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AI ChatBot for Android App

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Abstract: ***This abstract outlines the development of an AI-based chatbot solution designed to enhance user experience within Android applications. The chatbot serves as a virtual assistant, guiding users through different segments of the queries and facilitating various actions. It offers real-time suggestions to users, highlighting features and solutions that users may not be aware of, ultimately leading to a more efficient and intuitive application experience. The primary objective of this AI chatbot is to empower users by simplifying user understanding through an android app. This navigation assistance spans from basic tasks such as finding specific features to more complex questions, making it an valuable tool for both novice and experienced users. Moreover, the AI chatbot goes beyond mere guidance by offering proactive suggestions and leveraging its understanding of user preferences.***

Keywords: ***Natural Language Processing (NLP), User Interface(UI), Quick Response, Android App, Free to use, Intent Recognition.***

I. INTRODUCTION

All that is required for an Android Chatbot is an Android application. AIML, or artificial intelligence and machine learning, is used in the development of the Trust chatbot programme, which analyses and comprehends user messages. Answers to user questions are provided via this system, an android application. To begin a conversation, users only need to voice or type their query to the bot. To respond to the query, the system employs a built-in algorithm. Artificial Intelligence (AI) chatbots are chatbots that interpret and react to user input using AI methods like Natural Language Processing (NLP). Numerous functions, from simple question responding to major problem solving, can be encoded into these chatbots. AI chatbots are especially helpful in customer service, where they can offer consumers prompt, individualised support. Artificial intelligence chatbots growing in popularity as a means of giving consumers effective, personalized help. The study of how computers and human (natural) languages interact is known as natural language processing (NLP), which is an area of linguistics, computer science, and artificial intelligence. A class of models known as transformative-based models has shown great effectiveness in a variety of natural language processing tasks, including text categorization, language modelling, and machine translation. The self-attention mechanism, which enables the model to "pay attention" to distinct portions of the input sequence when processing it, is the fundamental concept underlying transformers. This is not the case with classic NLP models, which usually process the input using fixed-length context windows. Transformers have several advantages over other models, one of which is their superior ability to manage long-range dependencies. The model is able to "see" the complete input sequence at once, instead of just a little context window encircling each word, thanks to the self-attention mechanism. There are other variants on the transformer concept, including the GPT (Generative Pre-Training Transformer) and BERT (Bidirectional Encoder Representations from Transformers) models. These models have won numerous industry awards and produced state-of-the-art outcomes on a variety of NLP tasks. In response to user inquiries, the system offers pertinent responses. Instead of having to visit the trust in person to make inquiries, the user can utilise the application to ask questions regarding any actions relating to the trust. The application responds with a powerful Graphical User Interface (GUI). Text is entered into the chatbot. Text input/output is comparatively efficient since the user can verify the input for errors and recheck it if necessary. Giving text input takes time, though. Thus, integrating text interface with intent recognition technology is the answer.

II. LITERATURE REVIEW

The goal of the discussion is to create tools that will assist people, let them work better, and allow them to communicate within an android mobile as natural language. It is not intended to take on the role of a person or even remotely mimic human speech. In the homeroom, chatbot innovation may also be used as a teaching and learning tool. The issue of answer selection for lengthy talks in retrieval-based chatbots was examined by Wu and Al's research team [1]. Finding a method to match a response candidate to the context of a particular conversation while keeping in mind the connections between speeches within the context was the aim. The authors suggested a brand-new framework known as the sequential matching framework (SMF), which employs an RNN to compile matching vectors for the context and answer after converting the context into a fixed length vector. The SMF outperformed current state-of-the-art matching techniques when evaluated on two public datasets.

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Shamim-AI-Mamun and Md. Shahriare Satu [2] reviewed the chatbot apps that are created with AIML scripts. They claimed that chatbots powered by AIML are lightweight, simple to use, and effective. The technique is called Pattern Matching Algorithm. In order to obtain the longest pattern matching and determine which is the best, the AIML interpreter matches words for words. A set of files and directories known as Graphmaster, which contains a set of nodes known as nodemaster and branches that represent the first words of all patterns and wildcard symbols, can be used to explain this behaviour.

Unnati Dhavare and Umesh Kulkarni presented the idea of employing artificial intelligence (AI) for natural language processing [3]. This approach allows for speech, text, or image input and output from the system. Natural language processing, or NLP, techniques are used to process the input. In the end, you will be able to speak to your computer as if it were a human being thanks to the development of Natural Language Processing (NLP) software, which aims to create, analyse, and comprehend human languages.

Neha Atul Godse and others in team, through the use of many technologies, including machine learning[4], natural language processing, and integrated dialogue tools, the IBM Watson Conversation service facilitates communication between people and applications. After the user provides input to the chatbot via the chat application, a REST API connection is made to a chatbot plugin to receive the data. A ticket is created by the end user for any reason, problem, or inquiry. This inquiry is queued up for assignment to an ITSM department staff member. The end user must wait till an ITSM employee is assigned to answer his question.It could take a few days, which would prevent him from finishing his assignment.

Gunasekara, Lakindu, and Kaneeka Vidanage [5] used OWL (Web Ontology Language) verbalizers, goods created with OWL verbalizers, and ontology-based chatbots are the three categories in which they have talked about product relatedness. Examining the aforementioned products reveals that none of the verbalizers have concentrated on using OWL verbalizers on chatbots to generate responses, and the majority of the ontology-based chatbots use a static response generation or multiple methods in one component, making the architecture complex. Neither of the verbalizers nor the ontology-based chatbots have used the semantic web approach to develop results.

TABLE. 1 LITERATURE REVIEW

	References taken from other researches/work		
Slno	Title	Author's	Work
1	Dialogue-Oriented Interface for Linguistic Human-Computer Interaction: a Chat-based Application.	Vincenzo Di Lecce, Marco Calabrese Domenico Soldo, Alessandro Quarto- 2010	A design framework for building dialogue oriented chat-based interfaces to leverage HCI at the linguistic level has been proposed
2	An Intelligent Question Answering Conversational Agent using Naïve Bayesian Classifier.	Niranjan.M, Saipreethy.M.S., Gireesh Kumar.T. - 2012	An intelligent question answering system has been developed using the Naïve Bayesian concept.
3	Augmenting Industrial Chatbots in Energy Systems using ChatGPT Generative AI.	Gihan Gamage , Sachin Kahawala, Nishan Mills , Daswin De Silva , Milos Manic , Damminda Alahakoon , Andrew Jennings	Proposed a new architecture for the augmentation of pre existing chatbot using ChatGPT generative AI capabilities.
4	An overview of chatbot technology.	E. Adamopoulou and L. Moussiades. - 2020	Today's tech aims to reduce human involvement; chatbots excel in broad messaging outreach.
5	A literature survey of recent advances in chatbots.	G. Caldarini, S. Jaf, and K. McGarry. - 2022	The art in terms of language models, applications, datasets used, and evaluation frameworks.

III. METHODLOGY

A. *Existing System*

Over the past few years, numerous AI chatbots have been developed by various developers. To enhance the user experience, all developers wanted to build a bot that could personally answer any queries from users. Numerous chatbots were developed to find these kinds of findings, but for some reason, they started to lag due to a research gap that was not filled in a timely manner, making them outdated. Most of the chatbots are available for webpages and computers. Only limited Numbers of chatbot applications are available, in which only limited numbers of responses were retrieved. If an user wanted more responses , the user has to pay to get subscriptions. Below are the some already existing chatbots, they are

1) ELIZA: Instead of having a deep understanding, ELIZA just used basic pattern matching methods. This

2) Cleverbot: Due to a lack of methods and training data, it occasionally generates illogical and inconsistent results.

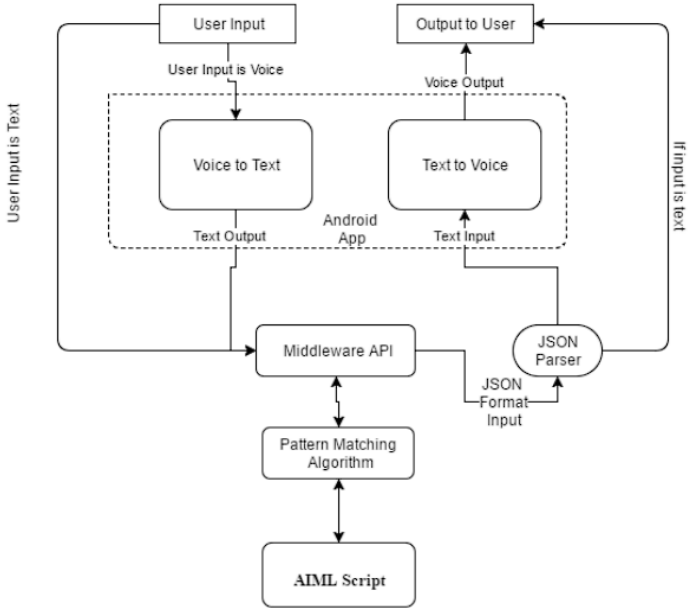


Fig. 1 Existing Architecture of Android chatbot

B. *Proposed System*

The technology used in the natural learning process takes the keywords entered by the user, extracts relevant results from the database, and shows the outcome on the screen. The middleware API receives the user input and returns the response.

1) *Natural Learning Processing (NLP)*: Natural Language Processing is a field of artificial intelligence that focuses on the interaction between computers and humans through natural language. Our proposed methodology uses NLP(Natural Language Processing) and NLU (Natural Language Understanding) along with ML that focuses on the interaction between computers and humans through natural language.

2) *Application Programming Interface (API):* Several APIs like Sentiment Analysis API, Knowledge Base APIs are used in this methodology. The Sentiment Analysis API like Google cloud Natural Language Processing analyzes text to determine the sentiment expressed, providing insights into whether the content is positive, negative, or neutral. The Knowledge Base API allows seamless access to information repositories, with notable options including Microsoft Azure Cognitive Search, Amazon Kendra, and Elasticsearch.

3) *BrainShop AI:* BrainShop offers an easy-to-use API so you can quickly incorporate the chatbot into your projects. Use our chat widget to install the chatbot quickly if you intend to add it to a website. You may integrate the chatbot onto your website in a matter of minutes.

4) *Constant Learning and Improvement*: By putting in place systems for continuous learning and improvement, you can be confident that the chatbot will change over time, getting more accurate and efficient at responding.

5) *Dialog management:* Putting in place a strong dialogue management system guarantees that user and chatbot interactions are consistent and helps to organise the flow of the conversation.

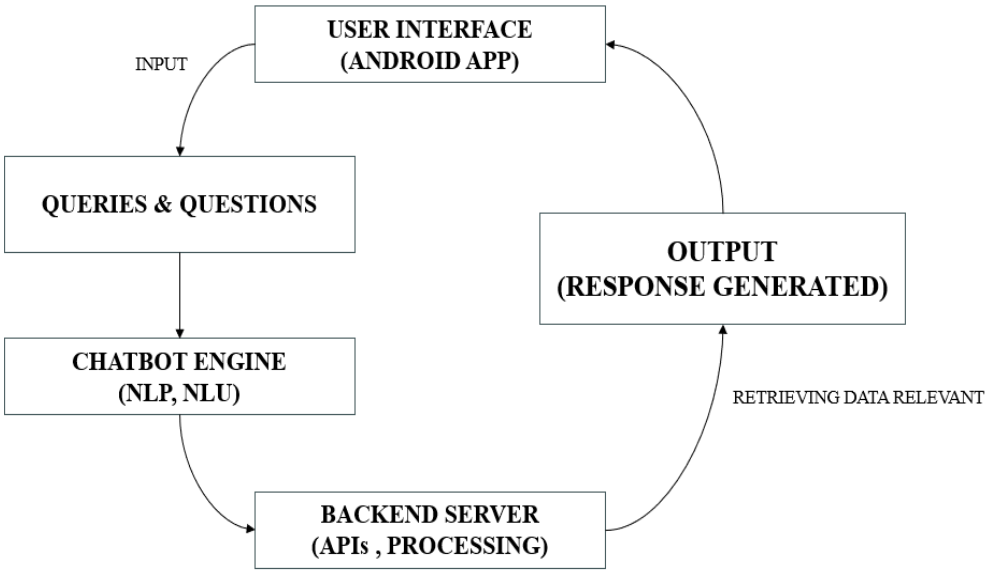


Fig. 2 Workflow of the proposed model

When we discuss natural language processing (NLP), we are discussing a vast area of artificial intelligence that includes numerous approaches such as LSTM, word2vec, fasttext, and PoS (part of speech) for the NLU (Natural Language Understanding).

C. Building NLP for ChatBot

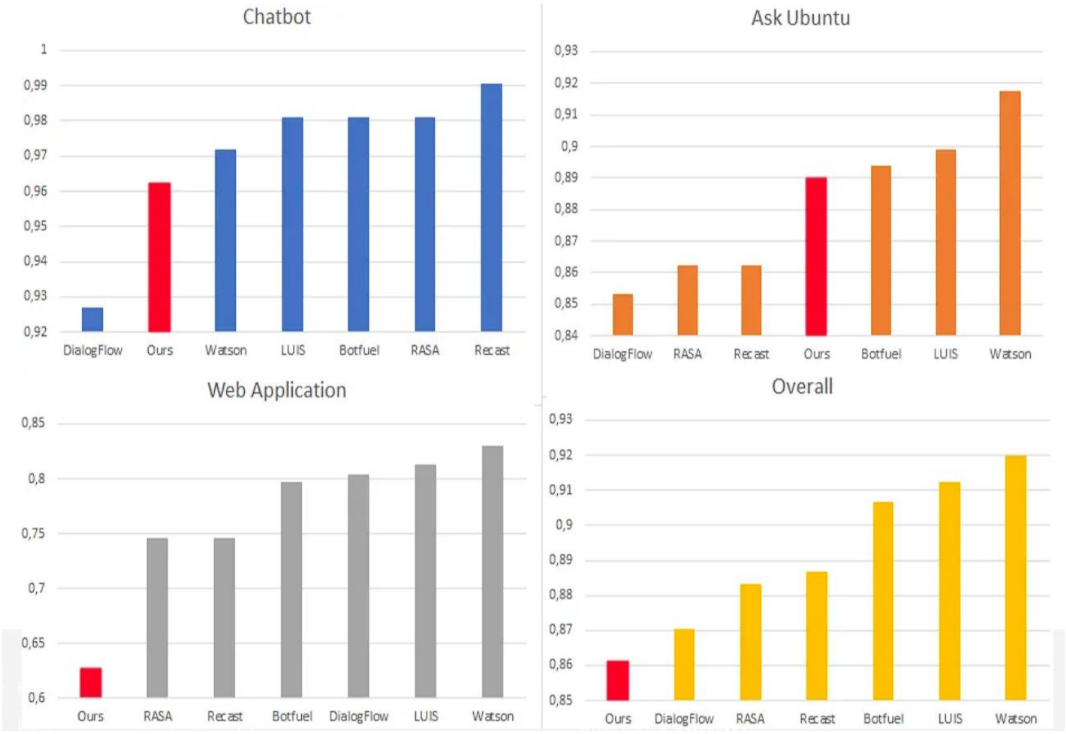


Fig. 3 A sample graph shows is still the worst out of all the providers because it performs horribly on the Web Application corpus, but it does better on the Chatbot Corpus than DialogFlow, and it ranks in the middle on Ask Ubuntu.

The sigmoid activation function is the optimum for our case; nevertheless, the tanh or leaky ReLU.

D. Activation Function

Tanh or leaky activation functions work best for our issue, whereas sigmoid activation functions are the default. Neural networks, such as the ones used to create chatbots, depend heavily on activation functions. The model's capacity to learn from and generalise from the data may be impacted by the activation function selection. Let's talk about the potential applications of the activation functions—tanh, leaky ReLU, and sigmoid—in chatbot development.

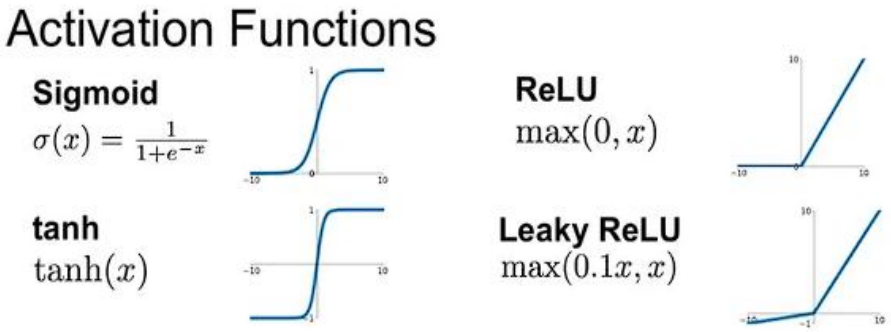


Fig. 4 Activation Function

The particulars of your chatbot task will determine the activation function to use. Leaky and tanh A sigmoid is excellent for binary classification applications, but ReLU can be useful in capturing more complicated patterns. For maximum performance in chatbot generation, it is common practise to combine these activation functions in different layers of a neural network. Finding the ideal architecture for your particular use case requires trial and error as well as fine adjustment.

After training the chatbot with Activation functions and properly implemented the Neural Networks with the help NLP , the following graph was recorded.

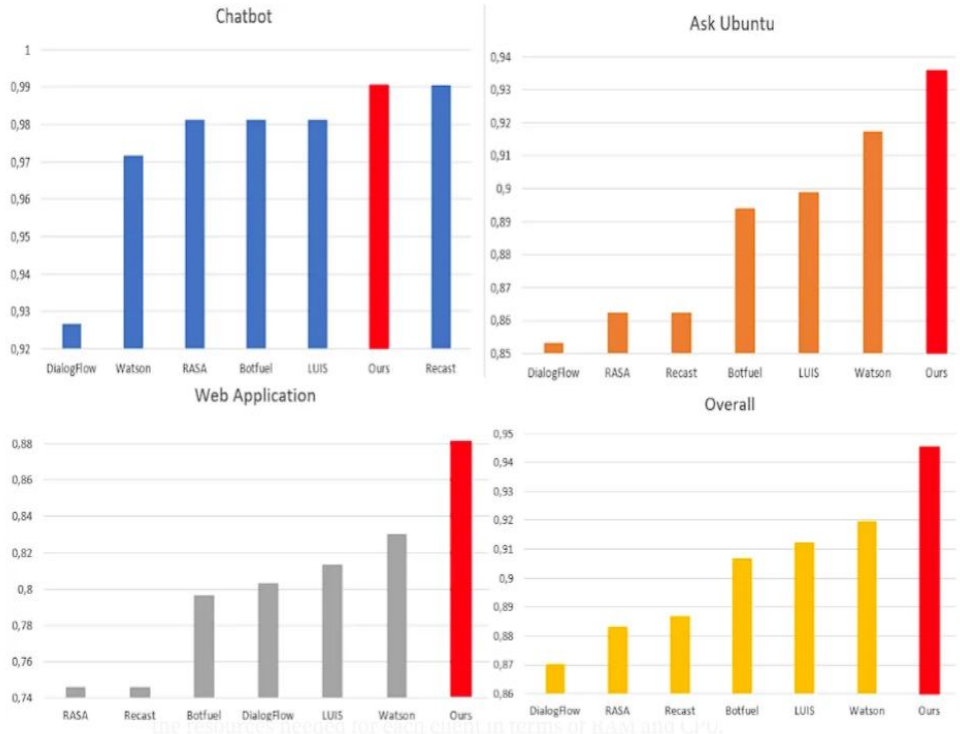


Fig. 5 we can see the Chatbot implemented with NLP using Neural networks broke all the records!.

E. BrainShop AI

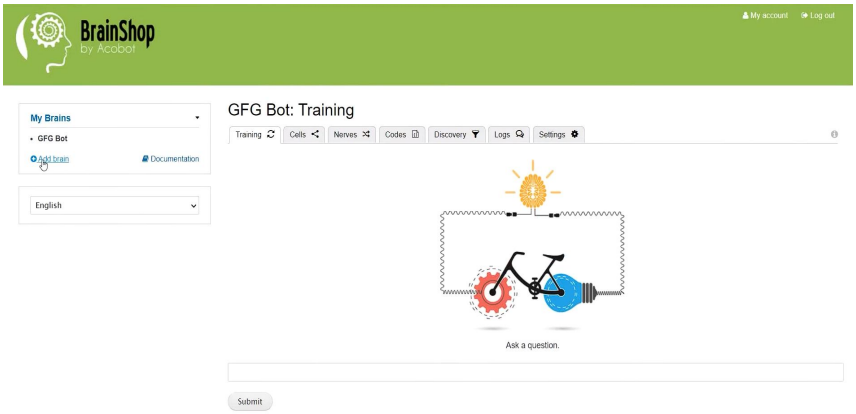


Fig. 6 BrainShop by Acobot (OpenAI).

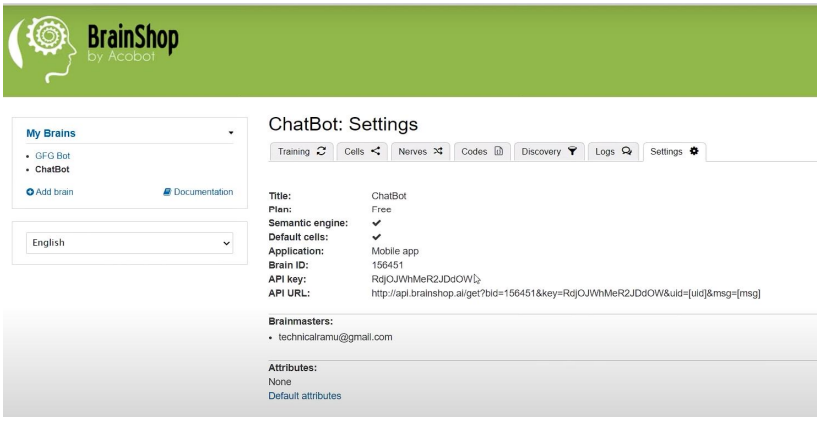


Fig. 7 The API key generated after creating API for the Android App.

IV. CONCLUSION

In conclusion, developing an AI chatbot for an Android app offers numerous opportunities to enhance user experiences, automate tasks, and provide efficient and personalized support. The key components for such a chatbot include NLP capabilities, backend integration, and the use of relevant APIs and libraries. By carefully planning the architecture and selecting the right tools, developers can create a powerful chatbot that engages users, improves efficiency. AI chatbot for Android can be a valuable addition to your app, catering to the ever-growing demand for AI-driven, text-based conversational experiences. The work had been made easier in several places by the natural language processing system's entire procedure. With a few lines of code, neural networks, and a logical procedure, we can comprehend natural language for Chatbot environments quite effectively.

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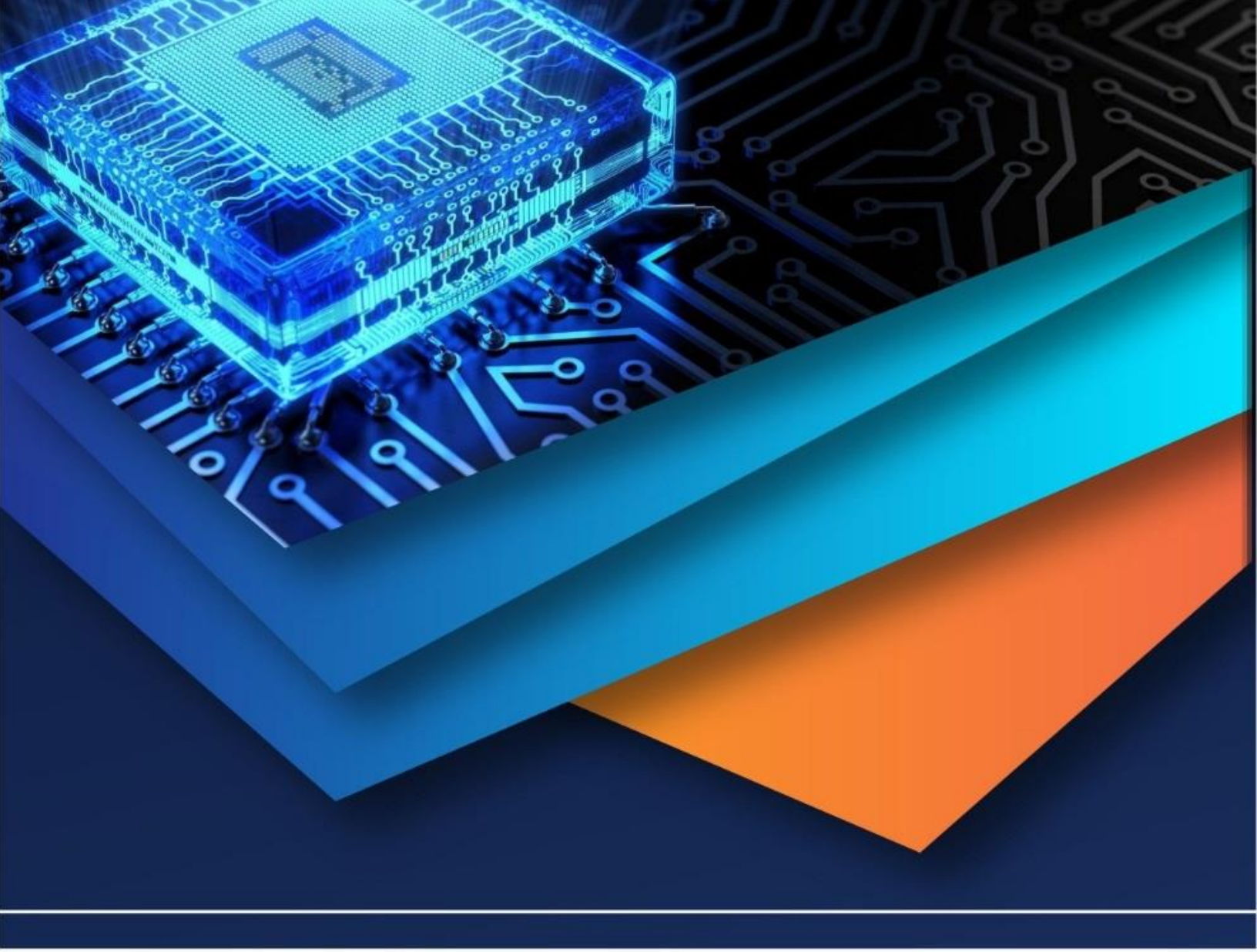
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