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VOCALICIOUS-Voice-Assisted Food Ordering Web Application

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Abstract: ***Vocalicious-voice assisted food ordering website is revolutionizing the way users interact with the platform by incorporating an Artificial Intelligence (AI) voice assistant. This advanced voice assistant not only suggests a wide range of food options available for ordering but also provides users with accurate cooking time estimates. Furthermore, it goes beyond the traditional food ordering experience bysuggesting nearby places to visit during cooking time, ensuring users can make the most of their time in the kitchen.***

The AI voice assistant takes personalization to the next level by offering different food recommendations based on individual preferences. By analyzing user behavior and order history, the system tailors its recommendations to each user's unique tastes andpreferences. Additionally, content-based filteringis employed to suggest related food items, ensuring a diverse and fulfilling culinary experience. Users can interact with the voice assistant, providing voice commands and receiving promptand accurate responses. Through the integration of AI technologies.

Keywords: food ordering, AI voice assistant

I. INTRODUCTION

In recent years, the use of artificial intelligence (AI)has become more prevalent in various industries, including the food industry. With the increasing demand for convenience and personalized experiences, incorporating an AI voice assistantintoa food ordering website has become a natural progression. The food ordering with AI voice assistant website project aims to create a user-friendly platform that allows customers to order food using their voice. The website will utilize a Content-based filtering algorithm for a recommendation. The AI voice assistant will interact with the customer and providepersonalized recommendations based on their past orders, preferences, and dietary restrictions. The website will also integrate with various food delivery services to provide customers with a seamless experience. Customers will be able totrack their order status and receive notifications ontheir preferred communication channels.

II. TECHNOLOGIES USED

A. *Content-based Filtering*

Content-based filtering is a recommendation algorithm that utilizes the similarity between items to make personalized recommendations. Itcalculates the similarity between items based on their attributes or features, typically represented as vectors. One commonly used similarity measure is the cosine similarity, which measuresthe cosine of the angle between two vectors.Given a user's preferences or profile vector, the algorithm then recommends items that have the highest similarity scores with the user's vector. The recommendation process can be summarizedas:

Recommendations=argimax (similarity(user_vector,item_vectori))

Here, user_vector represents the user'spreferences, item_vector_i represents the feature vector of item i, and similarity denotes the cosinesimilarity function.

B. *Machine Learning (ML)*

ML algorithms can be used to analyze large amounts of data and identify patterns and trends that can be used to make predictions and recommendations. In the context of your project, ML algorithms can be used to analyze user behavior and preferences and suggest relevant food items, cooking time estimates, and nearby places to visit based on the user's location and past behavior. ML can also be used to train the AIassistant to recognize and respond to voice commands more accurately over time.

Linear Regression Equation: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n + \epsilon$

where y is the dependent variable, x1, x2, ..., xn are the independent variables, β0, β1, β2, ..., βn are the coefficients, and ε is the error term.

C. Speech Recognition

Speech recognition technology can be used to accurately transcribe and understand voice commands from users. This technology uses a combination of acoustic and language models to identify spoken words and convert them into text. In the context of your project, speech recognitiontechnology can be used to transcribe user input and extract relevant information for food orders, cooking time estimates, and nearby places to visit.

D. Natural Language Understanding (NLU)

Natural Language Understanding (NLU) is a branch of artificial intelligence that focuses on enabling computers to comprehend and interpret human language. It involves the use of computationalalgorithms to extract meaning, context, and intentfromtext or speech inputs. NLU systems analyzesyntactic and semantic structures, apply machine learning techniques, and employ knowledge representation methods to grasp the nuances of humanlanguage. By understanding the intent behind user queries or statements, NLU facilitates accurate information retrieval, intelligent dialogue systems, sentiment analysis, language translation, and otherapplications that require a deep understanding of human communication

E. Natural Language Generation (NLG)

Natural Language Generation (NLG) is an AI-driven technology that transforms structured data or non-linguistic inputs into coherent and meaningful human-like text or speech. By analyzing context, applying linguistic rules, and utilizing statistical models, NLG systems generate written or spoken content across various domains. NLG enables the automation of tasks such as report generation, personalized emails, product descriptions, and more, making complex information accessible and facilitating efficientcommunication between machines and humans

F. Recommender Systems

Recommender systems are algorithms that suggestitems to users based on their past behavior, preferences, and the behavior of other users. In the context of your project, recommender systems can beused to suggest food items, based on the user's past behavior and preferences. This can help the AI assistant provide more personalized recommendationsand improve the overall user experience.

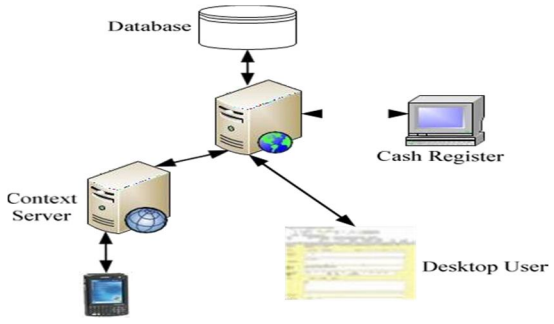
$$\text{Cosine Similarity Equation: } similarity(A, B) = \frac{A \cdot B}{|A||B|}$$

where A and B are two vectors, and the dot product(A · B) represents the cosine of the angle between the two vectors.

III. RELATED WORKS

XU Hongzhen, TANG Bin, SONG Wenlin [1] proposed Wireless Food Ordering System Based on Web Services. The Wireless Food Ordering System Based on Web Services is a project that utilizes web services to create a wireless andconvenient system for customers to order food from restaurants. The system is designed to be accessible via smartphones and other mobile devices, making it easy for customers to browse menus, select items, customize their orders, and place them with the restaurant.

The system is based on web services, which enable communication between the customer and the restaurant. The web-based application provides a user-friendly interface for customers to browse the menu, select items, and place orders. The system uses a database to store and manage customer orders, which are sent to the restaurant for processing. One of the key features of the system is the abilityto track orders in real time. Customers can monitor the progress of their orders and receive status updates, such as when their food is being prepared, cooked, and ready for pickup or delivery.



Vindya Liyanage, Achini Ekanayake [2] Proposed a Foody – Smart Restaurant Management and Ordering System. Foody is a Smart Restaurant Management and Ordering System that aims to streamline the ordering and management process for restaurants. The systemincorporates various features to enhance the overall customer experience, including online ordering, payment processing, and real-time ordertracking.

The system is designed to be user-friendly and accessible via mobile devices, enabling customers to browse menus, select items, customize their orders, and pay for them online. The system uses a database to manage customer orders, which are sent to the restaurant for processing.

In addition to online ordering and payment processing, Foody includes a range of management features for restaurants. These features include inventory management, menu management, and employee management.

The system also includes real-time order tracking, which enables customers to monitor the progress of their orders from the moment they are placed until they are ready for pickup or delivery. This feature provides transparency and ensures that customers are kept informed about the status of their orders.

Yakob Utama Chandra[3] proposed The Stimulus Factors of Order Online Food Delivery. It focuses on the factors that influence consumers to use online fooddelivery services. Convenience is a key stimulus factor for online food delivery services. The paper examines how online food delivery services can mitigate perceived risks through measures such as quality assurance, order tracking, and customersupport. Price is also a significant stimulus factor for online food delivery services. Consumers are attracted to thecompetitive pricing and special offers that are often available through online food delivery platforms. Thepaper examines how online food delivery services can leverage pricing strategies to attract and retain customers, while still maintaining profitability. Service quality is another important stimulus factor for online food delivery services. Consumers expect timely and accurate delivery, high-quality food, and responsive customer service. The paper examines how online food delivery services can maintain service quality through measures such as order tracking, customer feedback, and employee training.

Noor Azah Samsudin, Shamsul Kamal Ahmad Khalid[4] proposed A customizable wireless food ordering system with real-time customer feedback. Acustomizable wireless food ordering system with real-time customer feedback is a digital solution that streamlines the ordering process for restaurants and improves the customer experience. The system is designed to enable customers to place orders directly from their mobile devices orvia a restaurant's website or kiosk, allowing themto customize their orders to their exact preferences. The system also provides restaurants with a platform to manage their menu, pricing, and customer orders. This means that restaurant owners can update their menu items in real-time and respond to customer feedback on their dishes.With this, they can improve their offerings and keep up with the changing preferences of their customers.

One of the key features of this system is the real- time feedback mechanism. Customers can provide feedback on their dining experience, including the quality of the food, the service, andthe ambiance of the restaurant. This information is then passed on to the restaurant owner, who canuse it to improve their services and offerings.

Lim Tek Yong, Alexander Johnson [5] proposed Designing and Developing a PDA Food Ordering System Using an Interaction DesignApproach is a system that enables customers to order food through a PDA (Personal Digital Assistant) device. The system is designed to simplify the ordering process for both customersand restaurant staff and to provide an improved user experience. The interaction design approach involves a user-centered design process. This approach aims to create an intuitive and user- friendly system, where the users can easily navigate through the different options and functionalities. A back-end system for processingthe orders, and a database for storing the menu items and customer information. The PDA devicehas a touchscreen interface, where the users can browse through the menu, select their items, and place their orders. The system then sends the order to the back-end system, where it is processed and forwarded to the kitchen for preparation.

The interaction design approach is used to createan intuitive and user-friendly interface for the PDA device. One of the key features of the system is the ability to customize orders according to the customers' preferences.

Lidya Chitra Laoh [6] proposed An Android application for food delivery services. It is amobile application that enables customers to order food from restaurants and have it delivered to their doorstep. The application is designed to provide a user-friendly and efficient way for customers toorderfood, and for restaurants to manage and fulfill the orders.

The application typically includes several features such as a menu with different categories of food items, the ability to search for specific dishes or restaurants, customer reviews and ratings, and payment options. Customers can browse through the menu, select their desired items, and add them to their cart. They can alsospecify any special instructions or dietary requirements.

The application also includes a tracking feature that enables customers to track the status of their orders inreal time, from the time they are placed until they aredelivered. This feature provides customers with an estimated delivery time and allows them to view the delivery person's location on a map.

P.Saratha, Dr.G.V.Uma [7] proposed Formal specifications for an online food ordering system using the Z language. It is a method of rigorously defining the system's requirements, behavior, and properties using mathematical notation. The Z language is a formal specification language that allows developers to define the system in a precise andunambiguous manner, which reduces the potential forerrors and misunderstandings during the system's development.

The formal specification for an online food ordering system using the Z language typically includes a specification of the system's data types, operations, and constraints.

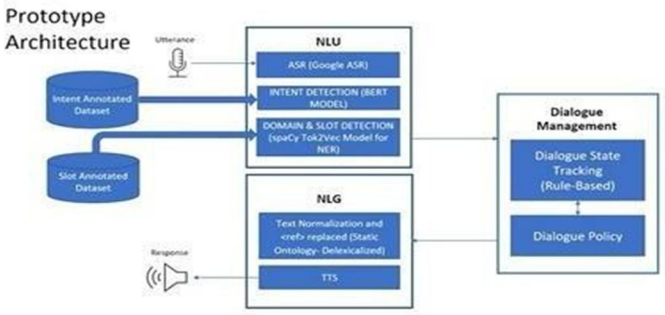
The specification may also include constraints on the data and operations, such as requirements for data validation, error handling, and security. The Zlanguage provides a formal notation for expressing thesystem's behavior and properties.

Tejas Raibagi, Ashwin Vishwakarma [8] proposed Orderista AI-based Food Ordering Application. It is an AI-based food ordering application that aims to simplify and enhance the food ordering experience forcustomers. The application is designed to enable users to order food from their favorite restaurants quickly and easily using their smartphones.

The application has a user-friendly interface that allows customers to browse menus, select dishes, andplace orders. based on the type of cuisine, dietary requirements, and price. Users can also view the ingredients and nutritional information of each dish before ordering. The AI-powered virtual assistant in theapplication provides personalized recommendations to users based on their past orders, search history, and preferences. The assistant can suggest the most popular dishes, provide cooking time for specific dishes, andsuggest nearby places to visit during the cookingtime. Customers can place orders through the application or through WhatsApp integration, where they can simply send a message to the WhatsApp number provided by the food orderingwebsite.

Subhash S, Prajwal N Srivatsa, Siddesh S [9] proposed An Artificial Intelligence-based Voice Assistant. It is a type of software that uses natural language processing and machine learning techniques to interact with users via voice commands. It is designed to perform a wide rangeof tasks, such as answering questions, settingreminders, making calls, sending messages,playing music, and controlling smart home devices, among others. These voice assistants are typically integrated into smart speakers, smartphones, and other internet-connected devices, and are activated bya wake word or a button press. Once activated,the assistant listens to the user's voice command,processes it using natural language processingalgorithms to understand its intent, and then performs the corresponding task by accessing relevant data or services. Over time, the assistantlearns from the user's interactions and becomes more personalized and accurate in its responses. AI-based voice assistants have become increasingly popular in recent years, and are now commonly used in homes, offices, and vehicles. They provide a convenient and hands-free way to access information and services and have the potential to enhance productivity, improveaccessibility, and even assist with healthcare tasks. Andreas M. Klein, and Martin Schrepp[10] proposed Measuring the User Experience Quality of Voice Assistants. Measuring User Experience Quality of Voice Assistants Measuring the quality of user experience with voice assistants is crucial in ensuring their success and adoption. User experience can be evaluated based on several factors, such as accuracy, response time, natural language processing, functionality, user interface, reliability, privacy, and security. Accuracy refers to how accurately the voice assistant can understand andrespond to user requests, while response time is the speed at which the voice assistant processes and responds to user queries. Natural language processingpertains to the voice assistant's ability to interpretnatural language, including regional accents and dialects. Functionality involves the range of tasks the voice assistant can perform, and the ease with which it can perform them. User interface pertains to the design and usability of the interface through which users interact with the voice assistant, while reliability refers to the consistency and dependability of the voice assistant's performance. Finally, privacy and security pertain to the level of protection afforded to user data and the measures taken to safeguard user privacy. Measuring these factors through surveys, usability testing, and user feedback can help identify areas of the user experience that need improvement and inform thedevelopment of more user-friendly and effective voiceassistant technologies.

Architecture



IV. LITERATURE SURVEY

Title	Method Used	References
Wireless Food Ordering SystemBased on Web Services	It involved requirements gathering, system design, implementation, testing, and deployment in an iterative and agile approach with frequent feedback and collaboration between team members and stakeholders.	[1]
Foody – Smart Restaurant Management andOrdering System	A survey-based research design to collect and analyze data on the factors that stimulate onlinefood ordering and delivery	[2]
Stimulus Factors of Order Online FoodDelivery	It involved a survey-based research design to collect and analyze data on the factors that stimulate online food ordering and delivery	[3]
customizable wireless food ordering system with real-time customer feedback	An iterative and incremental approach with phases including requirements gathering, system design, implementation, testing, and deployment, as well as integration with third-party services and frequent feedback and collaboration with stakeholders.	[4]
Designing and Developing A PDAFood Ordering System Using an Interaction Design Approach.	The iterative and user-centered design process, with phases including requirements gathering, prototyping, user testing, and implementation, as well as frequent feedback and collaboration with stakeholders and end-users.	[5]
Android Application Food Delivery Services	A combination of agile and waterfall approaches with phases including requirements gathering, system design, implementation, testing, and deployment, as well as integration with third-party services and frequent feedback and collaboration with stakeholders.	[6]
Formal Specification for Online Food Ordering System using Z language	A formal and rigorous approach using the Z language for specification, refinement, and verification of the system requirements andbehavior	[7]
Orderista AI-basedFood Ordering Application	A combination of agile and waterfall approaches with phases including requirements gathering, system design, implementation, testing, and deployment, as well as integration with third-party services and frequent feedback and collaborationwith stakeholders.	[8]
An Artificial Intelligence-basedVoice Assistant	Artificial Intelligence-based Voice Assistant use natural language processing, machine learning, and deep learning techniques to understand and interpret user voice commands and provide personalized responses.	[9]
Measuring User Experience Quality ofVoice Assistants	To measure the quality of user experience with voice assistants, a combination of methods such assurveys, usability testing, and user feedback are used to evaluate factors such as accuracy, response time, natural language processing, functionality, user interface, reliability, and privacy and security.	[10]

V. PROPOSED SYSTEM

The proposed will include several components, including a user interface, a natural language processing (NLP) module, a recommendation system, and a database.

The user interface will be designed to be simple and intuitive, allowing users to easily browseavailable food options, view cooking times, and receive nearby place recommendations. Users will also be able to interact with the AI voice assistant by speaking commands or questions, which will be processed by the NLP module.

The NLP module will use machine learning algorithms to analyze user input and extract relevant information, such as food preferences, cooking times, and location. The module will alsobe able to understand and respond to user requestsfor nearby places to visit during cooking time.

The recommendation system will use collaborative filtering techniques to suggest foodoptions to users based on their past orders and preferences. The system will also suggest nearbyplaces to visit during cooking time based on userlocation and interests. The database will store information about food options, cooking times, and nearby places to visit during cooking time. This information will be used by the AI voice assistant to provide accurate and timely recommendations to users. Overall, the proposed system will leverage advanced AI technologies to provide a seamless and personalized experience for users, while also enabling efficient food ordering and delivery processes.

Customers can place their orders by simply sending amessage to the WhatsApp number provided by thefood ordering website. The system should be able torecognize the food items and quantities mentioned in the message, and then process the order accordingly. To recommend best combo offers, the system can use artificial intelligence techniques to analyze past orders and recommend the most popular and frequently ordered combinations. The system can also take intoconsideration the customer's order history and preferences, and suggest personalized combo offers based on that. The system can use natural language processing to understand customer messages and respond with appropriate suggestions, such asrecommending popular dishes, providing cooking time for specific dishes, and suggesting nearby placesto visit during the cooking time. The voice assistant can be integrated with the system to provide a moreinteractive and user-friendly experience forcustomers. The system can also include features suchas real-time order tracking and feedback collection toensure a seamless, satisfactory customer experience.

VI. METHODOLOGY

The proposed method aims to develop a food ordering website integrated with an AI voice assistant to enhance the user experience. Themethodology for this project will be an agilesoftware development approach that includes requirements gathering, designing, implementation, testing, and deployment.

The first step in the methodology is to gather requirements by understanding the user's needs and the business requirements. This includes identifying the features required for the website, such as the ability to place an order, search for restaurants and food items, view menus, and receive suggestions from the AI voice assistant. The requirements-gathering phase will also include defining the project scope, timelines, andbudget.

The next step is to design the website's user interface and the AI voice assistant's conversation flow. This will be done by creating mockups andwireframes of the website's pages and the voice assistant's dialogues. The design will also includeselecting the colors, fonts, and images that will beused in the website's front end.

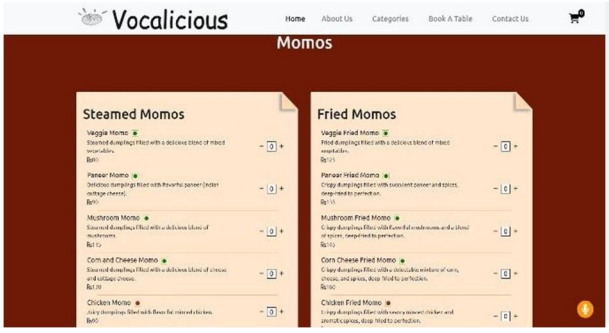
After the design phase, the implementation of thewebsite and the AI voice assistant will be done. The website will be developed using webdevelopment technologies such as HTML, CSS, JavaScript, and PHP. The AI voice assistant willbe built using Natural Language Processing (NLP) and Machine Learning (ML) techniques. The AI voice assistant will be integrated with thewebsite, allowing users to interact with it while browsing the website.

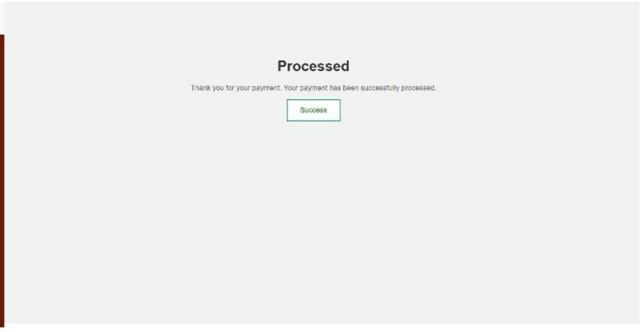
Once the implementation phase is completed,testing will be carried out to ensure that the website and the AI voice assistant are working asexpected. This includes testing the website's functionality, usability, and performance, as wellas testing the AI voice assistant's ability to understand and respond to user queries accurately.

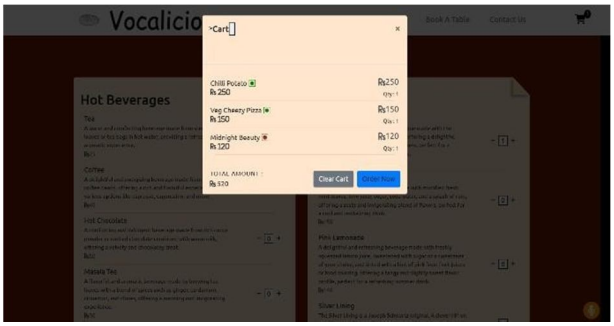
Finally, after testing, the website and the AI voiceassistant will be deployed to a productionenvironment. This involves uploading the website's files to a web server and configuring it to work correctly.

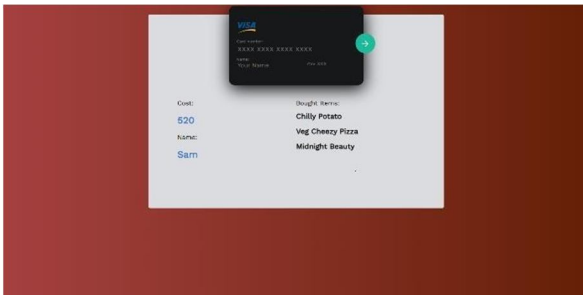
The AI voice assistant will also be deployed to a cloud-based platform such as Amazon Web Services (AWS) or Google Cloud Platform (GCP), allowing itto be accessed by users from anywhere in the world. The proposed methodology for developing a food ordering website with an AI voice assistant involves an agile software development approach that includesrequirements gathering, designing, implementation,testing, and deployment. This methodology will ensure that the website and the AI voice assistant are developed efficiently and meet the user's needs whilealso being scalable and maintainable.

VII. RESULT









VIII. CONCLUSION

Vocalicious is a food ordering website with an AI voice assistant and WhatsApp integration along with the suggestion of nearby places and best combo offers that can significantly enhance the user experience in food ordering. With the advancements in AI technology and the increasedusage of messaging applications like WhatsApp,this project can provide a competitive edge in thefood ordering industry. The design of the front end and back end is crucial for the success of theproject, and the chosen technologies and tools should be carefully evaluated. Furthermore, continuous updates and improvements based on user feedback can ensure the system's success andcustomer satisfaction. Overall, the project has thepotential to revolutionize the food ordering. process and make it more accessible and convenient for users.

IX. ACKNOWLEDGEMENT

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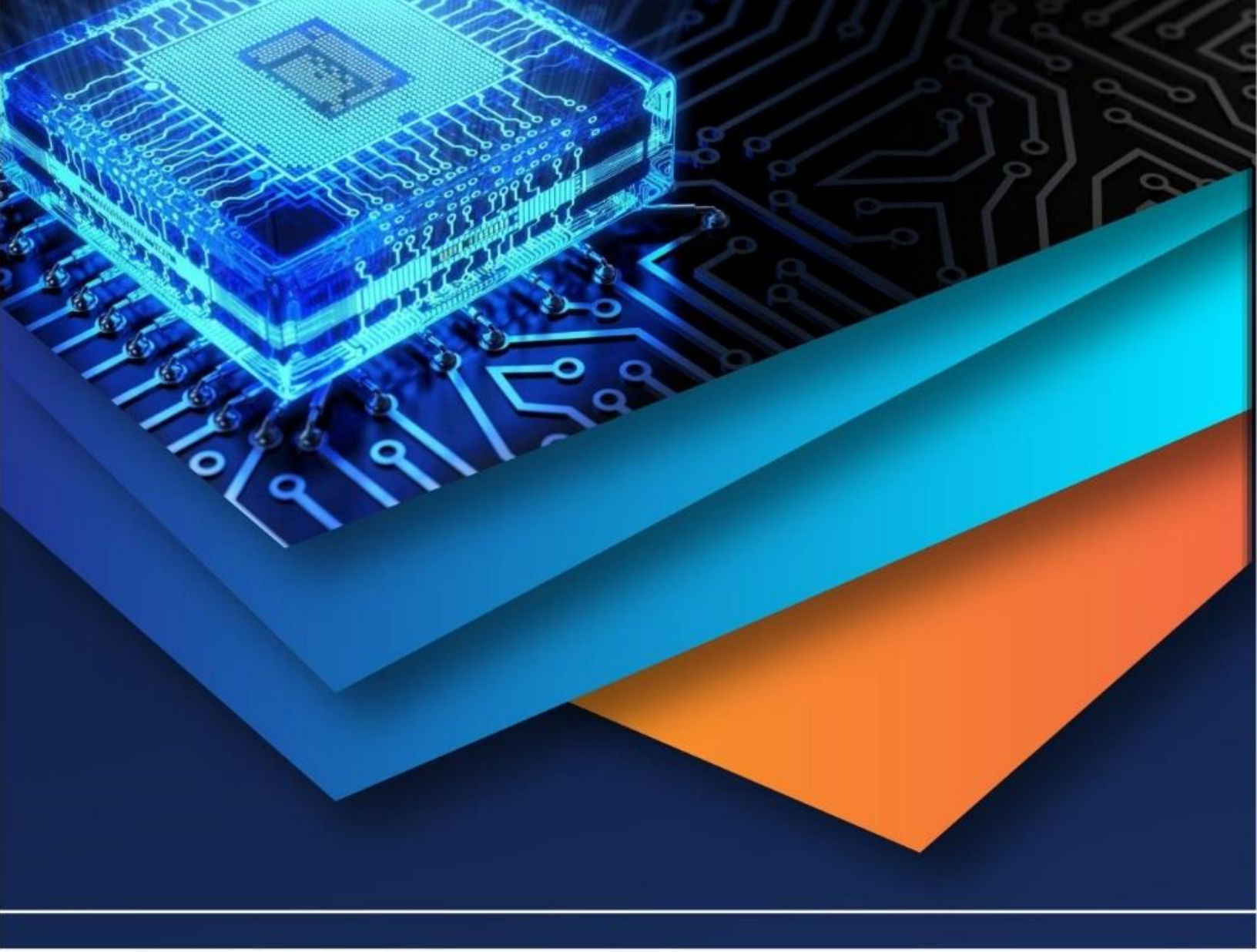

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