams impartially. To ensure that the applicants do not engage in any cheating conduct, these sophisticated systems use audio and video access techniques [3].

E. Services For Proctoring

The following elements make up online proctoring services:Authentication

The first thing to look for is the actual candidate taking the exam, not a proxy. This can be done by automatically authenticating the candidate before to the exam using AI- based facial recognition and OCR.

1) *Proctoring:* The system keeps an eye out for any unapproved activity by thecandidates while the exam is taking place. While the remoteproctor can keep an eye on the candidates via live video and audiostreaming, other checks based on AI that scan continually andsend alarms or warnings whenever any anomalies are foundinclude facial recognition, facial detection, and other checks. Thisguarantees that the AI engine will capture and log any instances that the proctors may have miss [7].
2) *Reporting:* If questioned, thorough report and analytics can offer the required proof to show instances of cheating or the use of unfairtechniques. Video and audio replay can be utilized to verify these incidents, and analytics can be used to automatically flag candidates who created a large number of alarms.

II. LITERATURE REVIEW

Many of the researchers proposed many solutions and different types of algorithms to enhance the performance and reduce the cheating methods in the online examination system.

In a research paper [1] by the author Mr. Vidhya and Ms. Hemathey proposed

The solution of artificial integrated system that will be able todetect any unfair in an examination.

According to their study they created the system that can keep a record of probable malpractices. This programmer aids educational institutions in keeping an eye on the exam procedure andpreventing any form of cheating. To ensure that the candidates do not engage in any dishonest behavior, their sophisticated measures include audio and video access approaches. So, they use the different algorithm for the face detection.

Limitations:

They use the HCLBP algorithm which stands for Haar cascadelocal binary pattern algorithm its accuracy rate is not so high

Also, they use the GLCM algo for the image recognition but this algorithm is not so much accurate at the blur time of the image in research paper [2] by Motwani Nikhil according to their study they also Wanted to create a web-based system so that malpractices can be stopped So they created an online MCQ based system that there is no need of pen and paper and examination can be remote only bytheir web system. They also proposed the solution of multifaced detection so cheating can be prevented.

Limitations: They use the yolo algorithm for the multifaced detection its iscorrect but the accuracy rate of yolo algo is only 76.5

percent so they unable to make that kind of web system to prevent cheating.

In research paper [3] by Anjali Rajendra in this research paper they proposed the Solution of online exam as well as the hiring online tests so they proposed software would assist the human proctor in keeping track of the student activities. In this way, whenever a student is suspected, they would be brought to the forefront of the human proctor's screen, and their suspicious activity fagged forlater review. So, they generated the idea of Proctor-U.

Limitations:

The system is not fully based on artificial intelligence and need of the human Intervention. Proctor-u uses both microphone as well as camera but the accuracy is not so much high as the one who is watching if miss the cheating cause so cheating cannot be prevented.

s.no	Researcher	Dataset	Approach and Technologyused	Re sult
1	Deepankar et al., Rajendra bhadke [2]	An online examinationsystem which uses the Random Number Generator Algorithms to auto generate the set of questions	HTML, Tomcat, MSAccess	Accurate but slow
2	AishwaryaSanjay Gunjal [3]	Online ExaminationSystem	HTML, CSS, PHP andMySql	Above 90 %
3	Li faung, Zhao Qiao-fang[4]	Research & developmentof online examinationsystem	Javascript at client side andJSP at the server side	Above 95 %
4	SWeaver,D., et al [1] to Munna RAhmed	WebCT andstudent evaluation	PHP/MYSQL	Above 90 %
5	Liu Dongsheng , Xu Qiaoxia[6]	Research anddesign of examination system	Complex Mechanisationat both end	Accuracyupto100%
6	B.persis Urbana Ivy[8]	Web basedonline Secured exam	PHP, Javascript, AndMysql, Apache server	Above 90 %
7	Mr. VidyaSG [10]	SystematicReview ononline examination	HCLBP, GLCM	96.34% accuracy
8	Sahil MotwaniChirag Nagpal, Xiao Jia[13]	AI based proctoring examinationsystem	Yolo 3 andLBPH	76.31% Accurate
9	Alessio HM Milay[9]	Interaction ofproctoring and student examination	Distance learning withaddition of CAMEO	Checking online to caughtcheat upto 30-40%
10	GufranaulKarim, IJCSI [5]	A novel students online examination system	Random number generatoralgo,JSP	Accuracy is high as well it include seed

III. BACKGROUND WORK

You can conduct Online Aptitude Tests to understand thepreparation of various competitive exam. You can also conduct exams in multiple languages [8]. The difficulty of holding English-language online exams in remote locations should be removed. It is simple to configure the system to display exam questions and answers in two languages, such as English and Hindi. Candidates preferring Hindi can select the Hindi option while the English Language can be chosenby students who want to appear for the online exam in English.

There may be a rise of the situation that internet connectivity may get lost during the examination. There are currently so many systems in which if the connectivity is lost then the system gets restarted and the candidate will not be able to give the examination where he/she left. But our system provides the facility of, if the internet connectivity stops during the examination, then after when internet gets back, the candidate can resume the examination from where he/she left.

Here we will be using a 360-degree camera for proctoring We had two options for resolving this issue: one included using a proctoring model on the client side, and the other involved using a proctoring model on the server side [7]. The model would be supplied to individual devices that administer examinations along with the browser pages in the client-side approach. These pages would gather the necessary data, extract the necessary information from it, and send this information to the server in the background. The gadget could only collect data through the server-side mechanism, which would deliver browser pages to the device. The pages would transmitthe server their raw data, and the server would then use a proctoring model to extract data from the photos. An online test is given in several locations. The smooth conduct of contact with remote candidates is crucial for resolving any problems or questions they may have about any process. This will guarantee that the exam runs without a hitch. Candidates can receive notifications from our system on the exam schedule and login information. In order to tell them about the online assessment procedure, you can contact them via email and SMS.

Solution: Online examination process security is one of the critical challenges. If you want to make sure that the right candidate is taking the exam in a safe setting without engaging in any fraud, you need follow the proper authentication and authorization procedures. To find leaks or security flaws during the exam process, the system should be able to audit the entire exam procedure. Our system has features that can help you to manage the security of the process. (i) Secure Browser ensures that the candidate cannot open any other window during the exam process. Opening other windows during online exam activity is prohibited,

A. Project Deliverables

Our Project involves two major elements. It starts by turning on a computer's camera and recording the student taking the test. This makes it possible for teachers to watch how the pupils behave and spot things like chatting to other people or looking stuff up in books that might be signs of cheating. Second, it either restricts the students' use of their computers for other purposes by disabling functions like copying, pasting, printing, and internet searches, or it either keeps track of everything they do on them, or both. "Locking down" a computer or browser refers to limiting students' access to problem-solving, reasoning ability of the individual. To know the nature of a person the suitable method is personality tests. Many multinational companies and institutes are using this methodto select the right candidates. It can be useful for the additional tools or resources. Exam recordings may also be examined by the instructor or teaching assistants [5].

B. Proposed Approach

Our proposed project is a Web-based application created withPython and the Django Framework. This effort provides a framework for automated and online exams. It provides an intuitive interface by utilizing HTML, CSS, and JavaScript. The functionality and features of this online test system project are user-friendly [4]. This online examination system,which is a softwaresolution, enables any industry or institute to plan, carry out, and manage exams through an online setting. The processing of results is delayed during manual examination systems, and the filtering of records is challenging. The likelihood of losing records and findingrecords is challenging.

The system requires a great deal of time and effort to maintain, which is also very tough. One of the essential components of an online educational system is the exam.It saves a lot of material resources, is quick enough to calculate results, and is effective [5]. On the basis of the web, an AI-based examination system is created. We have suggested a web-based approach to track down and analyses student fraud during online exams using artificial intelligence. Face recognition technology can be used to identify a student taking an exam. If the student's face matches a saved photograph of them, the student is authenticated and permitted to take the test.

There are twokey components to our project. In the beginning, it turns on a computer's camera and records the student doing the test. This makes it possible for teachers to watch how the students behave and spot actions like chatting with other people, mobile phones isdetected or looking up books that might be signs of cheating. Second, it either restricts the students' use of their computers for other purposes by preventing them from copying, pasting, printing, and conducting internet searches, or it either keeps trackof everything that students doon them or both.

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IV. METHODOLOGY

There are currently a number of webcam proctoring systems in use, but they are not particularly accurate, cannot catch all conceivable malpractices, and occasionally catch malpractice for someone who never attempted it owing to a systemic defect. The main goal of this project is to create features that will upgrade and expand the current webcam proctoring system [6]. The project's goals include developing the following features: head poses estimation, mouth opening detection, eyeball monitoring, number of people detection, mobile phone detection, and face spoofing detection. Python isused to create machine-learning models for each of these features. Each of the aforementioned features utilizes a live webcam feed acquired using OpenCV, and an output is obtained that offers details about the direction of the head and eyes, the existence of multiple people and a mobile phone, the opening of the mouth, and the occurrence of face spoofing. Allof these outputs are saved as a log file, which can be used to identify any potential malpractices based on these characteristics [9].

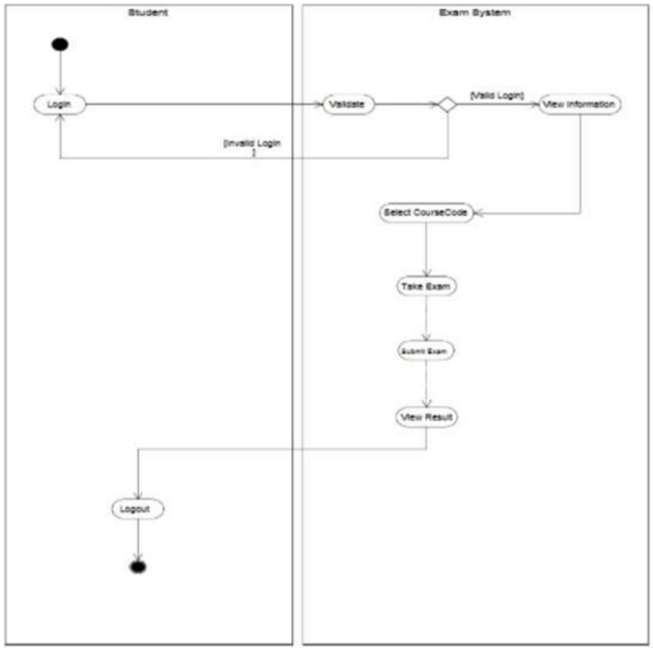

Figure.1. Flowchart Of Methodology

A. Designing Of The System

It uses HTML, CSS, and JavaScript to create a simple and pleasant user interface. The features and functionalities of this Online Exam System Project are user-friendly. The appearance and usability of a website, mobile application, software program, or other interactive platform are the focus of user interface (UI) design. To be a successful UI designer, you must cultivate both hard and soft skills, such as technical, teamwork and interpersonal abilities.

B. HTML

HTML, an acronym of Hyper Text Markup Language. It is themarkup language for developing Web pages. HTML is a combined form of various elements. HTML elements allows the page to render the content.
HTML has numerous applications, including web development. HTML code is used by developers to design how browsers display web page elements such as text, hyperlinks, and media files.

C. CSS

CSS is a stylesheet language for describing the appearance of an HTML or XML document. CSS defines how elements should appearon the screen, on paper, in speech, or in other media. CSS is designed to separate content from presentation elements such as layout, colors, and fonts. By giving more control and flexibility over how presentational characteristics are specified, this separation can increase content accessibility. It can also enable multiple website content to share formatting by defining the pertinent CSS in a separate.css file, reducing complexity and repetition in the structural content. Finally, it can enable the.css file to be cached to speed up page load times between the pages that share the file and its formatting.

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D. SCSS

SCSS, an acronym for Sassy Cascading Style Sheets. It isessentially an advanced and evolved version of the CSS language. It was created by Natalie Weizenbaum and Chris Eppstein, and it was designed by Hampton Catlin. It has more advanced features and is often referred to as Sassy CSS. SCSS assists a user in addingextra features to CSS, such as nesting, variables, and so on. Extra features make the process of writing SCSS easier & faster than he standard CSS language. The CSSfunction and code can be used by the SCSS language.The SCSS remains fully compliant with CSS syntax whilealso supporting the full power of SASS.

E. JAVASCRIPT

JavaScript, referred to simply as JS, is a scripting language that, along with HTML and CSS, is one of the most fundamental components of the Wide Web. This division can enhance the material. JavaScript is a high-level, frequently just-in-time compiled language that complies with ECMAScript. First-class functions, prototype-based object- oriented programming, and dynamic typing are all supported.It supports imperative, functional, and event-driven programming and is multi-paradigm. Included are the Document Object Model, dates, regular expressions, data structures, and text-related APIs.

F. PYTHON

Python is an advanced programming language. It works with a wide range of programming paradigms, including structured, object-oriented, and functional programming. Python's simple, easy-to-learn syntax emphasizes readability, lowering programmed maintenance costs. Python provides support for modules and packages, which promotes programmed modularity and code reuse. For all popular platforms, the Python interpreter and sizable standard library are freely distributable in source or binary form.

G. Algorithms Used In The System

The system is automatically used to calculates the results usingNLP and ANN algorithms.

1) *NLP:* When it comes to the technology used to create such a model for evaluating descriptive answers, NLP, or Natural Language Processing, plays a significant role. NLP can perform a variety of innovative tasks, such as predicting whether a message or email is spam or ham and performing quality searches on shopping websites such as www.amazon.in and www.flipkart.com to search for various categories of items such askitchen utensils, electronic gadgets, apparels, food items, and many other such the products that areavailable on the internet.
2) *ANN:* This uses an Artificial Neural Networks algorithm to make comparisons of responses and store marks in this dataset,and then they tested the same response using the Natural language processing algorithm to identify system errors and store marks in the database, and finally they compared both marks to give the final result. They achieved effective results by employing these methods. The program's output was compared to tests performed by a technical member. Methods for analyzing webcams using artificial neural networks: We only had the student's microphone, webcam, and keyboard/mouse to monitor an online exam. Rather than audio,we will concentrate on video and detecting student keyboard/mouse input in this section.

III. RESULT AND DISCUSSION

The application of the examination and printing of the results immediately following the examination are two features that define the suggested programmer. We list the key benefits of the proposed program after the completion of implementation:

From the start of the examination to the end it consists of interfaces that are professional. Instructions for supporting the student during the test, such as switching between questions, knowing the time and remaining questions, and using the calculator are included [10]. The program can save the answers of the students to each question and save the final degree.

Instructions for supporting the student during the test, such as switching between questions, knowing the time and remaining questions, and using the calculator are included [9]. The program can save the answers of the studentsto each question and save the final degree (used in the case of student objection to the degree).

IV. CONCLUSION

Thorough evaluation present day the literature tells that there arenumerous methods to put into effect song Recommender machines. A have a look at modern-daystrategies proposed with the aid of preceding scientists and developers changed into completed. primarily based on the findings, the objectives latest our gadget had been fixed. As the electricity and blessings of modern-day AI-powered applications are trending, our challengemight beat rending generation usage. on this machine, we provide an outline of ways tune can have an effect on the consumer's temper and how to pick out the proper music tracks to enhance the person's moods.

The carried-out system can detect the person's feelings. The emotions that the machine can come across have been glad, unhappy, angry, impartial, or amazed. After determining the user's emotion, the proposed system provided the person with a playlist that carries music matches that detected the temper. Processing a huge data set is memory in addition to CPU in depth. this will make improvement more tough and appealing. The reason is to create this application in the most inexpensive possible way and alsoto create it below a standardized device. Our track advice gadget based on facial emotion reputation will lessen the efforts ofmodern-day customers in growing and coping with playlists.\

V. FUTURE WORK

So, for the online examination system, we need GUI and proctoringas well so this Semester we have built up the GUI that how our project looks like and the authenticity of the GUI using HTML, CSS and the JavaScript. For the next semester, we are going to add proctoring to the project Where our proctoring online exam software provides remote proctoring technology to prevent cheating. Using our online examination system admin can take authorize and proctortest. For educational institutions, we offer live proctoring and human proctoring systems. Our system automatically takes pictures of users when they are taking tests whenever students deliver them. There is still much to do for the upcoming semester.

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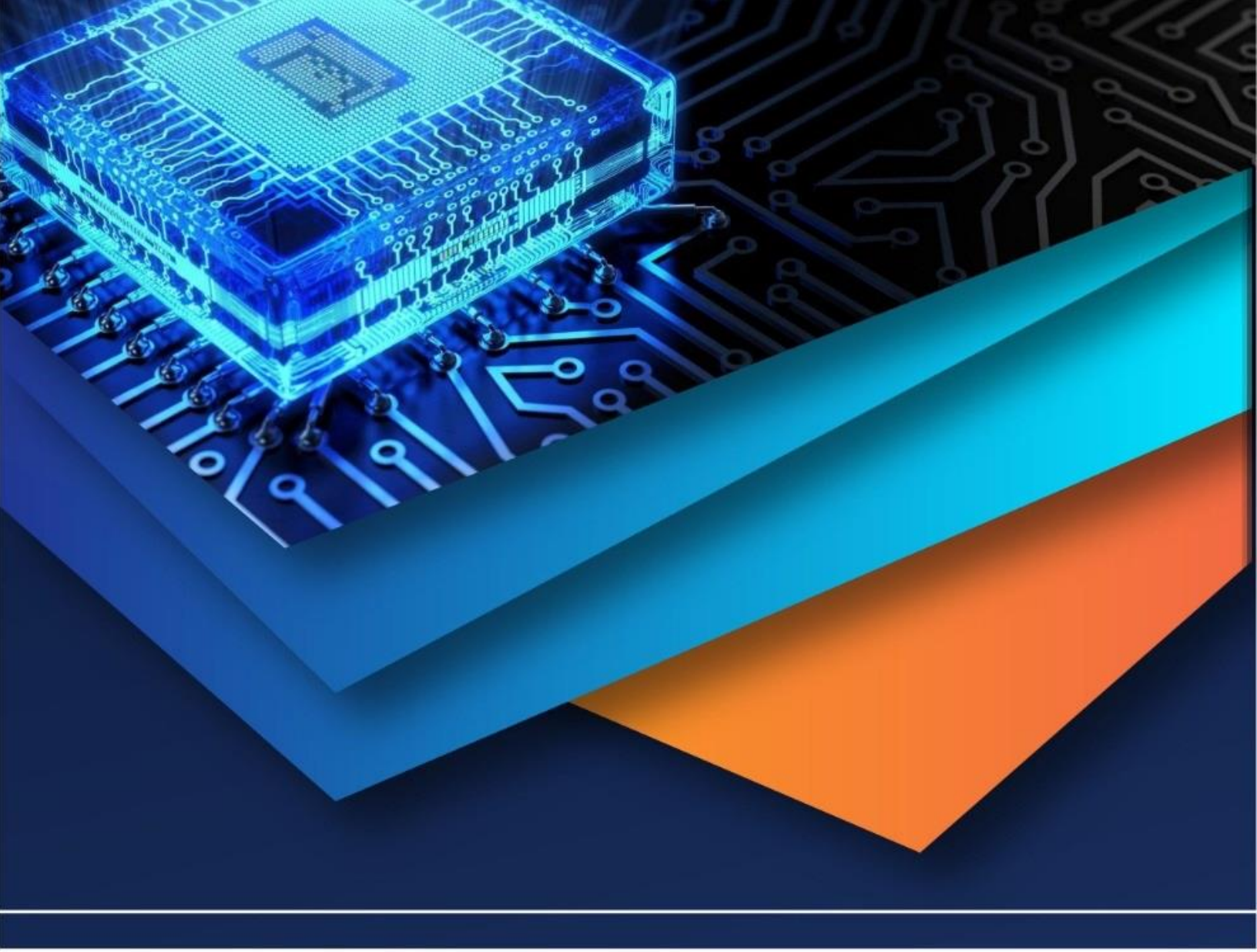

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