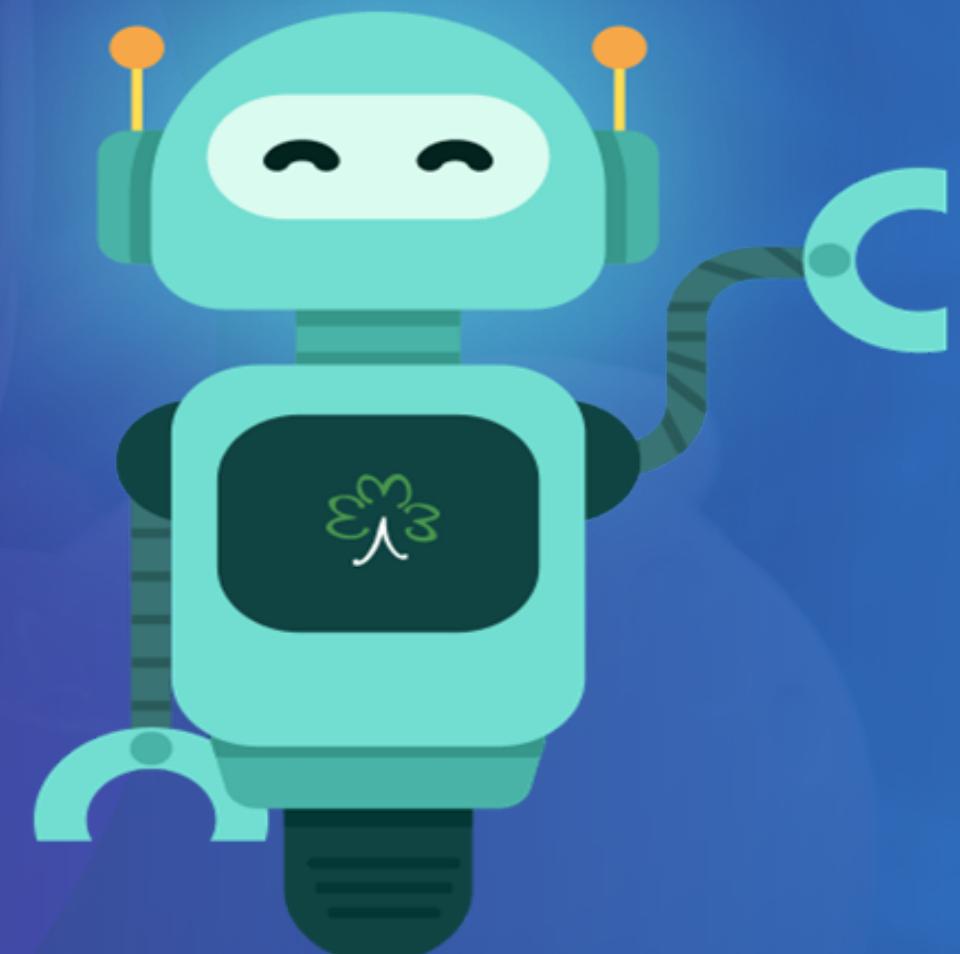


CHATBOT

A presentation on chatbot by the students of Information
Technology-

- Arkya Ghosh
- Ananya De
- Aritra Sen

under the mentorship of Dr Surajit Kumar Roy



TEAM MATES



**ARKYA
GHOSH**



**ARITRA
SEN**



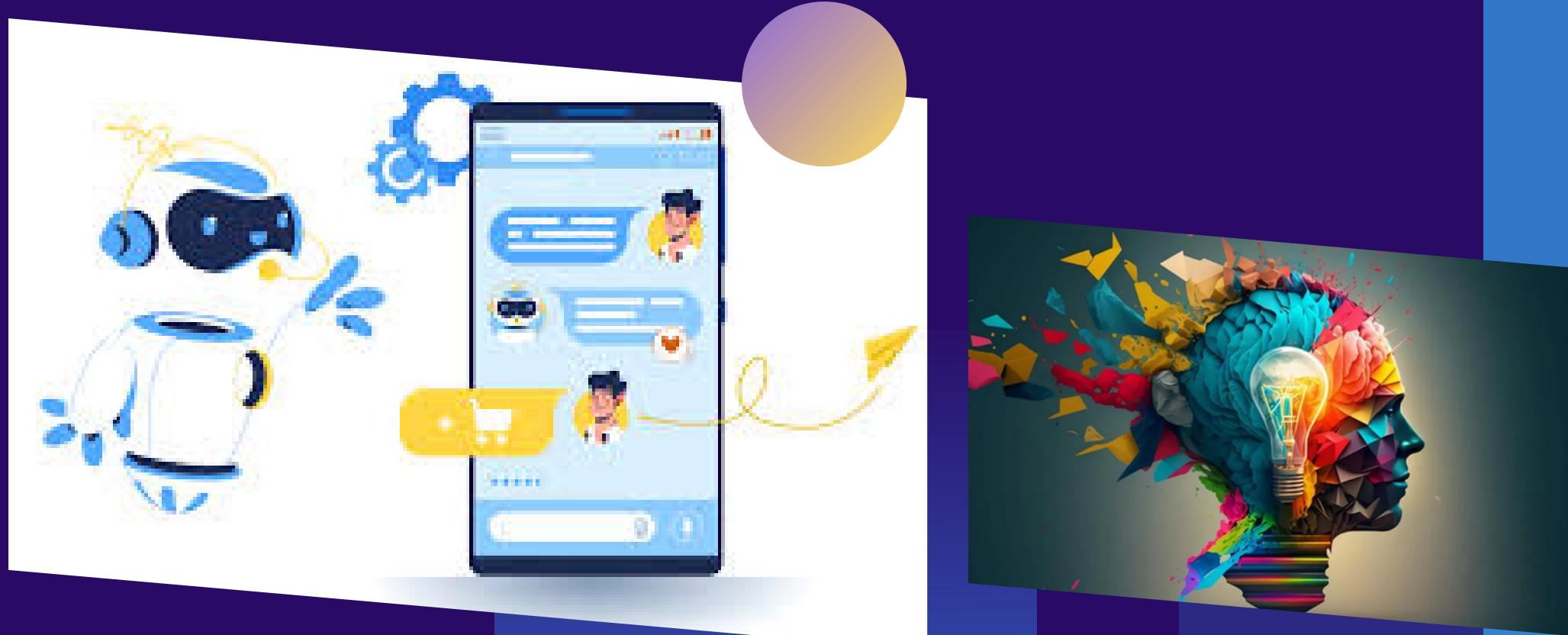
**ANANYA
DE**

OUR MENTOR



**Dr SURAJIT
KUMAR ROY**

What prompted the idea of chatbot?



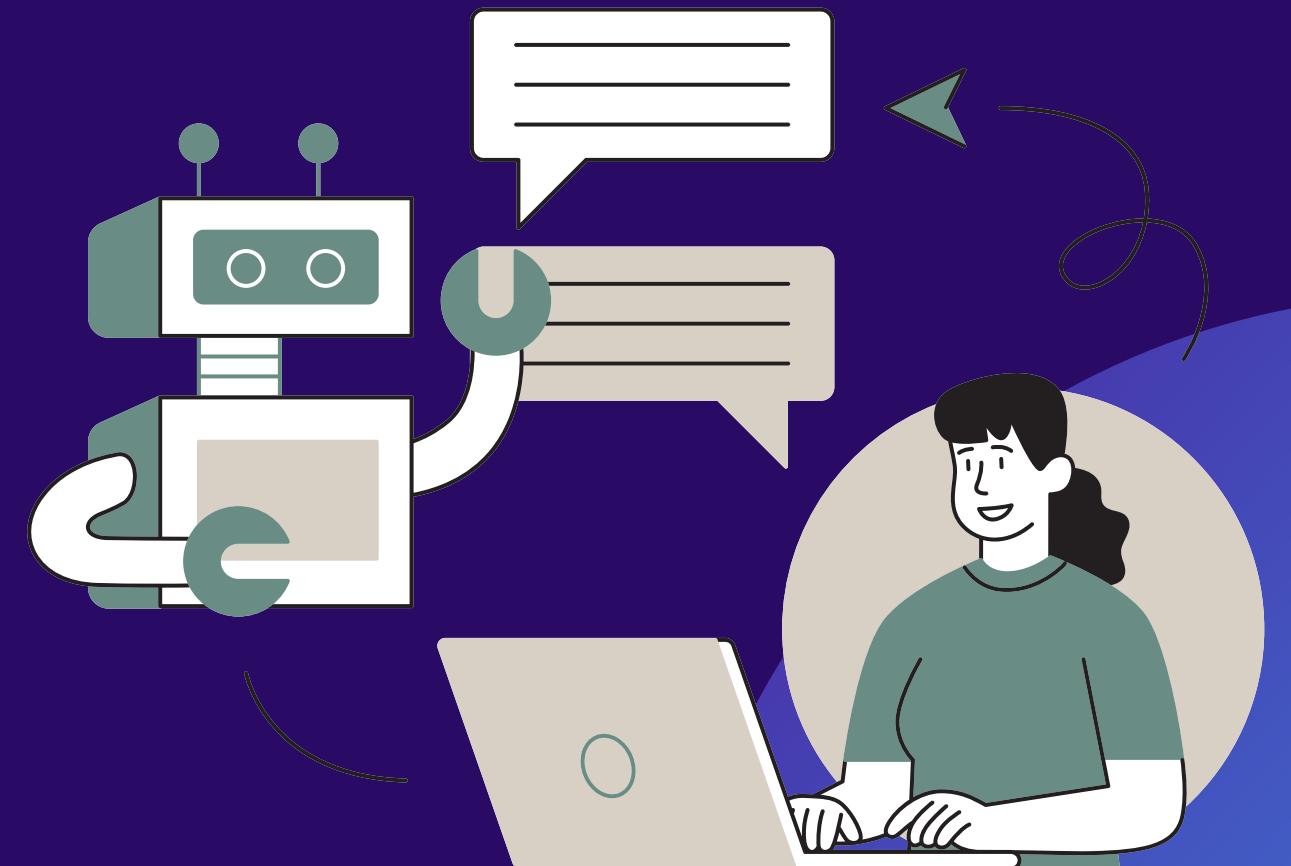
**“Modern Problem,
Modern Solution**

WHAT IS A CHATBOT?

A chatbot is a software application that uses artificial intelligence (AI) to simulate a conversation or interaction with human users via messaging or speech-based interfaces. Chatbots are designed to understand natural language input from users and respond with relevant information or actions.

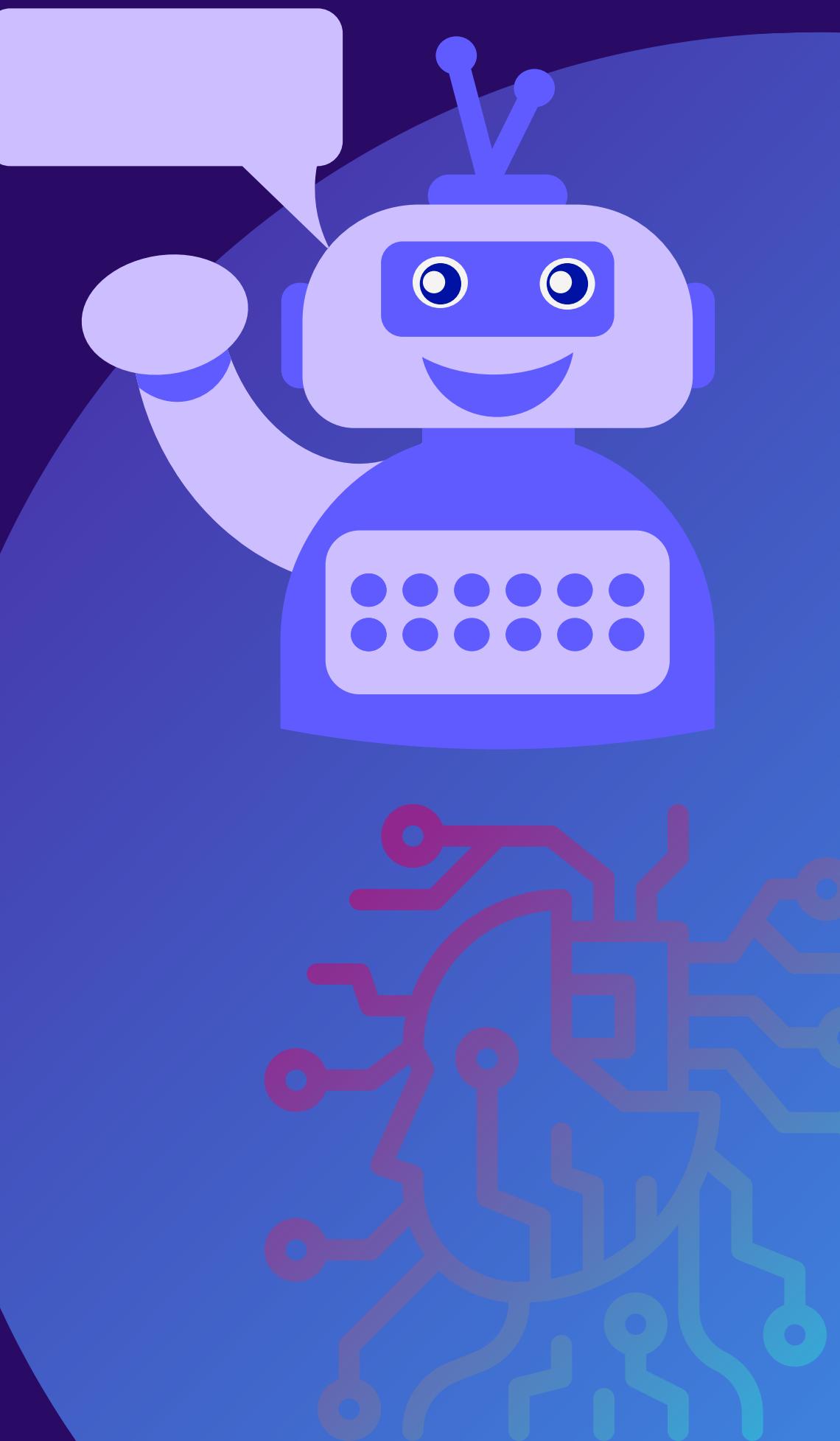
TYPES OF CHATBOTS

- AI Based chatbot
- Rule Based chatbot



AI Based ChatBot

- An AI-based chatbot is a chatbot that uses artificial intelligence (AI) technologies such as natural language processing (NLP), machine learning (ML), and deep learning (DL) to understand and respond to user queries and requests.
- They can also handle more complex requests and provide more accurate and relevant information to users.
- AI-based chatbots can be used in a wide range of applications, including customer service, e-commerce, healthcare, education, and many others. They can help businesses improve customer satisfaction, reduce costs, and increase efficiency by automating tasks and providing round-the-clock support.

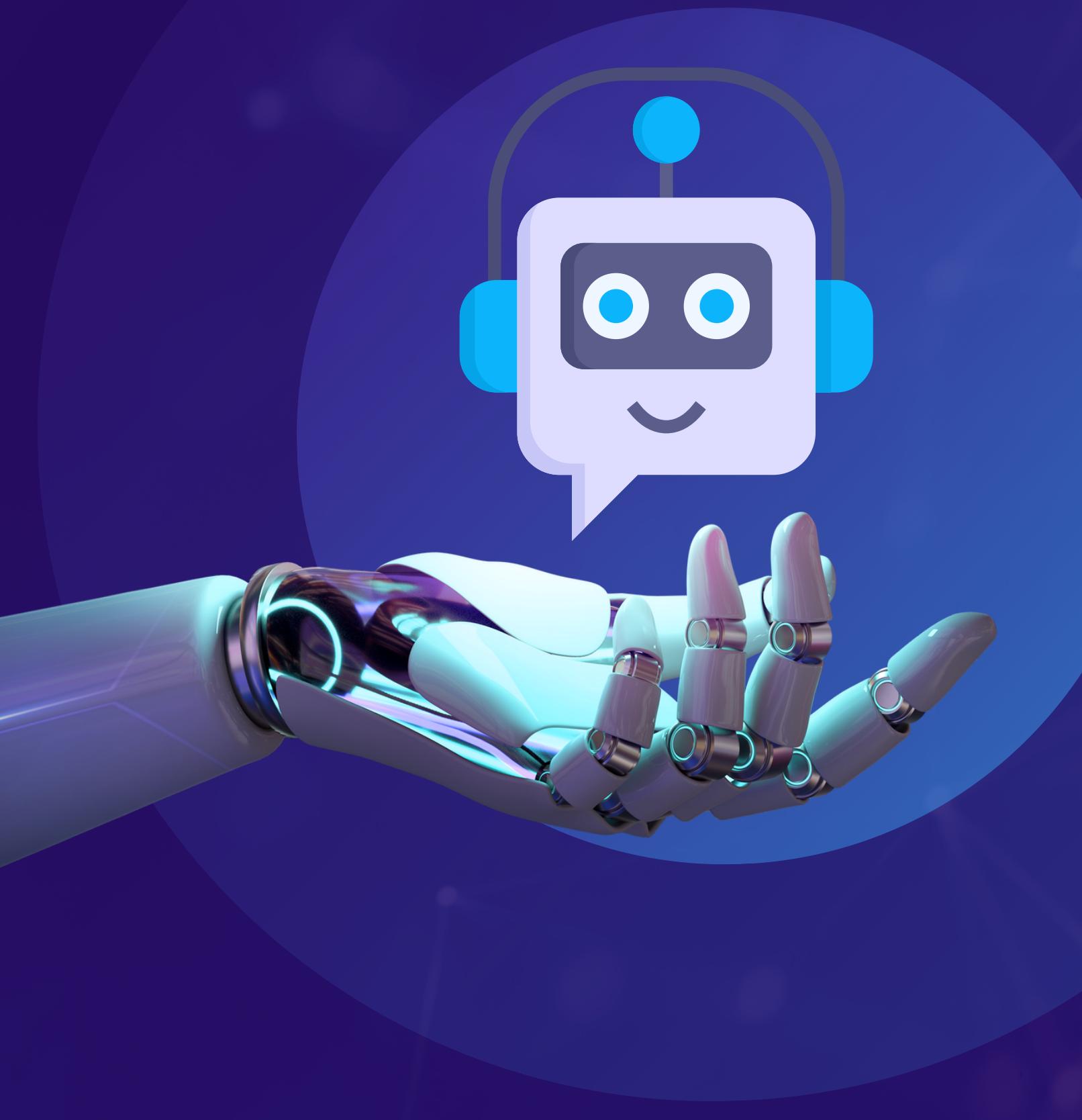


RULE BASED CHATBOT

- A rule-based chatbot is a type of chatbot that operates based on a predefined set of rules and responses. Rule-based chatbots use a decision tree or if-then-else statements to determine the appropriate response to user queries and requests.
- Rule-based chatbots are typically less complex than AI-based chatbots and are easier to implement and maintain. However, they are also less flexible and less capable of handling complex queries and requests.



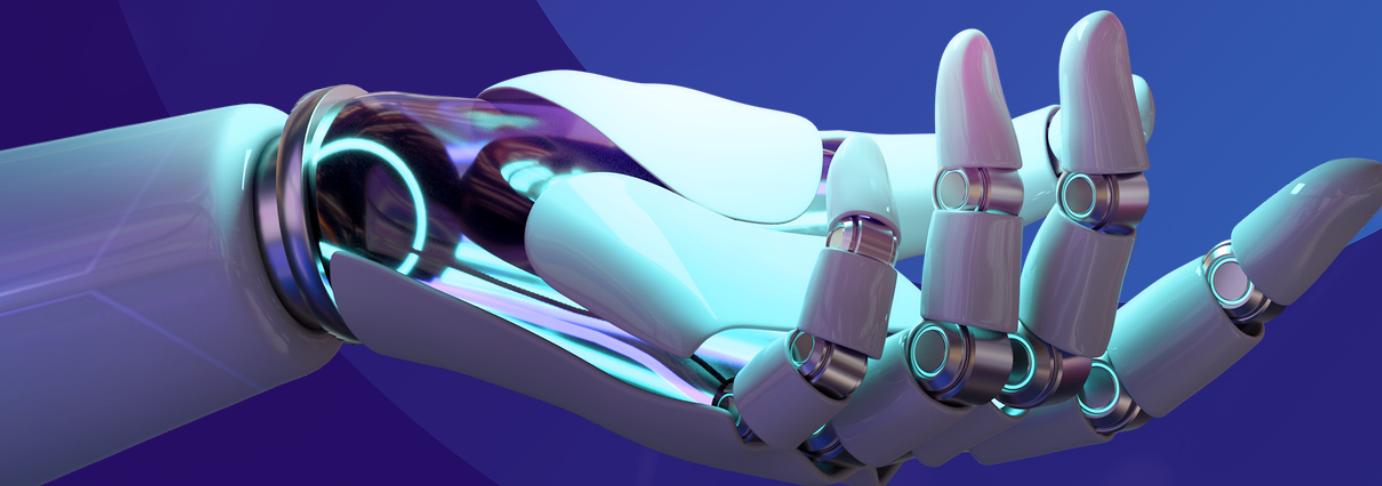
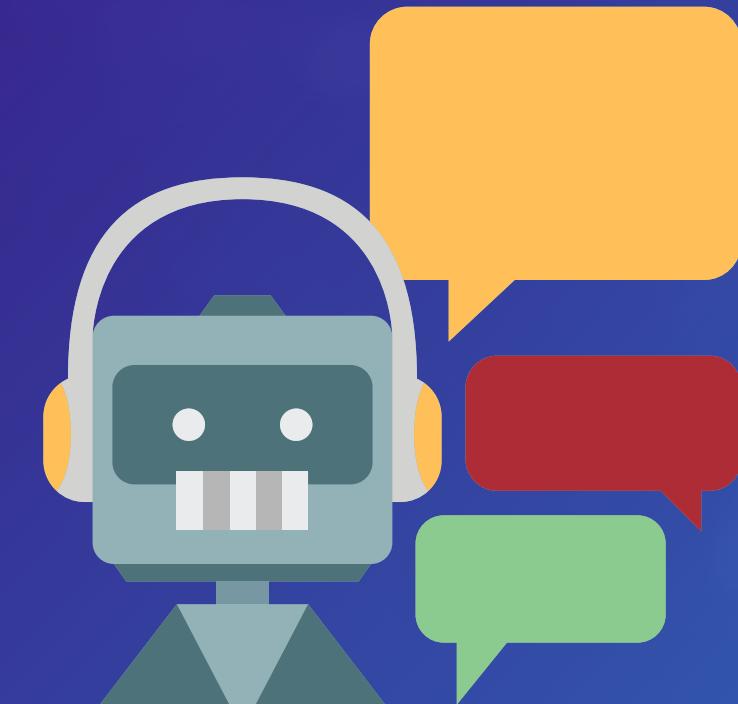
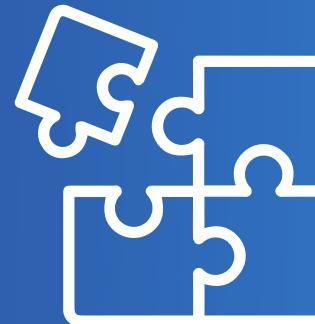
USES OF AI BASED CHATBOT



AI-based chatbots can be used in a wide range of applications, including customer service, e-commerce, healthcare, education, and many others. They can help businesses improve customer satisfaction, reduce costs, and increase efficiency by automating tasks and providing round-the-clock support.



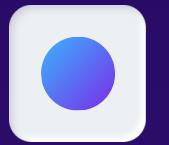
USES OF RULE BASED CHATBOT



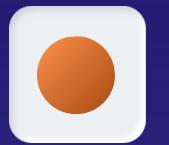
Rule-based chatbots are often used in simple applications, such as FAQ (Frequently Asked Questions) pages, where the questions and answers are already defined. They can also be used in situations where the responses to user queries are predictable, such as scheduling appointments or providing basic product information.



Why we chose to ⁰⁴create AI based chatbot?



AI chatbots can learn and improve over time through user interactions, so you do not need to have a complete set of rules in place from the start. This means that you can start with a simple chatbot and gradually add more features and capabilities over time as the chatbot learns from user interactions.



A rule-based chatbot requires a more comprehensive understanding of the specific use case and the potential user input and responses that need to be programmed in advance. This can require more upfront planning and development effort. We faced a great problem when we tried to create the dataset for rule based chatbot.



If the chatbot needs to handle a wide range of user input and provide more complex responses, an AI chatbot may be a better choice.

01

FRONTEND

Designing the frontend of
the chatbot

STEPS

03

02

BACKEND

Designing the backend
(working) of the chatbot

Hosting

Hosting the chatbot to make it
accessible for all.

CHATBOT ARCHITECTURE

- **Front-end:** The front-end of a chatbot is the user interface that users interact with to communicate with the chatbot. This can include a chat window or voice assistant device. The front-end can also include natural language processing (NLP) components that enable the chatbot to understand and interpret user input.
- **Back-end:** The back-end of a chatbot is responsible for processing and generating responses to user input. This can include machine learning algorithms, natural language generation (NLG) components, and decision-making engines that help the chatbot understand the user's intent and provide relevant responses.
- **Database:** The database is where all of the chatbot's data is stored, including user information, conversation logs, and other relevant data. This data can be used to train the chatbot and improve its performance over time.

CHATBOT ARCHITECTURE

- **Pattern Match:** Chatbots use pattern-matching techniques to classify textual inputs and provide appropriate responses. Developers create repetitive behaviors using message patterns that match parts of customer messages. Chatbots can only answer questions if specific words are present in the patterns.
- **Algorithms:** To get the chatbot ready with adequate responses, developers create a hierarchy with the permutation and combination of different patterns. Algorithms help make the structure more manageable by reducing the total number of different types of classifiers.

How Do Chatbots Work?

Chatbots Work on 3 Basic Models



USER INTERFACE

- Chatbot UI appears as a chat window or bubble.
- Users interact by typing messages.
- NLP is used to understand user inputs and provide responses.
- Chatbots may offer suggestions or prompts.
- Visual aids such as images or videos can enhance the user experience.
- Chatbots can be integrated with other applications for additional functionality.
- UI should be user-friendly with clear instructions and feedback.

OUR USER INTERFACE

The screenshot shows a dark-themed chat application interface. The conversation log is as follows:

- User: Hello
- Bot: Hi there! How can I help you?
- User: What is a chatbot?
- Bot: A chatbot is a computer program designed to simulate conversation with human users, especially over the Internet. Chatbots are used in a variety of applications, such as customer service, information retrieval, and automated online assistants.
- User: What are the types of chatbot?
- Bot: 1. Rule-Based Chatbots: These chatbots are programmed to respond to specific commands and keywords. They are designed to provide a set of predetermined responses based on the user's input.
2. AI Chatbots: These chatbots use artificial intelligence (AI) to understand user input and generate responses. They can learn from conversations and become more accurate over time.
3. Natural Language Processing (NLP) Chatbots: These chatbots use natural language processing (NLP) technology to understand user input and generate responses. They can interpret complex sentences, recognize intent, and extract information from conversations.
4. Voice-Enabled Chatbots: These chatbots use voice recognition technology to understand user input and generate responses. They can be used for voice-based interactions such as voice search, voice commands, and voice dictation.

At the bottom left is a text input field with the placeholder "Ask codex..." and a blue send button with a white arrow icon at the bottom right.

Natural Language Processing (NLP)

NLP is a crucial component in enabling chatbots to provide a seamless and natural conversational experience for users. By using algorithms and machine learning techniques to analyze, understand, and generate natural language, chatbots can understand and respond to user input in a conversational manner. NLP allows chatbots to identify intent and context behind user input, generate appropriate responses, and mimic human-like interactions, resulting in a personalized and engaging experience for users.

Natural Language Processing (NLP)

- NLP enables computers to interact with human language in a natural way
- Chatbots use NLP to understand and respond to user input in a conversational manner
- NLP allows chatbots to analyze intent and context behind user input
- Chatbots use NLP to identify keywords and generate appropriate responses
- NLP enables chatbots to generate grammatically correct and semantically meaningful responses
- Chatbots mimic human-like interactions, providing a personalized and engaging experience

Components of Natural Language Processing (NLP) used in chatbot

- Tokenization: Breaking down user input into individual units
- Part-of-speech tagging: Labeling each word in a sentence with its part of speech
- Named Entity Recognition (NER): Identifying and categorizing named entities
- Sentiment Analysis: Analyzing the tone and emotions behind text
- Intent Recognition: Identifying the underlying purpose or goal behind user input.

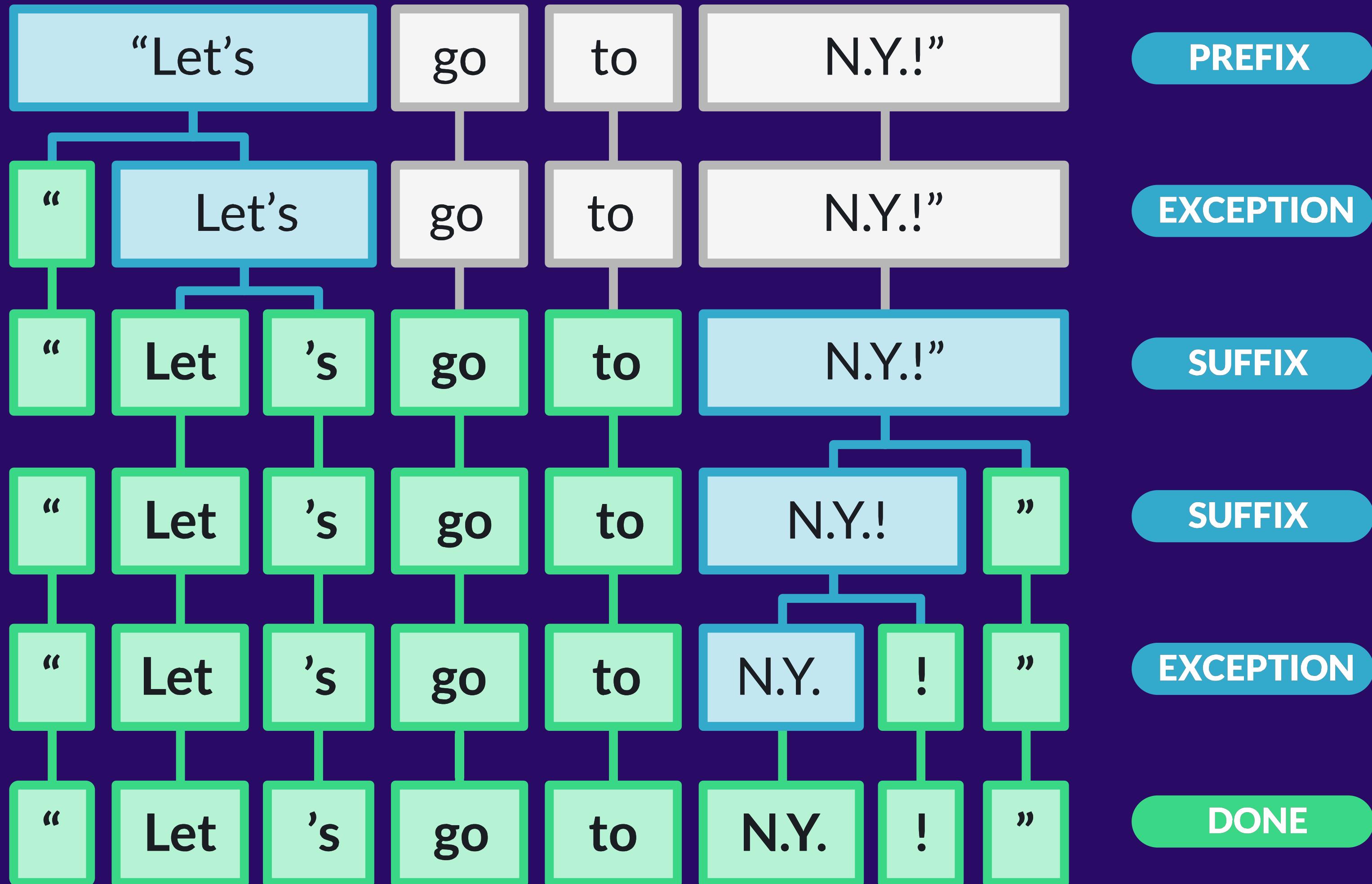
TOKENIZATION

- Tokenization is the process of breaking down a sentence or paragraph into individual units of meaning.
- Tokenization is a key component of NLP, which allows chatbots to analyze and understand user input in a more granular way.
- Tokenization can involve breaking text down into sentences, words, or phrases.
- Chatbots use tokenization to better understand user intent and provide more accurate responses.
- By breaking down input into smaller, more meaningful units, chatbots can analyze and respond to user queries in a more natural and conversational manner.

Part-of-speech (POS) tagging

- Part-of-speech (POS) tagging assigns each word in a sentence a specific part of speech, such as noun, verb, adjective, or adverb.
- POS tagging is critical in NLP, helping chatbots understand the grammatical structure of a sentence and the role of each word within it.
- Examples of POS tagging in chatbots include identifying verbs, nouns, and adjectives in a sentence.
- Identifying verbs helps chatbots understand the user's intent, while identifying nouns can be used to provide relevant responses.
- Identifying adjectives can help chatbots provide product recommendations and other personalized responses.

Here is an example of Tokenization of a sentence



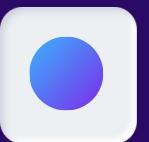
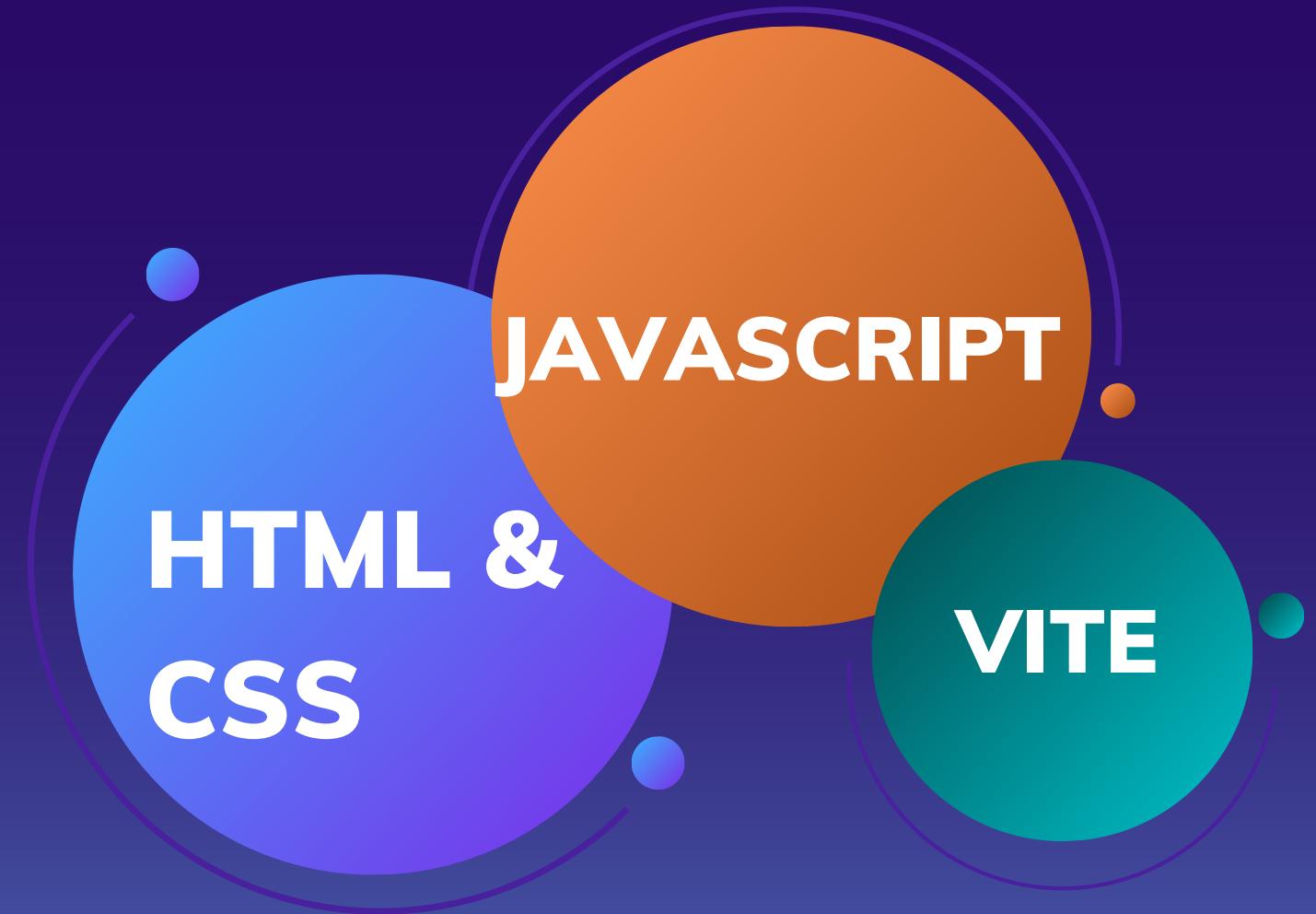
Machine Learning

- Machine learning algorithms are used to train chatbots to understand and respond to user input.
- The process starts with a large dataset of labeled examples of user input and corresponding responses.
- Chatbots use machine learning algorithms to analyze the dataset and learn patterns and relationships between input and output.
- Once trained, chatbots can apply what they've learned to new user input and provide a response based on their understanding.
- As chatbots interact with more users, they can continue to learn and improve their responses based on feedback.
- Types of machine learning algorithms used in chatbots include supervised, unsupervised, and reinforcement learning.
- Supervised learning is commonly used in chatbots, where the chatbot is trained on labeled examples of user input and corresponding responses.
- Unsupervised learning can help chatbots identify patterns and relationships in unstructured data such as text.

API

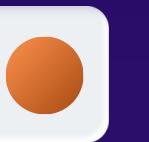
- API stands for Application Programming Interface.
- It is a set of rules and protocols that allow different software applications to communicate with each other.
- APIs enable developers to create new applications that can integrate with existing services or data sources.
- They are used extensively in web development, mobile app development, and other software applications.
- APIs can be classified into different types, such as RESTful APIs, SOAP APIs, and GraphQL APIs.
- Each type of API has its own set of protocols and specifications for communication and data exchange.
- APIs play a critical role in modern software development by enabling interoperability and integration between different systems and services.

FRONTEND



HTML AND CSS

Used to design the basic outlook of the UI



JAVASCRIPT

Add various functionalities like the 3 dots sign used as a loading button while the chatbot tries to fetch the answer.



VITE

Vite is used to build and bundle the JavaScript code of the chatbot front-end, which can then be integrated with the back-end implementation of the OpenAI API.

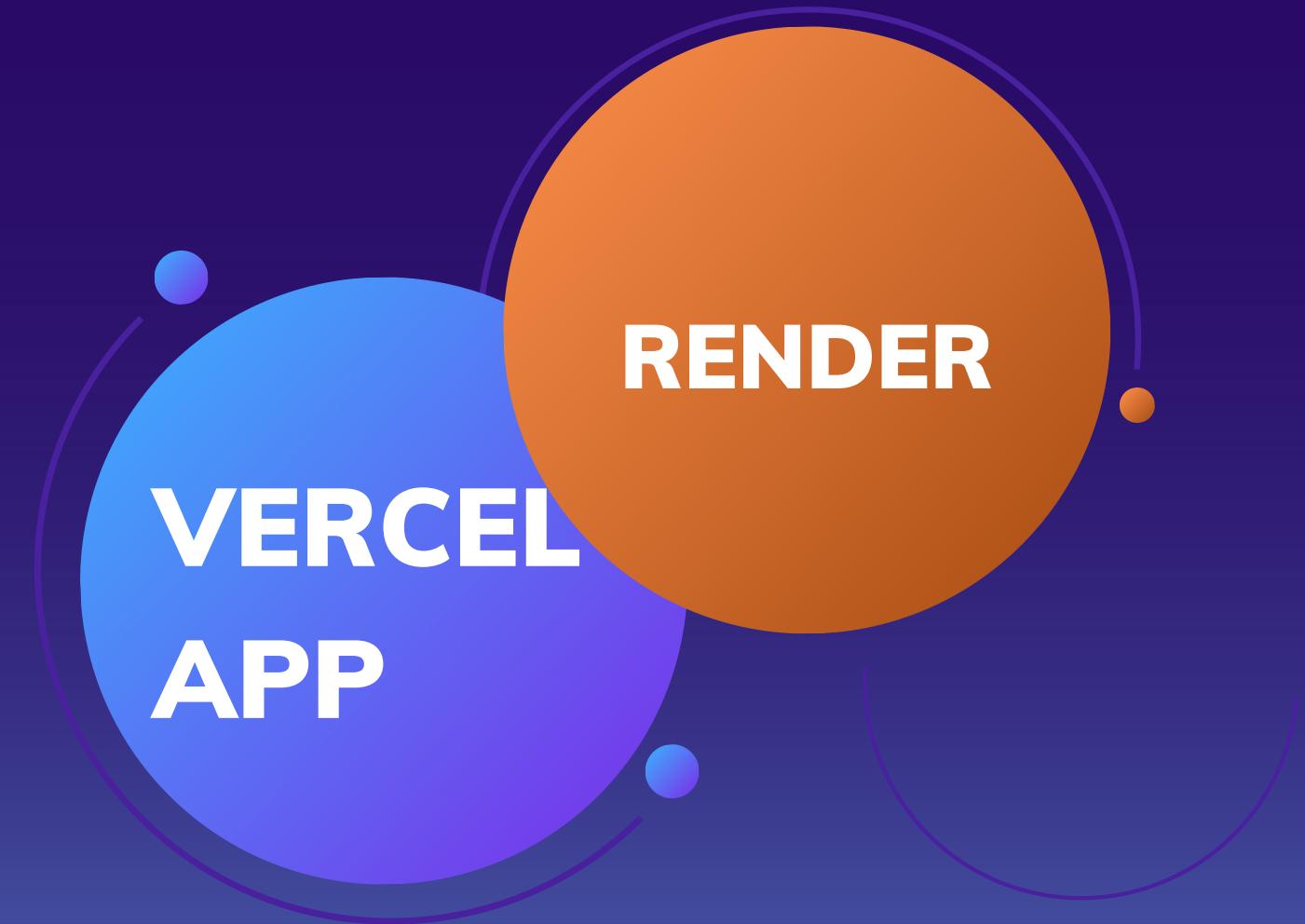
BACKEND



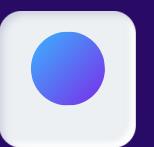
OPEN AI API

OpenAI API is an artificial intelligence platform that provides developers with access to powerful natural language processing tools, such as language translation, sentiment analysis, and text completion. It uses state-of-the-art deep learning models to generate human-like language and provide sophisticated analysis of text data. The API is designed to be easy to use and integrate into a wide range of applications, including chatbots, virtual assistants, and customer service tools. Developers can access the OpenAI API through a simple API key authentication process and use it to enhance the functionality and capabilities of their applications.

DEPLOYMENT



open-ai-codex-drab.vercel.app



HTML AND CSS

To deploy the chatbot's frontend, we used Render, a cloud platform that provides simple and scalable web hosting.



JAVASCRIPT

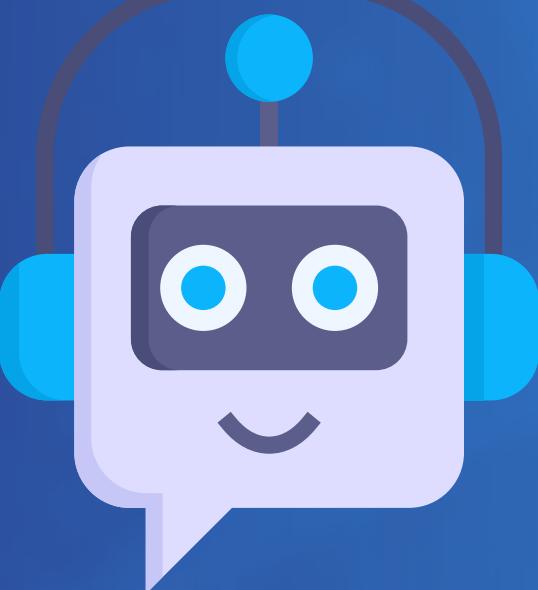
we deployed the chatbot's backend on Vercel, another cloud platform that specializes in serverless functions.

Future Prospects

- Add an authorization system requiring users to sign in before using the chatbot
- Use a third-party authentication service or build a custom authentication system for added security and privacy
- Fine-tune the language model by providing more training data and adjusting parameters for improved accuracy, fluency, and coherence
- Implement a feedback system for users to rate responses and provide suggestions for improvement
- Use feedback to iteratively improve chatbot's performance over time.

CONCLUSION

In this project, we designed a chatbot using front-end technologies such as HTML, CSS, and JavaScript, with the back-end powered by the OpenAI API. We deployed the front-end on Render and the back-end on Vercel. The process involved several steps, such as creating the user interface, integrating the OpenAI API, and deploying the application. We also had to take care to ensure that the project was scalable, secure, and reliable.



REFERENCES

1. Vite documentation

<https://vitejs.dev/>

2. Chatbot basics

<https://www.oracle.com/in/chatbots/what-is-a-chatbot/>

3. Youtube video

<https://www.youtube.com/live/JzPgeRJfNo4?feature=share>

4. Future of chatbot

<https://link.springer.com/article/10.1007/s00607-021-01016-7>

5. Open AI API

<https://platform.openai.com/docs/api-reference/introduction>

6. Comparative analysis of chatbots.

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3563674

Thank You.

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https://github.com/ghost-comder03/open_ai_codex

open-ai-codex-drab.vercel.app