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CHATBOT FOR SONG RECOMMENDATION SYSTEM

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Abstract: A song recommendation machine is designed to provide personalized musical recommendations based on person options, helping people discover new collections of melodies tailored to their tastes. By taking advantage of the higher algorithms, the Gadget improves the general listening and simplifies the exploration of the melodies. As the melody performs an important function in the day-to-day life, Want's advice structures for sensitive transmission is more exceptional than ever. This framework carries detailed methodologies, equipment and implementations to guarantee adaptability and precision. It gives an uninterrupted and interactive person who delights, dynamically thinking of variables beyond listening discs. By promoting the effective interaction of the human computer, the system offers precise and custom-made recommendations, saving time and enriching the musical discovery for customers.

Key words: Chatbot, song recommendation, Spotify API, Last.FM API, generation of reproduction lists.

I. INTRODUCTION

The concept of recommendation systems dates back to 1979, with the Grundy de Elaine Rich Library device as an early example. Grundy helped users select books first collecting personal information and classifying them in stereotypes based on their preferences. Then he provided book suggestions with summaries and recommendations refined through monitoring questions when users were not satisfied. Modern, emerging recommendation systems in the 1990s have significantly evolved with advances in automatic learning and data processing capabilities. These systems take advantage of the vast user data and computer power to provide personalized suggestions, addressing the challenge of overwhelming options such as electronic commerce, travel and transmission. Music recommendation systems

are particularly critical in the modern subscription music industry, where abundant digital content requires personalized suggestions to meet user preferences. The collaborative filtering predicts interest when analysing patterns in the ratings and behaviours of the users. Together, these methods address challenges such as dispersed data while offering personalized musical experiences. Recommendation systems predict user preferences based on past behaviours, with the aim of improving user experience and increasing participation.

II. LITERATURE SURVEY

Aioli, f [1]. This study explores the large-scale recommendation systems, focusing on the scalability and efficiency required for data sets as vast as the data set of millions of songs. Aioli research provides information on high-dimension data management and the importance of balancing precision with computational efficiency in recommendations systems. For our project, this study highlights the need to optimize recommendation algorithms when working with extensive musical databases.

Spotify [2]. The Spotify approach for personalized songs suggestions demonstrates the realistic software of collaborative filtering and the study of machines. From Spotify, we examine the cost of taking advantage of consumer behaviour, which consist of a hearing history, to create studies of unique and personalized consumers. This version stimulated our challenge of understanding dynamic recommendation techniques that respond to changing personnel options over time.

Peter Knees and Markus Schedl [3]. It provides fundamental knowledge about music recommendation systems, which covers web-based strategies. The authors discuss techniques such as the extraction of audio functions and the web scraping to collect relevant user data, which we incorporate into our project integrating audio analysis with the user's feeling. His work reported our understanding of combining technical and user-centred approaches for a complete recommendation system.

Chris Johnson [4]. Johnson's article explains the improvement process in the back of Spotify's Discover Weekly, a personalized reproduction list function. The key conclusion of this reference is the emphasis on user participation through constant and personalized content material. By observing Spotify's success with Discover Weekly, we learned the impact of combining automated recommendations with human intuition to maintain interest and satisfaction of the user in our own recommendation model.

Zhiwei Gu, Li Guo and Tianchi Liu [5]. The discussion of automatic learning techniques to classify music by gender, a fundamental aspect of music recommendation. The ideas of the study of the classification and selection of characteristics based on the genre reported our decision to incorporate gender metadata as a key component of our recommendation algorithm.

III. PROPOSED SYSTEM

Definitions: The proposed diagram for a tune tips gadget implies several key components. First, the user entry is captured through a consultation interface, allowing to accumulate options. Then, the tactical machine records the use of an advisory engine fed through collaborative or material -based material filtering techniques. Next, it accesses a song database, which includes metadata, genres and musical attributes. The council model generates a list of suggested songs, based on the consumer profile and the previous interactions. The results are filtered and classified mainly based on relevance and diversity. Then, the user obtains the final suggestions through a user interface, where he can explore, pay attention or refine the options. Finally, the device collects comments to improve the accuracy of Destiny's suggestions.

Goals: The intention of this mission was to study the masterization of devices and their fundamental principles, in addition to numerous approaches and statistics mining algorithms. Another purpose became familiar with many machines study algorithms and how to use them. Learning algorithms on my own no longer makes you an engineer; The real task is to discover what method is excellent for a safe task. The main objective was to establish a framework for consumers to use a good way to help them discover the perfect songs for them. This project seeks to discover the correlation and similarity between the unique songs, and then assemble a framework of the tips system that shows a new song to its spotify playback list, mainly depending on these facts.

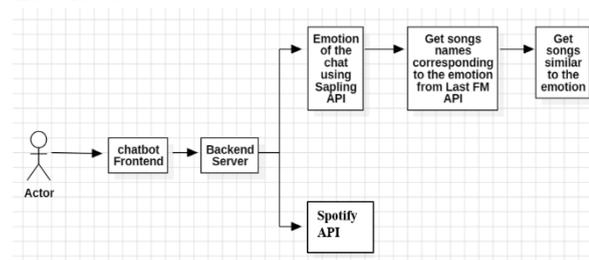


Fig.1. Architecture of Proposed System

IV. EXISTING SYSTEM

Existing music recommendation systems include several well-known approaches and platforms. An outstanding example is Pandora's Music Genome project, launched in 2000, which analyzed Various musical elements like melody, harmony, and lyrics are analysed to build customized playlists that align with a user's personal taste. These features help identify the essence of what the listener enjoys. Leading platforms like Spotify, Apple Music, and Amazon Music take this a step further by using advanced machine learning techniques to track listening habits and refine their recommendations over time, offering users a smarter, more intuitive music discovery experience.

A technique combined with user data, which include hearing history and song grades, to offer personalized recommendations. These systems generally use three main types of recommendation strategies: content -based filtering, which suggests songs with similar characteristics such as gender, tempo or instrumentation for those that the user has previously enjoyed; Collaborative filtering, which identifies patterns in the behaviour of similar users to recommend songs, which makes it effective to introduce new or trend music; and hybrid systems, which combine content based approaches to improve precision and diversity in recommendations. These existing models have significantly improved user experience by adapting suggestions to individual tastes, although each one has their limitations depending on the availability of user data and song metadata.

V. SYSTEM DESIGN

The system design for the Chatbot music recommendation is structured to offer a personalized user experience based on emotional entry. The process begins with the user who provides information through a consultation interface, which generally describes his emotional status. This entry is analysed using emotions detection techniques, and the system identifies the mood of the user. Using this emotional context, the recommendation engine, which takes advantage of the collaborative filtering or content -based methods, consults a musical database that contains metadata, genres and audio characteristics of the songs. Then, the engine generates a list of suggested tracks aligned with the emotional state and user listening preferences. These recommendations are filtered and classified by relevance and diversity before showing the user. The chatbot, driven by the cake chat, involves the user in a multiple laps conversation, refining suggestions based on users' comments and allowing greater exploration of similar songs.

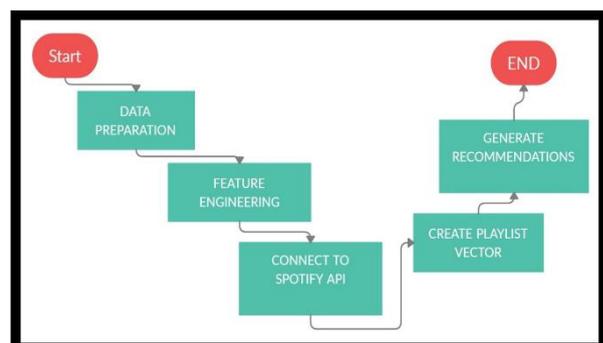


Fig.2. System Architecture

In addition, user feedback is continuously collected to improve system performance over time. The system is designed to provide a perfect and interactive experience through an easy -to -use interface, which offers musical recommendations on one side and similar clues on the other, backed by a visual colour scheme that reflects the user's mood.

IV. TECHNIQUES USED

A. Sentiment analysis

Sentiment analysis is the process of identifying and categorizing emotions or attitudes expressed in a piece of text—typically classifying it as positive, negative, or neutral. The main goal of sentiment analysis, also known as opinion mining, is to better understand public perception, which can be incredibly valuable for businesses looking to grow. Beyond just polarity, it often dives deeper into detecting specific emotional tones like happiness, anger, sadness, or excitement.

B. Content Based Filtering:

Content-based filtering is a recommendation technique that suggests items—like songs—based on the specific features of content a user already enjoys. Instead of focusing on what others are listening to, it centers entirely on the individual's preferences. For example, if a user frequently listens to soft, acoustic tracks with emotional lyrics, the system will recommend songs that share similar qualities. It does this by analyzing various elements such as genre, tempo, instrumentation, mood, lyrics, and even the artist's signature style.

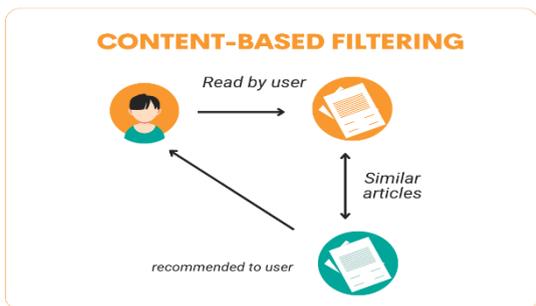


Fig.3.Working of Content Based Filtering

C. Collaborative Filtering:

Collaborative filtering is a method that makes recommendations by identifying users with similar behaviors or preferences. The underlying idea is that people who have shown similar interests in the past are likely to enjoy the same items in the future. Instead of analyzing the content itself, this approach groups users based on their activity or preferences and suggests items that peers in the same group have liked. For music, this might mean recommending tracks that other listeners with similar tastes have enjoyed, even if the user hasn't heard of them before.

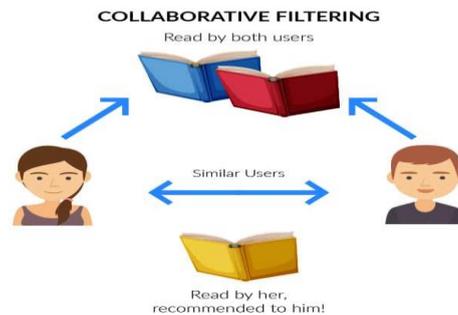


Fig.4.Working of Collaborative Filtering

There are two ways: • User -based: recommend songs that users who are similar to you like. • Based on elements: recommends songs that are often heard together by many users.

D. Rider API:

Rider API can play a valuable role in a song recommendation system by improving the interaction and user experience through advanced language processing capabilities. While the offspring is mainly known by grammatical verification and the improvements of conversational ones, it can be integrated into a recommendation system to improve chatbot interfaces, handle users' consultations more naturally and customize the answers. For example, when users write requests from vague or grammatically incorrect songs, such as "reproducing something relaxed of the successes of last weekend", Sapping natural language processing tools can help analyses the intention with precision, which makes it easier to connect users with the right tracks.

E. Spotify API:

Spotify API can be used to build a song recommendation system by providing access to rich musical data, including track metadata (such as the song title, artist and album) and audio characteristics such as tempo, energy, dancing and Valence. When analysing these characteristics, you can understand the characteristics of the songs that a user enjoys and recommends similar clues using method such as content based filtering, collaborative filtering or a hybrid approach. With the user's permission, the API can also access the reproduction lists and the songs liked, allowing to customize the recommendations. This allows the creation of intelligent reproduction lists, based on the mood or gender specific adapted to individual listening preferences. Spotify API is a powerful tool that developers can use to access the vast Spotify musical catalog 3 4 and user -related data to create music applications, recommendation systems, analysis tools and API web spotify, allows applications to interact with the spotify platform programmatically.

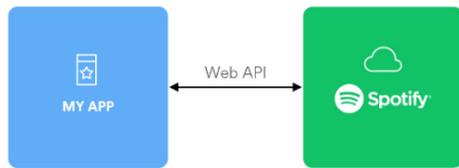


Fig.5.Working of Spotify API

F. Frontend and Backend:

The front end plays a vital role in delivering an engaging and user-friendly experience. In the case of a chatbot, the front end typically involves designing the Graphical User Interface (GUI) that users interact with. HTML (HyperText Markup Language) is widely used to build these web-based interfaces. On the other hand, the back end of the system handles the logic and data processing, utilizing technologies such as the Rider API and the Last.FM API to support functionality and provide relevant data.

VI. APPLICATIONS

Emotions -based musical recommendation: Tailor musical recommendations to the emotional state of users, providing a personalized and emotionally resonant experience. This could be used in therapeutic environments to help users regulate their mood through music.

Improvement of customer satisfaction: Personalized interaction improves user participation and satisfaction, so it is a valuable tool for music transmission platforms that seek to retain users by offering a unique and personalized experience.

VII. RESULT ANALYSIS

The Song Recommendation System successfully used collaborative filtering and filtering techniques based on content to generate personalized songs suggestions for users. Using content -based filtering, the system recommended songs with similar attributes, such as gender, tempo and mood, for which they previously liked a user. This assured that the recommendations will be closely aligned with individual listening preferences. Collaborative filtering uses a user's listening history and behavior to recommend songs favored by others with similar tastes. This often introduces a wider range of music, sometimes even outside the user's usual genres, leading to unexpected and fresh discoveries. In experiments with a sample user data set and the Spotify website, the hybrid model (which combines both filtering methods) showed a better accuracy of recommendation, diversity and user satisfaction compared to the use of any of the methods alone. Users received more relevant and pleasant suggestions, especially when Spotify audio characteristics (for example, energy, valence, danceability) were integrated into the model.

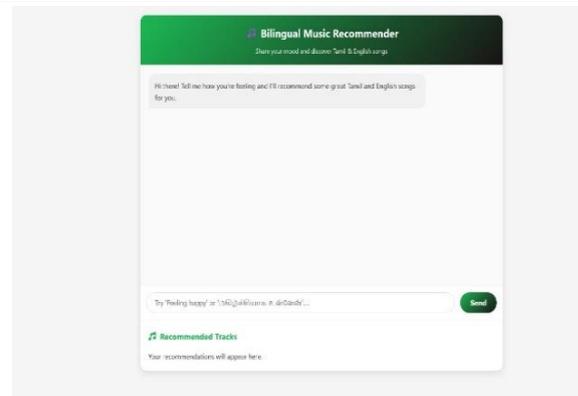


Fig.6. Chatbot

Real -time integration (Spotify API) By taking advantage of the Spotify website, the system obtained real -time data that includes: • Song audio characteristics (for example, danceability, tempo, mood) • The best user tracks and recently played songs • Spotify's own recommendation engine as an additional layer This assured that the model remained updated and dynamically adapted to recent listening behaviour.

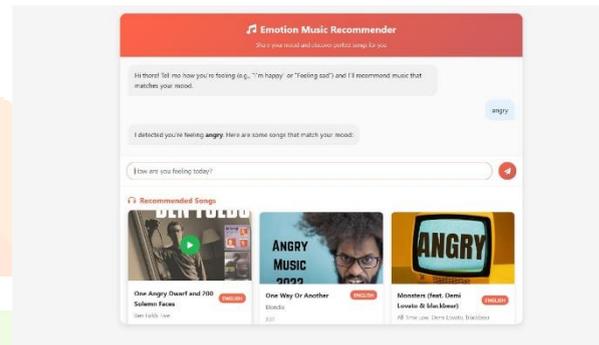


Fig.6. Prediction Result

VIII. CONCLUSION

In conclusion, the song recommendation system effectively demonstrated how the combination of content -based filter methods can improve the quality of music recommendations. Although content -based filtering guarantees alignment with the specific preferences of a user, collaborative filtering introduces diversity and helps discover new music based on community trends. The integration of the data in real time using the Spotify API added practical functionality and richer recommendations. In the future, the system can be further improved with deeper user interaction data, real -time feedback loops and better natural language processing to interpret users' entries with greater precision. In general, this approach offers a scalable and attractive solution for the discovery of personalized music.

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