

Building an AI Chatbot Using OpenAI's GPT API

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Why a Chatbot:

I choose a chatbot because it allows me to gain experience in the growing field of AI. OpenAI has one of the best implementations of using AI to create a cutting-edge chatbot. Creating a chatbot allows for someone to understand the way AI is designed, implemented, and put into code. It allows me to create the code that can get information from OpenAI's AI models like Davinci or GPT-3. I can apply what I learned about the theory of AI, Algorithm Design, Operating Systems (Managing Website Servers), and Website Development.

Research and Development:

The risks of AI are not known yet nor are its possibilities. "For decades AI researchers have tried to build algorithms to mimic human intelligence, but the real breakthrough may come from building algorithms that try to mimic the open-ended problem-solving of evolution—and sitting back to watch what emerges" (Heaven 2021). It is a very useful tool for a variety of applications. It can write code, books and business memos. AI is great at problem-solving, research, and storytelling. The power of AI models is increasing with how powerful computers are becoming and how much data exists for them to process. "These machine language systems consist of large artificial neural networks and are 'trained' via a trial-and-error process over mountains of data" (Goldstein 2023). The more data that the AI can process, the better they usually become. Advancements in AI can be seen in the automation of jobs, developments in the medical field, developments in engineering, changes in education, and changes in lifestyle (Eloundou, T. 2023).

System Design and Implementation:

When I choose an AI model, I wanted to choose one that I was familiar with so I chose OpenAI. I decided on node.js and react because they allow writing code using JavaScript and work well with formatting the website with CSS. I used the functions in the node.js module OpenAI API available via node (npm install OpenAI) (OpenAI 2023) to integrate ChatGPT into my website which I created using React and JavaScript. OpenAI uses tokens to handle how large the input and output files are. A large amount of information will take a while to process. Similarly so would a large output. This gives insight into how OpenAI manages and controls the server time each user has access to. I learned how to apply AI temperature to get the desired project specific output. Temperature is how deterministic you want the output to be. It can be used to be very creative at a cost of not giving the best answer possible. A valid temperature range is from 0 (least creative) to 1 (most creative).

Features of my Implementation:

I implemented several features into the chatbot in addition to the API Word Filtering to limit the content sent to OpenAI's API. An array contains words that the client cannot send to the API using the website. Such requests are not answered by the API. OpenAI has libraries for using node as well as python. Libraries exist for integrating OpenAI in C#, C++, PHP and many more languages but they were not created by OpenAI (OpenAI 2023). I decided on using the node libraries as I wanted to use react to make it easier to implement the front-end code and node.js

has great support for react. OpenAI has great documentation on their website for using the OpenAI libraries on both node and Python. Static site compactable. Implemented in a way that allows all the requests to be made on the client so that the server only needs to send the files from the server to connect directly to the API. It saves on computation and memory. It also reduces latency as the request does not have to be sent to a local server to be processed before it can be sent to OpenAI's servers. The time it takes for a response is much quicker as it does not need to be a middleman for content filtering.

What I Learned from the Project:

I learned how to apply the theories behind AI, Algorithm Design, Operating Systems (Managing Website Servers), and Website Development. Some of the ways that OpenAI's API is different than ChatGPT such as content filtering and speed. How to build a website using node.js and react and implementing node modules like OpenAI's API (OpenAI 2023). How to create and connect the website front end to the back end of a website using http requests. How to make API keys secure using a back-end website host. I learned how different the API is from the ChatGPT website. It doesn't always respond a full sentence and it sometimes tries to predict your words instead of or before answering your question. One can send blank responses via the API to have GPT-3 generate responses to itself. I learned how to use node.js to build a website and to call servers, importing models like the OpenAI modules, how to read documentation to build a program on my own, debugging, patience, and problem solving, time management to finish a project. I also learned how to communicate front end to back end over a https request to server and then to API as a function call.

What I Would Do Differently:

Once I got the code to a state in which all the functions worked, I was concerned that if I wanted to make any small change, I would have to rewrite most of the code. This turned out to not be a huge problem, although because it was my first time using OpenAI's API and react there were a few setbacks when trying to make changes before and after the code was working. There were times when I thought that the code should work but it did not because of a change in the code caused a different function to fail. In the future, having some experience in implementing API's in node.js, I should be able to understand how to create code that is less valuable to such mistakes and be able to recognize them sooner when they do occur. Multiple API keys removed from my OpenAI account for unknown reasons (Either they were posted on GitHub or I was making invalid request initially to OpenAI's servers). The OpenAI API calls required lots of troubleshooting to get to a state that was reliable. The React and JavaScript code user interface needed to be tested after each change to verify that the change was implemented successfully. Reading the documentation for OpenAI, node, and react was challenging to put together in a way that made sense and that I thought would be functional. It required a lot of trial and error of what functions that I could use as well as looking up how to use them correctly and put them together.

Summary:

Overall, the project was a great experience that I have learned a lot from. I would recommend everyone create a website using node and react to understand more of how the modern web is

built on libraries and modules that need to be connected. I would also recommend that everyone learn how OpenAI implemented their API to understand how APIs are connected but also to gain a deeper insight into how AI is developed and discover new ways on how AI needs to be built in order to achieve new things in better ways in the future of the internet.

References:

- Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023, March 23). *GPTs are gpts: An early look at the labor market impact potential of large language models*. arXiv.org. Retrieved May 6, 2023, from <https://arxiv.org/abs/2303.10130>
- Goldstein, J. A., Sastry, G., Musser, M., DiResta, R., Gentzel, M., & Sedova, K. (2023, January 10). *Generative language models and automated influence operations: Emerging threats and potential mitigations*. arXiv.org. Retrieved May 6, 2023, from <https://arxiv.org/abs/2301.04246>
- GPT-4. (2023). Retrieved May 6, 2023, from <https://openai.com/research/gpt-4>
- Heaven, W. D. (2021, June 25). *Ai is learning how to create itself*. MIT Technology Review. Retrieved May 6, 2023, from <https://www.technologyreview.com/2021/05/27/1025453/artificial-intelligence-learning-create-itself-agi/>
- OpenAI. (2023). OpenAI API. Retrieved May 6, 2023, from <https://platform.openai.com/docs/api-reference/introduction>
- OpenAI. (2023). OpenAI API. Retrieved May 6, 2023, from <https://platform.openai.com/docs/libraries>