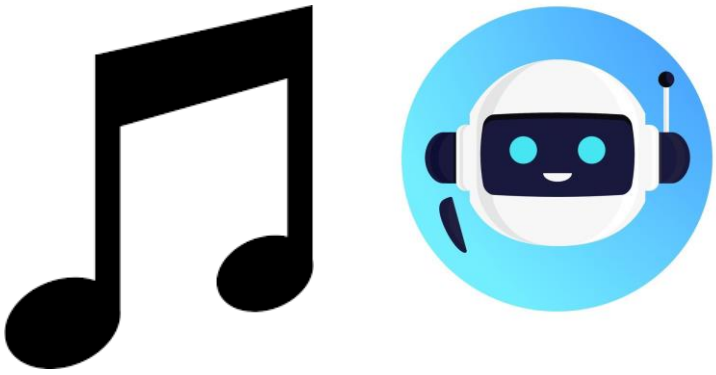
Song Sage: Personalised Melodies



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1. Aim

The "Song Sage" project is what I'm starting with the intention of developing an AI-powered conversational assistant that specialises in giving people song recommendations and information. With my help, this assistant will leverage its ability to create and understand natural language to provide interesting and instructive answers based on the user's interests and questions. To enhance users' music discovery experiences, my idea for the "Song Sage" is to create a smart tool that blends seamlessly into the user's experience and offers individualised suggestions along with informative facts about songs, artists, albums, and track details. I want to provide consumers with a useful tool that not only entertains them but also makes it easier for them to learn about and explore the world of music by utilising modern-edge AI technologies.

2. Introduction

The "Song Sage" helper is here to transform the music experience for fans all over the world. It is an AI-powered companion. This assistant covers a wide range of music-related content, including songs, artists, albums, and track details. Its major objective is to give users individualized recommendations and informative insights. People's lives are profoundly impacted by music, which may be an emotional, entertaining, and inspirational source. With so many songs, musicians, and genres to discover, it can be daunting to navigate the enormous world of music. By providing a customized and intuitive interface for finding new music, learning about favorite artists, and having meaningful conversations about songs, the "Song Sage" seeks to lessen this difficulty. With the help of artificial intelligence, the assistant aims to improve user accessibility and enjoyment of music discovery and listening overall. The "Song Sage" assistant makes use of several modern-edge technologies, such as RAG, API connectors, file search capabilities, and Open Ai’s GPT-based language model. The assistant can read user queries, acquire pertinent data from carefully vetted datasets like the Spotify API and Kaggle dataset, and provide customized responses based on each user's preferences by utilizing natural language interpretation and generation. Furthermore, prompt engineering approaches are integrated into the assistant to facilitate user interactions and guarantee the provision of precise and meaningful information.

3. Assistant Design: A Schematic View

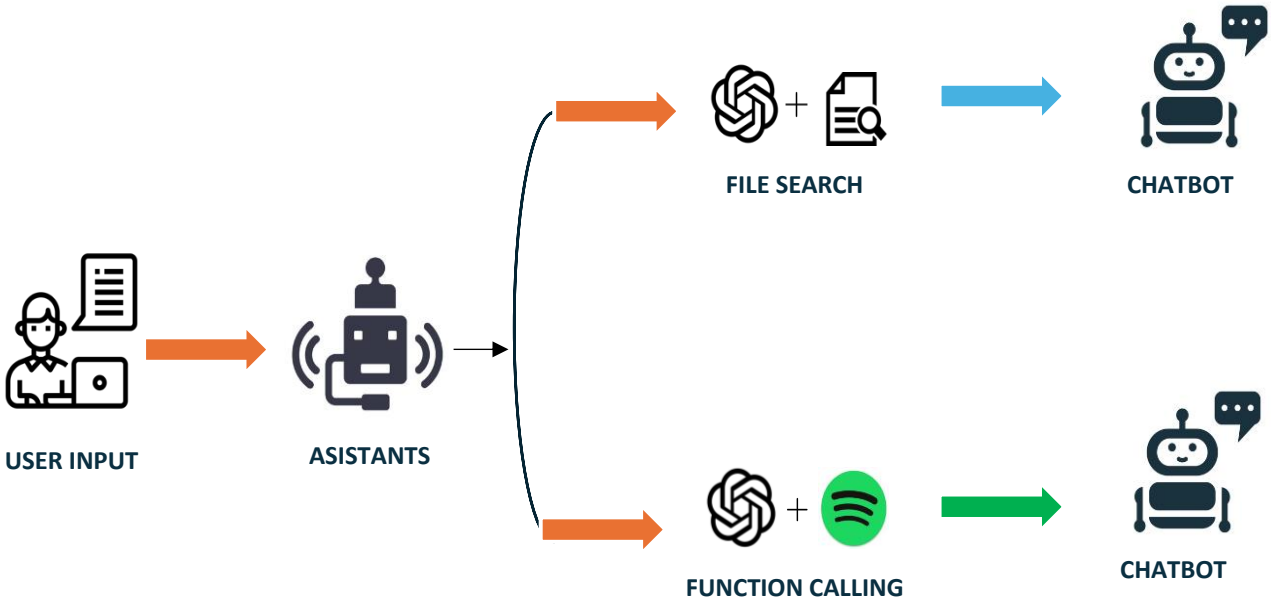


Fig. 1 – System Design

The "Song Sage" assistant, powered by the Assistants API, specializes in delivering personalised song recommendations and insightful song-related information. It collects information from a curated Kaggle dataset that includes song titles, artist names, albums, and track metadata by utilising the file search capability. This feature guarantees that user inquiries receive precise and pertinent answers, improving the user experience by providing insightful information about the music industry. The assistant gathers personalized music recommendations from other sources such as the Spotify API by leveraging the function calling functionality when used with Retrieval-Augmented Generation (RAG). Through the integration of RAG, relevant data to be retrieved according to particular factors like language, year, or favourite artists.

The "Song Sage" assistant prioritizes a seamless user experience focused on information retrieval and song recommendations, hence bypassing features like code interpretation and custom function call-backs. This streamlined approach ensures efficient interaction with song-related content. Leveraging the Assistants API, the assistant utilizes file search and function calling components to provide personalized recommendations and informative content, enhancing the overall music discovery experience for users.

Features Leveraged:

I. File Search Component:

My main goal in the initial enrolment procedure is to make the most of the Assistants API's file search capability. The file search component retrieves data on songs, artists, albums, and tracks from a carefully selected dataset of song-related content. This dataset was carefully chosen by me to guarantee correctness and applicability. I can quickly and effectively extract song-related data from the dataset using the file search tool in response to user inquiries.

To enhance the "Song Sage" assistant's ability to retrieve song-related data, I have integrated the file search feature of the Assistants API. This allows the assistant to access a curated dataset containing song details. I've set up a vector store named "Song Sage" to efficiently store and retrieve this data. During user queries, the assistant utilizes the file search tool to locate relevant information within the dataset, ensuring prompt and accurate responses. This integration significantly enhances the assistant's capability to provide precise and relevant answers, thereby improving the overall user experience.

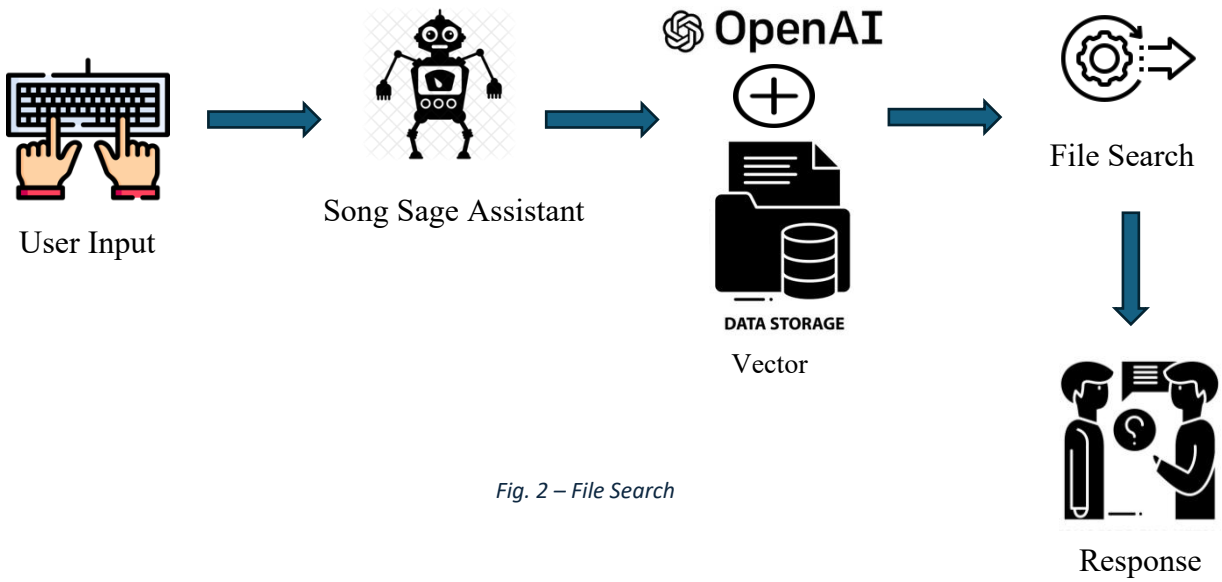


Fig. 2 – File Search

II. Function Calling Component:

Integrating external Spotify APIs with the assistant enables personalized music recommendations based on user-entered parameters like language, year, and favorite artists, enhancing the overall user experience.

API Integration: The assistant uses user-specified parameters to collect music recommendations and make calls to external sources. With the help of this capability, the assistant can access a large library of songs and make recommendations that are specific to the user's tastes.

Response Generation: Based on the parameters entered, the assistant uses the recommend songs function to retrieve appropriate music recommendations in response to user requests. After that, it formats the suggestions into a response that is easy to utilize.

User Question: Users communicate with the assistant by giving it information about their preferred language, ideal year, or favourite musicians.

Function Call: To obtain tailored music recommendations from Spotify's extensive music catalogue, the assistant calls the recommend songs function and passes it the parameters that the user has specified.

Response Generation: The user is then presented with a cohesive answer that the assistant formatted from the retrieved song recommendations.

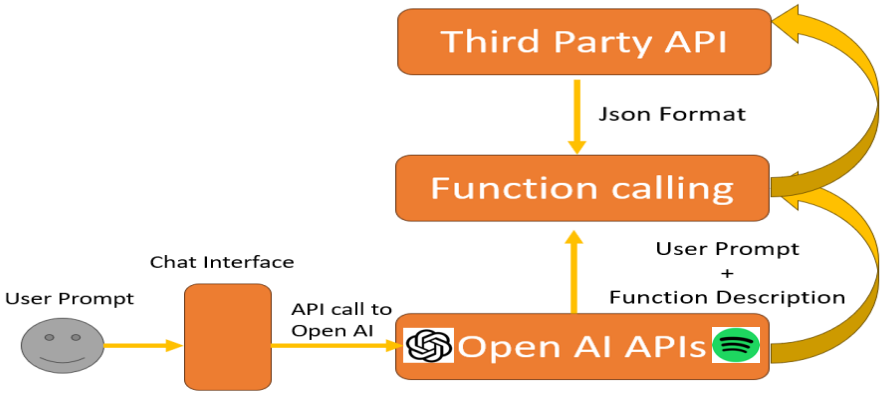


Fig. 3 – Function Calling

III. **Features Not Used**:

Image Search: Because its primary concentration is on textual content associated with songs, the assistant does not make use of the Assistants API's image search function. Although visuals could improve the user experience in some situations, the assistant's primary purpose of offering song-related recommendations and information does not require graphics.

The code interpreter: feature offered by the Assistants API is not used by the assistant because it is unrelated to the objective of obtaining song-related data. Rather than running code or carrying out computational tasks, the assistant's primary concentration is on extracting textual information from the dataset.

4. Added Value: More than Mere ChatGPT

The "Song Sage" assistant surpasses Chat GPT by offering the latest and most precise song-related information. Unlike Chat GPT, which lacks access to real-time data, the "Song Sage" frequently updates its curated dataset using file search functions. This ensures users receive the most accurate answers by refreshing details on songs, artists, albums, and track metadata. Additionally, the assistant excels in providing tailored insights, contrasting with Chat GPT's generic responses. By leveraging function calling, the assistant can make API calls to services like Spotify, delivering personalized music recommendations based on user preferences such as language, year, or favourite artists. This dynamic feature enables the "Song Sage" to offer highly relevant recommendations, enhancing the user experience. Ultimately, the "Song Sage" stands out as a valuable resource for music enthusiasts, offering individualized recommendations and current insights into the music industry. The "Song Sage" assistant delivers personalized recommendations and current song-related insights, distinguishing itself from Chat GPT and enhancing the user experience.

5. Outside Knowledge: Curated Data Sources

The "Song Sage" assistant improves its knowledge base and offers precise song-related information and recommendations by utilizing carefully selected data sources.

Spotify API:

I added real-time information on songs, artists, albums, and track details by utilizing the Spotify API. With the use of this API, the assistant may get the most recent data on artists, songs that are currently trending, and customized song recommendations depending on user preferences. The information gleaned from the Spotify API guarantees that the assistant provides current and pertinent insights on the music industry.

Kaggle Dataset - Top 10,000 Spotify Songs (1960 - Now):

I have curated a diverse collection of top songs spanning various genres from 1960 to the present using the Kaggle dataset, featuring renowned artists and bands. This dataset, complete with track details like album URI, name, and artist URI, enhances the assistant's ability to deliver accurate and relevant song-related insights, enriching user experiences.

Cleaning and Preprocessing:

I made sure the Kaggle dataset was accurate and clean by preprocessing it to fix any errors or missing data. This required assuring data integrity, eliminating duplication, and cleansing and standardizing data fields.

Specialized Knowledge:

The "Song Sage" assistant leverages curated data from the Kaggle dataset and Spotify API to offer detailed insights into music. With this knowledge, it provides tailored music suggestions and precise answers, enhancing the overall user experience.

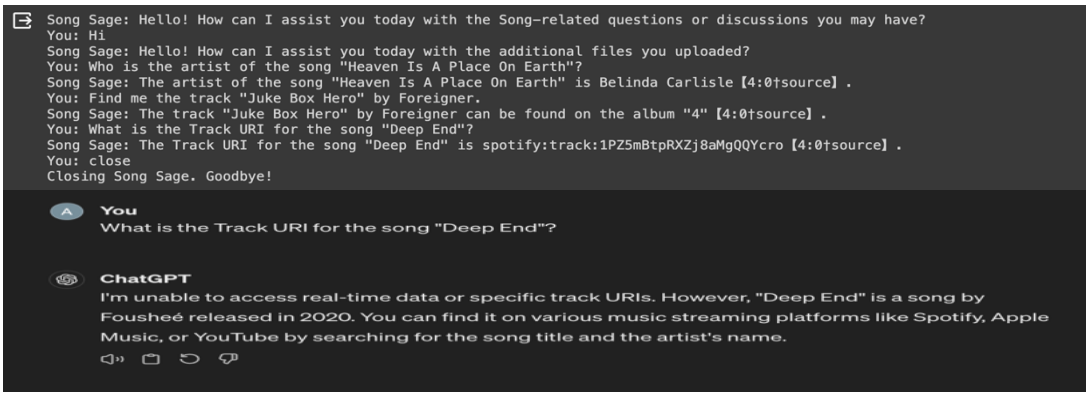
Example:

Track URI	Track Name	Artist URI(s)	Artist Name(s)	Album URI	Album
spotify:track:1XAZlnVtthcDZt2NI1Dtxo	Justified & Ancient - Stand by the Jams	spotify:artist:6dYrdRlNZSKaVxYg5IrvCH	The KLF	spotify:album:4MC0ZiNtVP1nDD5lsLxFjc	Song
spotify:track:6a8GbQIlV8HBUW3c6Uk9PH	I Know You Want Me (Calle Ocho)	spotify:artist:0TnOYISbd1XYRBk9myaseg	Pitbull	spotify:album:5xLAcbybSAlRtPXnKkqqXA	Pitbu

Fig. 4 – Dataset Example

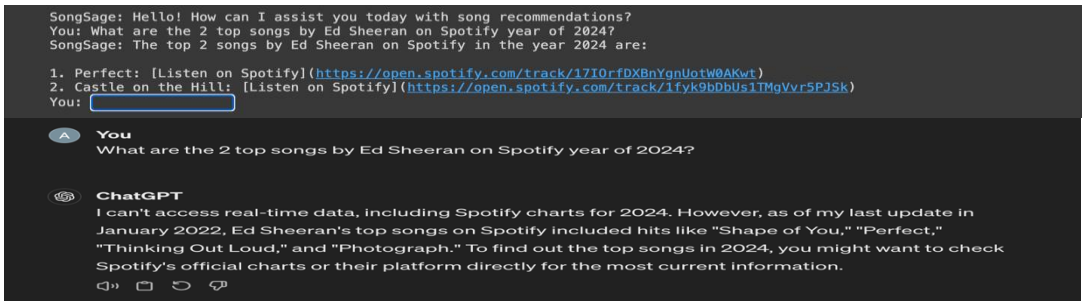
6. Worked Examples

1) File Search Vs Chat GPT 3.5



- **ChatGPT 3.5:** Responded that the Track URI for "Deep End" was not provided in the shared data but helped if the song was included in the provided list.
- **Song Sage (File Search Chat Bot):** Provided the Track URI for "Deep End" as "Spotify: track:1PZ5mBtpRXZj8aMgQQYcro" from the curated dataset.

2) Function Calling Vs Chat GPT 3.5



- **ChatGPT 3.5:** Stated it couldn't access real-time data but offered general information based on its last update, suggesting checking Spotify's official charts for the latest details.
- **Song Sage (Function Calling Chat Bot):** Leveraged function calling with Spotify's API to dynamically retrieve and present the top 2 songs by Ed Sheeran on Spotify in 2024, showcasing its ability to offer personalized and real-time recommendations.

In comparison to ChatGPT 3.5, Song Sage excels in retrieving specific song details. While ChatGPT 3.5 couldn't provide the Track URI for "Deep End," Song Sage swiftly offered it through file search. Additionally, while ChatGPT 3.5 couldn't access real-time data, Song Sage dynamically retrieved personalized recommendations using function calling with Spotify's API.

7. Summary and Conclusion

In summary, the "Song Sage" assistant has established a strong basis for offering consumers meaningful song-related information and individualized music recommendations. There are several opportunities for improvement and development in the future. Adding more data sources to the assistant's knowledge base, such user-generated material and real-time music charts, could improve the assistant's suggestions and insights. Furthermore, enhancing the assistant's natural language comprehension skills and applying sophisticated NLP methods like sentiment analysis may improve its precision in interpreting user preferences and requests. Investigating multi-modal interactions like picture and speech recognition—could improve the assistant's usability on many platforms and gadgets. All in all, the "Song Sage" assistant has the potential to become a vital tool for music lovers everywhere by carrying on with innovation and incorporating state-of-the-art technology, providing unmatched insights and recommendations catered to specific interests and preferences.

8. References

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