AI CHATBOT USING CHATGPT

A Project Report

Submitted in partial fulfillment of the requirements

Of

MANGAYARKARASI COLLEGE OF ENGINEERING

Mohamed sikkandar M – mohamedsikkandar091@gmail.com

au923821114018

Under the Guidance of

P.Raja

Master Trainer

ACKNOWLEDGEMENT

First I would like to thank **NAAN MUDHALVAN** team for giving me the opportunity to do the project within the organization.

I also would like to thank **Mr. P. RAJA Master Trainer** with their patience and openness they created an enjoyable working environment. It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

We wish to convey our heartfelt thanks to our Secretary **Dr. P. ASHOK KUMAR M.A., M.Ed., B.G.L.,** who always blessed us to give best.

We heartily express our profound gratitude to our Managing Director **Er. A. SHAKTHI PRANESH B.E., M.B.A.,** for the constant support.

We highly thankful to the Principal **Dr. J. KARTHIKEYAN M.E., Ph.D.,** for the facilities provided to accomplish this internship.

We would like to thank my Head of the Department **Dr. B. VINOTH M.E., Ph.D.,** for his constructive criticism throughout my internship. We extremely great full to my department staff members and friend

ABSTRACT

The goal of this project is to design, develop, and implement an AI chatbot powered by ChatGPT, which simulates human-like conversation. The chatbot should be capable of assisting users in various domains such as customer support, education, and virtual assistance. The primary objective is to ensure that the chatbot understands and responds to user queries naturally and accurately, providing coherent and contextually appropriate responses. The chatbot will be evaluated for its effectiveness in handling diverse queries, its user satisfaction, and its overall performance.In conclusion, an AI chatbot powered by ChatGPT is a powerful tool that can significantly enhance user interactions across industries, from customer service to education and healthcare. The system's architecture ensures that it is scalable, responsive, and intelligent, offering both the flexibility of advanced natural language processing and the robustness of modern cloud-native technologies.

Keywords : AI Chatbot,ChatGPT,Human-like conversation, User queries, Natural language understanding, Coherent responses, Customer support, Education, Virtual assistance, Response accuracy, Contextual understanding, User satisfaction, Performance evaluation, Scalable system architecture, Natural language processing (NLP),Cloud-native technologies.

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CHAPTER 1

1. Introduction

1.1 Problem Statement:

Although human agents can be quite good at giving tailored replies, factors like training disparities, weariness, or experience levels might affect how consistently they respond. The user experience is bad because rule-based chatbots, despite their low cost, are frequently restricted to predetermined replies and find it difficult to manage intricate, dynamic, or nuanced interactions. Users of today are used to conversational interfaces and anticipate a fun, interactive chatbot experience. However, because of their small answer set and lack of contextual awareness, simple chatbots frequently fall short in keeping users' attention.

1.2 Motivation:

One of the most sophisticated NLP models on the market is ChatGPT, which is based on OpenAI's GPT-3.5/4 models. Because of its ability to comprehend and write text that is similar to that of a person, it can respond naturally in a variety of conversational scenarios. ChatGPT can handle a wide range of user inquiries since it has been pre-trained on a large dataset covering several subjects. This enables rapid implementation across several businesses and makes it adaptable to new domains without requiring lengthy retraining.

It is possible to use this model into a range of applications since OpenAI's ChatGPT API is simple to include into current systems. Businesses can swiftly deploy the chatbot thanks to its ease of use, which also helps to cut down on development time.

ChatGPT may offer 24/7 assistance, addressing frequently asked questions concerning goods, services, refunds and other matters. Help with complicated Queries: By decomposing difficult queries and providing detailed instructions, it can assist with more complicated queries. It may customize replies for specific users by taking into account context and past interactions, which raises user happiness and engagement. ChatGPT may improve the shopping experience by providing personalized product recommendations based on customer interests and activity .Order tracking and support: It can help with product availability, order status, and exchanges or returns, relieving human agents of some of their workload. Virtual Shopping Assistant: It may act as a virtual salesman by assisting customers with product selection and responding to frequently asked questions.

1.3 Objective:

1. User Queries accurately and relevantly: Make sure the chatbot can comprehend user inquiries and give accurate answers, offering trustworthy information or support in a variety of situations.
2. Improve User Experience by Interaction in Natural Language: Provide replies that are conversational and human-like to help consumers find interactions simple, interesting, and intuitive.
3. Preserve Context in Multi-Turn discussions: Give the chatbot the ability to preserve context in a number of messages so that discussions make sense and develop organically over time.
4. Manage a Broad Variety of Domain-Specific Queries: Give the chatbot the tools it needs to respond to a variety of questions, ranging from general inquiries to those pertaining to a particular topic (such as customer service, product details, or frequently asked questions).
5. Operate 24/7 with High Scalability and Cost-Efficiency: Reduce reliance on human agents by offering 24/7 service to satisfy customer requests without incurring large additional expenditures.

1.4 Scope of the Project:

1.4.1 Customer Support:

By answering routine consumer queries about products, troubleshooting, order tracking, and often asked topics, the chatbot may offer organizations scalable assistance.

1.4.2 Information Retrieval:

ChatGPT may aid users with general knowledge inquiries, suggestions, and procedural advice by rapidly retrieving and communicating information on a wide range subjects.

1.4.3 Virtual Assistant:

It can serve as a virtual assistant, handling duties including reminding people, responding to inquiries, and offering basic planning or advice (such as ideas for trips or stores).

1.4.4. Lack of Real-Time Data Access:

ChatGPT is not appropriate for activities needing up-to-date information, such as live stock prices, weather updates, or news, as it does not have real-time data access unless it is specifically linked to external systems.

1.4.5 Limited Domain-Specific Knowledge:

Despite ChatGPT's extensive general knowledge, without further training on domain-specific material, it could not be as deep in highly specialized topics (such as intricate legal or technical domains).

1.4.6 Contextual Retention in Long Conversations:

Although ChatGPT is capable of remembering context in brief exchanges, it may find it difficult to appropriately keep recall data in lengthy or intricate discussions, which might result in repeating or unnecessary answers.

1.4.7 Market Research and Data Analysis:

Analyzing customer feedback or reviews. Summarizing industry trends. Creating reports based on structured data input. The chatbot can engage website visitors, ask qualifying questions, and gather contact details for potential leads.

1.4.8 IT Support and Helpdesk Automation:

A chatbot can help users troubleshoot common technical issues, such as connectivity problems or software errors. The bot can query an internal knowledge base to provide quick answers, guides, or solutions to common problems.

CHAPTER 2

Literature Survey

The origins of AI and chatbots can be traced back to the 1950s when scientists first began exploring artificial intelligence (Almelhes, 2023). The early developments of AI included the creation of the first AI program called ELIZA, which aimed to replicate human conversation. Over time, AI technology progressed and led to the development of more advanced chatbots that can understand and respond to complex requests. Today, chatbots and AI are utilised in numerous industries, from healthcare to customer service, continuously advancing as technology progresses. One of the cutting-edge AI chatbot technologies is ChatGPT, which uses natural language processing and machine learning to allow users to interact with a virtual assistant. ChatGPT, an advanced AI chatbot, results from cutting-edge research conducted by OpenAI, an American AI research laboratory. As part of the generative pre-trained transformer (GPT) family of large language models (LLMs), ChatGPT's development involved a fine-tuning process that combined supervised learning and reinforcement learning techniques. ChatGPT is designed to be highly intelligent, intuitive, and capable of responding to complex requests in a human-like manner [1]. ChatGPT is the latest development in the group of systems known as "chatbots". Chatbots are intelligent systems that are developed using either rule-based or self-learning (AI) methods. Early chatbots were rule-based, relying on pre-set responses and limited conversational flow. The introduction of Natural Language Processing (NLP) models, particularly transformer-based models like OpenAI's GPT series, revolutionized chatbot capabilities by enabling more nuanced, context-aware conversations. Studies highlight how transformer models allow for large-scale language understanding and generation, making them versatile for complex dialogues (Vaswani et al., 2017). [**2**].

The history of ChatGPT started with the first-generation generative pre-trained transformer (GPT-1) language model, which was an evolution of NLP technologies. It employs the large-scale training of models using unsupervised transformer language models. GPT-2 included five minor improvements and increased the training textual data to 40 GB. As a result, GPT-2 could formulate very coherent and plausible-sounding results, as shown in a study that it could effectively generate patent claims [3].

The results of the literature review show that the use of ChatGPT AI in education has grown rapidly in recent years. ChatGPT has been applied in a variety of educational contexts, including as a learning assistant, virtual tutor, assignment corrector, and interactive learning aid. Some of the benefits of using ChatGPT AI in education include increasing the accessibility of learning materials, providing fast and personalized feedback, and encouraging student engagement and learning motivation. However, some challenges need to be addressed, such as ethical concerns, data privacy concerns, and technology limitations. This study concludes that AI ChatGPT has great potential to change the way students learn by providing adaptive and personal assistance in the learning process [4].

In the Chatbot technology, computer program has been developed for the Chat with the human user. It can distinguish questions and provide automatic responses. Modern Chatbot technologies use more specific branches of AI Such as DL and NLP. It can interact with human users through the visual languages, in written and spoken form (Adamopoulou and Moussiades, 2020b; Hague and Rubya, 2023).Conducted user studies to evaluate chatbot effectiveness Identified key factors influencing user satisfaction Provided design recommendations for improving chatbot usability The Chatbot technologies are described as AI-based example of the Human-Computer Interaction (HCI). Chatbots are also famous as artificial conversation entities, digital assistants, interactive agents, or smart bots [5].

Surveyed the current state of conversational AI research. Identified key challenges and opportunities in chatbot development. Discussed future directions for conversational AI research (Conversational AI: The Rise of Chatbots" by MIT CSAIL (2020))

The literature survey shows that ChatGPT and similar AI chatbots have a wide array of applications due to their ability to handle diverse conversational contexts, adaptability, and learning capabilities. Despite ethical, privacy, and technical challenges, continued advancements in training methods, ethical oversight, and performance evaluation will likely expand ChatGPT’s role in industry and society. Future research will further refine its capabilities, allowing for more specialized, secure, and user-centered AI-driven conversational systems.

CHAPTER 3

Proposed Methodology

3.1 System Design:

1. User Interface:

- The area of the application where users communicate with the chatbot is called the frontend.
- This might be an integrated widget, mobile app, or website that lets people talk to the chatbot.
- This part displays user messages and chatbot answers while controlling text input and output. Elements that guarantee accessible, user-friendly designs that function effectively across a range of devices.

2. API Layer:

- The backend interacts with ChatGPT's API, manages requests, and processes user data.
- API Gateway: Directs incoming requests to the relevant back ends or micro services from the frontend.
- Orchestration Layer: Coordinates the retrieval of replies from the ChatGPT model, manages session management, and controls the flow of instructions and data.

3. Chatbot Engine:

- Using user input and any accessible context, the ChatGPT API makes a call to the OpenAI API to produce replies.
- Personalized Logic/Prompt Engineering: Optimizing and ensuring that the answers correspond with the particular use cases of your application.
- Post processing responses: Verifies that they are suitable, succinct, and adhere to any content standards or business regulations.

3.1.1 Registration:

- Evaluate your needs and objectives.
- Obtain your API key by creating an OpenAI account.
- Decide on a development environment.
- Create the conversation flow for your chatbot.
- Connect your chatbot to the ChatGPT API.
- Make your chatbot available.

3.1.2 Recognition:

- Get the basics right.
- Clearly state the goal of your chatbot.
- Configure the environment for development.
- Obtain an API key for OpenAI.
- Put the required libraries in place.
- Make Your Script for a Chatbot.
- Test and refine.

3.2 Modules Used:

1. User Interface (UI) Module.
2. API Integration Module.
3. Message Processing Module.
4. Security and Compliance Module.
5. Infrastructure and Deployment Module.
6. Session Management Module

3.3 Advantages:

- ChatGPT may run nonstop, offering assistance and interaction at any moment.
- ChatGPT can help in a variety of circumstances, languages, and vocabulary levels. Its inclusiveness helps close language or knowledge barriers and makes it usable by a variety of user groups.
- ChatGPT is useful for idea generation, brainstorming, and supporting the production of creative writing or content. It offers ideas, drafts, and prompts that can help teams and individuals get projects off the ground or get beyond creative barriers.

3.4 Requirement Specification:

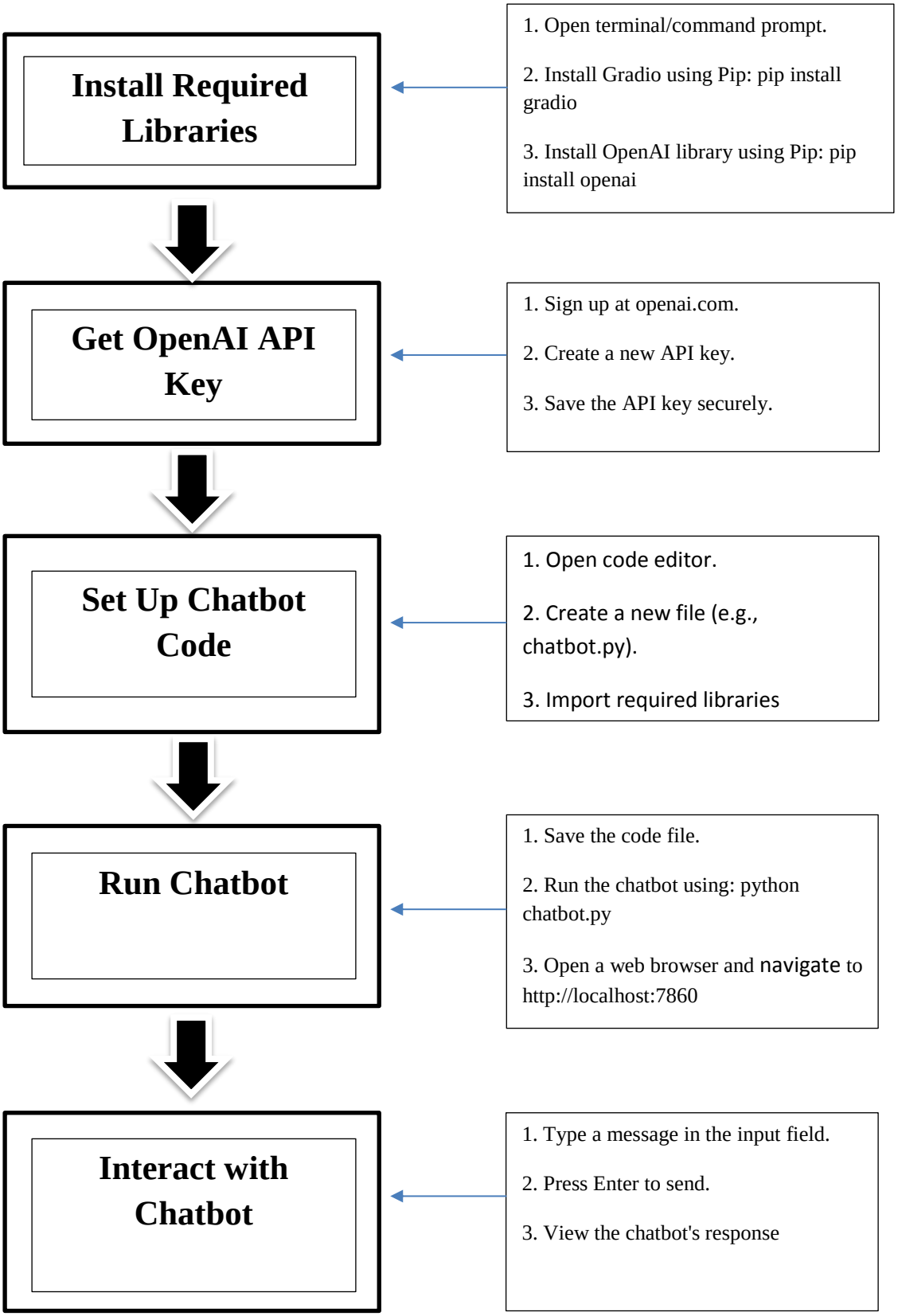
3.5.1. Hardware Requirements:

1. Processor: 1.6 GHz or faster
2. Memory: 4 GB RAM (8 GB or more recommended)
3. Storage: 1 GB available disk space
4. Display: 1280x960 or higher resolution
5. Internet connection (for updates and extensions)

3.5.2. Software Requirements:

- Python 3.8+
- Pip
- VS Code with Python and Pylance extensions
- OpenAI API Key
- OpenAI Python library (pip install openai)
- Gradio (pip install gradio)
- Optional: Virtual environment (venv) and Postman (for API testing)

3.5 Data Flow Diagram:



CHAPTER 4

Implementation and Result

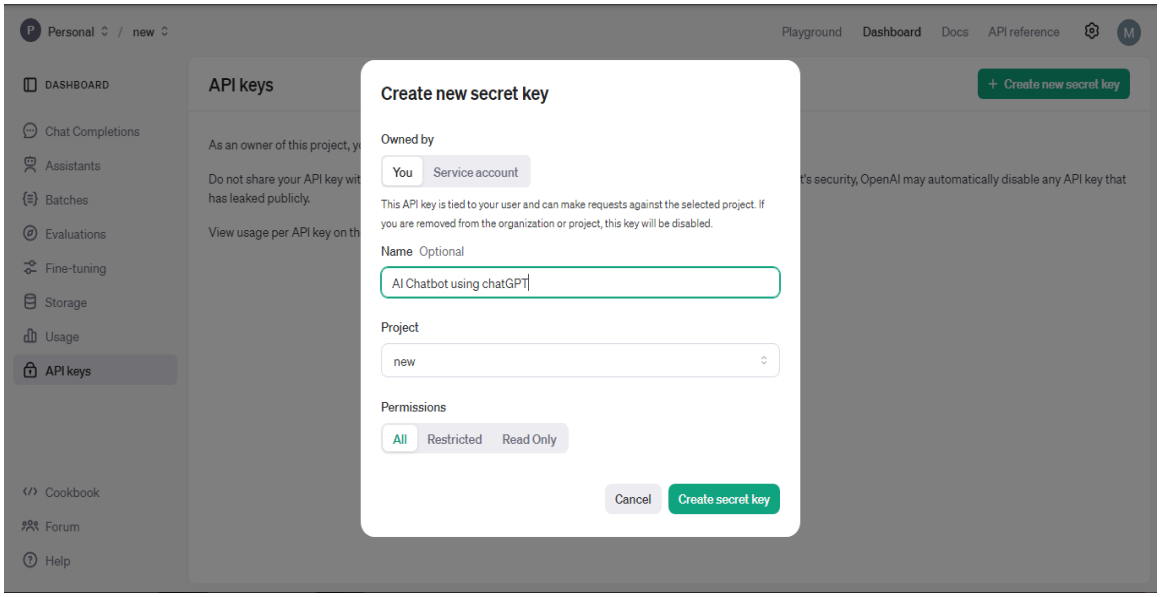
4.1 Results of Face Detection:

Using a computer vision model (such as OpenCV or a deep learning model for face recognition) and a framework that permits communication between the two systems is required to integrate face detection features with ChatGPT. This is how it would operate.

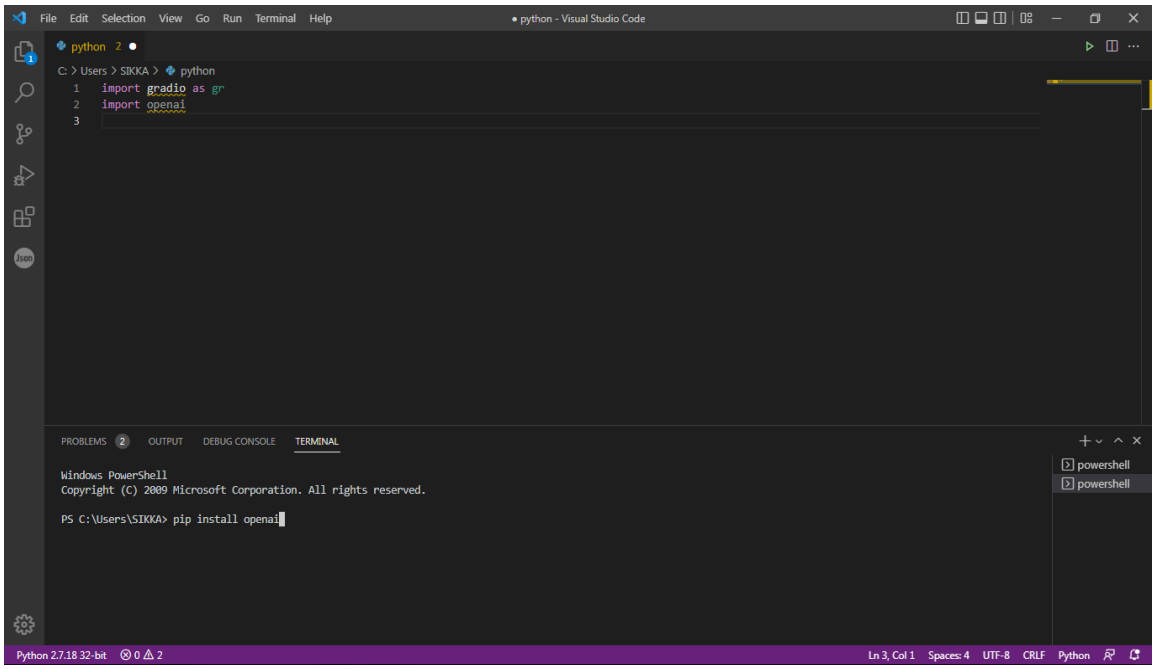
- Image Processing Framework
- Integrate Face Detection with ChatGPT
- Connecting the Module

4.2 Program:

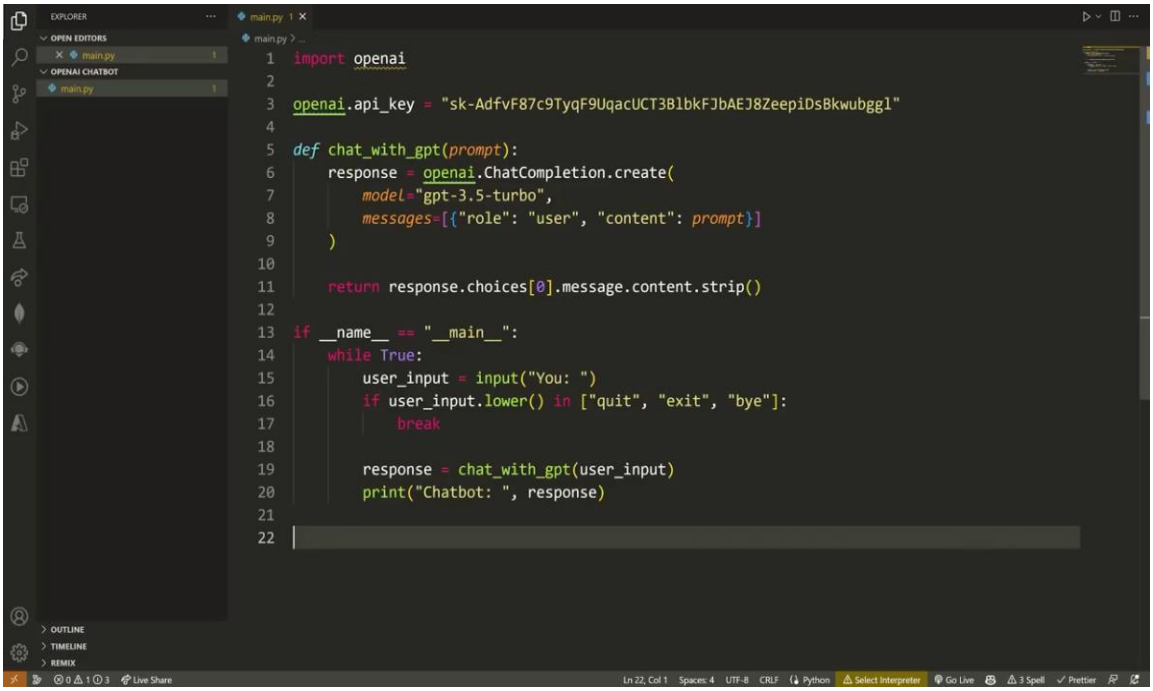
1. Obtain an API key for OpenAI From https://platform.openai.com/api-keys



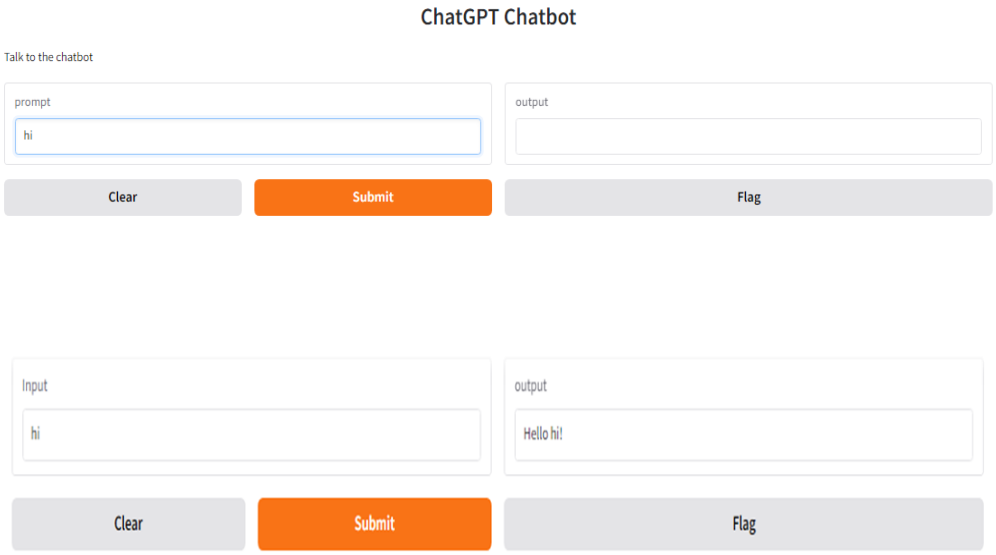
2. Install the python packages



3. Program for an AI chatbot using ChatGPT



4. Output



4.3 Tips and Variations:

1. Customize chatbot personality and tone.
2. Add more advanced features (e.g., intent detection, entity recognition).
3. Integrate with other APIs (e.g., Google Maps, Wikipedia).
4. Deploy chatbot on a cloud platform (e.g., Heroku, AWS).

4.4 Troubleshooting:

1. Check API key validity.
2. Verify library installations.
3. Consult OpenAI documentation and community forums.

CHAPTER 5

Discussion and Conclusion

5.1 Key Findings:

- In general, ChatGPT's usage of filters and safety procedures works well, although sometimes it filters answers too much or too little. These restrictions are necessary to stop dangerous content, but there are still certain restrictions to make sure delicate subjects are handled properly.
- The present discussion session is the only time the AI can recall information. In lengthy talks or across several sessions, it frequently finds it difficult to sustain thoughtful, context-aware replies, underscoring the need for better memory and contextual awareness.

5.2 Git Hub Link of the Project: https://github.com/MOHA263/Chatbot.git

5.3 Video Recording of Project:

https://drive.google.com/file/d/1tp6vey5fVbfcVn7X4Na_sKFC70JT19ag/view?usp=sharing

5.4 Limitations:

- ChatGPT has limited ability to retain context over long conversations or remember past interactions across sessions, so it may struggle to maintain complex, evolving dialogues.
- ChatGPT makes an effort to deliver correct information, but occasionally it produces replies that are deceptive, biased, or wrong. In sensitive areas, such as mental health, medical, or legal information, this might be problematic since its answers may be interpreted as expert advice.
- ChatGPT contains safety procedures and filters to stop hazardous behaviour, however these aren't always 100% effective. The system may occasionally overfilter, limiting the subjects that may be safely discussed.

5.5 Future Work :

- To improve the chatbot's ability to recognize users' emotions, include sentiment analysis and emotion recognition technologies. This may enable the chatbot to modify its tone or strategy, providing more sympathetic answers and averting potentially unpleasant circumstances put strong security measures in place to protect user information.
- This entails creating explicit privacy regulations, anonymizing user activities, and encrypting talks. Additionally, make sure the chatbot complies with laws like GDPR and HIPAA regarding the handling of sensitive data in the healthcare and other sectors. Incorporate proactive features that allow the chatbot to start discussions in response to specific events (like user inactivity or scheduled reminders) or automatically offer fixes for persistent problems.

- Future development of an AI chatbot driven by ChatGPT should concentrate on enhancing its multimodal, contextual understanding, memory, and personalization features. To increase its application and guarantee fairness, it will be essential to address problems like ambiguity, bias, ethical considerations, and multilingual support. The utility and credibility of the chatbot will be further increased by improving its capacity to manage specialized topics, interact proactively, and protect user privacy. By taking care of these issues, the chatbot can develop into a more intelligent, human-like helper for a range of use cases, benefiting users and businesses alike.

5.6 Conclusion:

In conclusion, a ChatGPT-powered AI chatbot contributes to more efficient, scalable, and engaging user interactions across multiple sectors. It enhances operational performance, reduces costs, and provides users with high-quality assistance, ultimately leading to improved customer satisfaction and business outcomes. Users can interact with systems more easily and intuitively thanks to the AI chatbot's ability to have natural, human-like dialogues. This enhances consumer satisfaction and accessibility, particularly in areas like healthcare, education, and customer service.Organisations can drastically cut the operating expenses related to using human support agents while maintaining the ability to provide accurate, high-quality assistance by automating responses and conversations. With minimal resource commitment, the chatbot may be continuously improved to accommodate new use cases. Continuous learning and optimization are made possible by the feedback loop that exists between users and the chatbot. The system can be iteratively enhanced to produce more efficient interactions and an improved user experience overall as it gathers data on user performance and satisfaction.

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