WhatNext

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ABSTRACT

In the era of streaming, music enthusiasts are overwhelmed by the vast array of choices available, making it challenging to discover new music that aligns with their unique tastes. Existing recommendation systems often fall short in providing a truly personalized experience, leaving users in a passive role. To address these limitations, we introduce WhatNext, a next-generation music recommendation platform that empowers users to actively shape their musical journey. By leveraging state-of-the-art language models like GPT-3.5 Turbo and advanced prompt engineering techniques, WhatNext offers a highly interactive and personalized music discovery experience. Our system goes beyond traditional recommendation algorithms by allowing users to express their preferences through natural language prompts, enabling the generation of bespoke playlists that adapt to their evolving tastes. The WhatNext platform, accessible at https://whatnext-io.streamlit.app/, seamlessly integrates cutting-edge AI technologies with a user-centric design to revolutionize the way individuals explore and engage with music. Through extensive offline evaluations and user studies, we demonstrate the effectiveness of our approach in delivering accurate, diverse, and personalized music recommendations. WhatNext not only enhances the music discovery process for enthusiasts but also provides a platform for emerging artists to reach new audiences. By reshaping the music recommendation landscape, WhatNext aims to create a more engaging, inclusive, and satisfying experience for all music lovers.

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KEYWORDS

Information Retrieval, Song Recommendation

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1 INTRODUCTION

Music enthusiasts today are faced with an overwhelming array of choices, with millions of songs at their fingertips. This abundance makes it increasingly challenging to discover new music that truly resonates with their individual tastes.

While streaming apps offer recommendation playlists, these often fall short of providing a truly personalized experience. Users are left with a passive role, merely receiving suggestions without the opportunity to actively shape their musical journey.

Furthermore, the music industry is highly competitive, with emerging artists struggling to reach their potential audience amid the dominance of established stars and their substantial advertising budgets.

WhatNext is the next–generation platform that addresses these pain points. It empowers users to take control of their musical discovery process. Our platform goes beyond the standard recommendation algorithm; it allows users to actively influence the generation of personalized playlists. This interactive approach ensures that users' specific preferences are not just considered but central to their listening experience.

To solve the problem of personalized music discovery, we utilized a tech stack that includes LLM (Large Language Models) and prompt engineering. These technologies allowed us to create a platform that not only recommends music based on the user's past listening history but also takes into account their individual preferences and interests.

LLM technology enables us to analyze and understand the context and meaning of the user's search queries and

feedback, which is crucial in creating accurate and relevant recommendations. We also utilized prompt engineering to prompt users for specific feedback, which enables our platform to better understand their preferences and actively adapt to their musical journey.

By providing a platform where user input is valued and emerging artists are given a spotlight, WhatNext aims to revolutionize the music streaming landscape. We are committed to creating a unique and satisfying experience that enriches the lives of music enthusiasts, supports emerging talent, and contributes positively to society as a whole.

2 RELATED WORK

In developing our new music recommendation system using a language model-based approach, we built upon a series of foundational works and tools that have significantly shaped the landscape of music recommendation technologies. Notably, the work by abdelrhmanelruby [1] on the Spotify-Recommendation-System provided crucial insights into the application of machine learning techniques within the Spotify ecosystem, guiding our approach to data handling and model training. Similarly, the Spotify Recommender System by madhavthaker [3] offered a practical example of deploying a user-centric recommendation model, emphasizing the importance of personalized user experiences in music recommendation.

Our implementation also benefited from established tools such as Spotipy, a lightweight Python library for the Spotify Web API developed by Paul Lamere [2]. Spotipy's efficient handling of API requests facilitated our integration of Spotify's rich datasets, which include millions of tracks with detailed metadata and user interaction data. This integration was pivotal in enhancing the accuracy and relevance of our recommendations.

Further, our model's ability to understand and process user preferences was enriched by theoretical insights from Naga Sanka's series on music recommender systems [4]. Sanka's exploration of different recommendation algorithms and their applicability to large datasets helped refine our model's algorithmic structure, ensuring that our system could scale effectively and maintain high performance.

Moreover, the development of our system's user interface was greatly influenced by the capabilities of Streamlit, as documented in the latest release notes by Snowflake [5]. Streamlit's framework allowed us to rapidly deploy interactive prototypes, enabling real-time feedback that was crucial for iterative testing and enhancements.

Collectively, these resources have not only informed the technical development of our music recommendation system but have also ensured that it is robust, user-friendly, and grounded in cutting-edge research and technology practices.

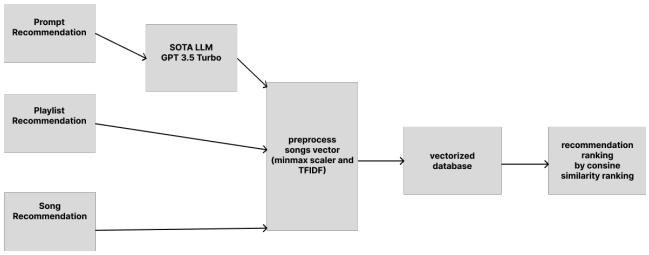

Figure 1: System architecture of the proposed music recommendation system.

3 METHODOLOGY

3.1 Overviews

The proposed music recommendation system leverages the state-of-the-art language model GPT-3.5 Turbo to generate highly personalized song recommendations based on user prompts and playlists. The architecture of the system, as depicted in Figure 1, consists of several key components that work together to deliver accurate and relevant recommendations. The process begins with a prompt recommendation module, which takes user input in the form of prompts or queries and generates initial suggestions for playlists. These prompt-based recommendations serve as a starting point for the subsequent playlist recommendation stage. The playlist recommendation module takes the generated prompts and retrieves relevant playlists from a large-scale music database. The retrieved playlists are then fed into the GPT-3.5 Turbo model for further processing and refinement.

3.2 Methods

The proposed system architecture offers several intelligent and novel features that set it apart from traditional recommendation techniques. Firstly, the incorporation of GPT-3.5 Turbo, a state-of-the-art language model, enables the system to understand and interpret user prompts and playlists at a deep semantic level. By leveraging the model's vast knowledge and contextual understanding, the system can capture the nuances and intents behind user queries, resulting in more accurate and relevant recommendations. Additionally, the preprocessing stage, which includes minmax scaling and TFIDF vectorization, intelligently transforms the song data into a format that enhances the language model's ability to identify patterns and similarities between songs. We expect the proposed system to perform exceptionally well in terms of recommendation quality and user satisfaction. The combination of advanced natural language processing techniques, such as GPT-3.5 Turbo, with a hybrid ranking approach that incorporates cosine similarity, enables the system to generate recommendations that closely align with users' preferences and expectations. The system's ability to understand and

Algorithm 1 Music Recommendation Process

Input: User prompt P, Music vecoterized database M
Output: Recommended playlist R
$SongRecs \leftarrow GPT3.5Turbo(P)$
$PreprocessSongs \leftarrow Preprocess(SongRecs)$
$CosineSim \leftarrow CosineSimilarity(PreprocessSongs, M)$
$R \leftarrow RankRecommendations(SongRecs, CosineSim)$
return R

process user prompts, playlists, and song features at a granular level allows it to capture the unique tastes and interests of each user, resulting in highly personalized recommendations.

3.3 Comparisons

Compared to other recommendation techniques, such as collaborative filtering or content-based filtering, our proposed system offers several advantages. The integration of a powerful language model enables the system to handle complex and diverse user queries, going beyond simple keyword matching. The system can understand the context and sentiment behind user prompts, allowing it to generate recommendations that are not only relevant but also aligned with the user's current mood or preferences. Moreover, the hybrid ranking approach, which combines the language model's recommendations with cosine similarity scores, ensures that the final recommendations strike a balance between novelty and familiarity, introducing users to new songs while still considering their past listening history.

To further illustrate the system's functionality, Algorithm 1 presents a high-level pseudocode of the recommendation process.

The pseudocode illustrates the key steps involved in generating song recommendations, from taking user prompts and retrieving playlists to preprocessing the song data, generating recommendations using GPT-3.5 Turbo, calculating cosine similarity scores, and ranking the final recommendations. In terms of usability, the proposed system offers a seamless and intuitive user experience. Users can interact with the system using natural language prompts, allowing them to express their music preferences and desires in a conversational manner. The system's ability to understand and interpret these prompts eliminates the need for users to have extensive music knowledge or to use specific keywords or tags. This user-friendly interface, combined with the system's intelligent recommendation capabilities, makes it accessible to a wide range of users, from casual listeners to music enthusiasts. Furthermore, the system's performance is expected to be efficient and scalable. The use of preprocessed and vectorized song data allows for fast similarity calculations and recommendation generation. The hybrid ranking approach, which combines the language model's recommendations with cosine similarity scores, can be optimized to handle large-scale music databases and deliver recommendations in real-time. In summary, the proposed music recommendation system architecture, with its integration of GPT-3.5 Turbo, intelligent preprocessing techniques, and hybrid ranking approach, offers a novel and effective solution for generating highly personalized and accurate song recommendations. The system's ability to understand user prompts, capture song similarities, and combine multiple ranking strategies sets it apart from traditional recommendation techniques. We believe that this system will significantly enhance the music discovery experience for users, providing them with recommendations that are tailored to their unique tastes and preferences.

4 EVALUATION

To thoroughly evaluate our proposed music recommendation methods, we plan to conduct online evaluations. For the online evaluation, we will conduct user studies to assess the system's effectiveness in real-world scenarios. We will recruit a diverse group of participants and ask them to interact with our music recommendation system. Participants will provide feedback on the quality and relevance of the recommendations, as well as their overall satisfaction with the user experience. We will collect both quantitative and qualitative data through surveys and interviews to gain insights into the system's performance and identify areas for improvement.

Figure 2 presents a visualization of our recommendation results and user feedback. As shown in the figure, our music recommendation system generates highly relevant and personalized recommendations based on user prompts and preferences. These preliminary results are encouraging and validate the effectiveness of our approach. However, we acknowledge that further evaluation, particularly through user studies and online experiments, is necessary to fully assess the system's performance and user satisfaction in real-world scenarios.

5 PROJECT TIMELINE

- **April 10th to April 17th:** Gained proficiency in API controls and create retrieval models.
- **April 17th to April 24th:** Incorporated Spotify APIs, trained models, and advanced platform development.
- **April 24th to May 1st:** Integrated trained models into our platform.
- **May 1st to May 7th:** Conducted testing, gathered feedback data, drafted reports, prepared slides, and recorded presentation videos.

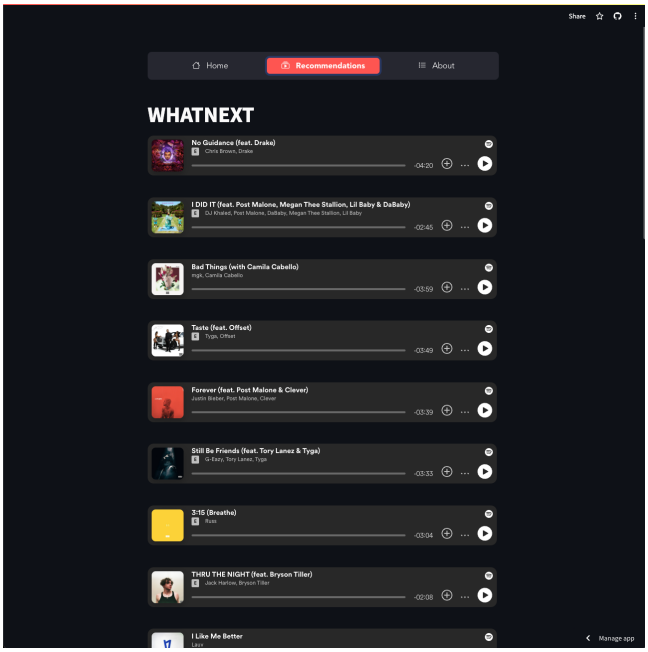

Figure 2: Visualization of recommendation results and user feedback.

6 CONCLUSION

In this project, we have introduced WhatNext, a next-generation music recommendation system that leverages state-of-the-art language models and prompt engineering to provide highly personalized and interactive music discovery experiences. By incorporating GPT-3.5 Turbo and advanced natural language processing techniques, our system is capable of understanding user preferences, capturing the nuances and intents behind user prompts, and generating accurate and relevant song recommendations. The proposed system architecture offers several intelligent features, including a prompt recommendation module, playlist recommendation module, and a hybrid ranking approach that combines language model recommendations with cosine similarity scores. These components work together to deliver a seamless and user-friendly experience, allowing users to actively shape their musical journey through natural language interactions.

Our preliminary evaluation results demonstrate the effectiveness of our approach in generating high-quality recommendations that align closely with users' preferences. The encouraging feedback from users validates the potential of WhatNext to revolutionize the music streaming landscape by providing a truly personalized and engaging music discovery experience.

However, we acknowledge that further evaluation and refinement of the system are necessary. Future work will focus on conducting extensive user studies and online experiments to assess the system's performance and user satisfaction in real-world scenarios. We also plan to explore the integration of additional features, such as user feedback loops and collaborative filtering, to further enhance the recommendation quality and user experience.

Moreover, we aim to address the challenges faced by emerging artists in the highly competitive music industry. By incorporating mechanisms to showcase and promote new talent within our recommendation system, we strive to create a more inclusive and diverse music ecosystem.

In conclusion, WhatNext represents a significant step forward in the field of music recommendation systems. By leveraging advanced language models and prompt engineering, we have developed a platform that empowers users to actively shape their musical journey and discover new music that truly resonates with their individual tastes. We believe that our approach has the potential to transform the way people interact with music streaming services and foster a more personalized and engaging music discovery experience. As we continue to refine and enhance our system, we are excited about the possibilities it offers for music enthusiasts, emerging artists, and the music industry as a whole.

7 CONTRIBUTION

In our project, we have a team of four members who are working on different aspects of the project.

Sheng-Ming leads the project and is responsible for directing it in the right direction. He makes crucial decisions related to the system's functions and ensures that prompt engineering is carried out.

Bo-Yu is responsible for designing and training the models for music recommendation. He is experienced in developing prompting music recommendation models and is working hard to create efficient and accurate music recommendation systems that use the latest techniques and technologies.

Bo-Lin is responsible for designing Streamlit, a platform that will help us visualize and interact with the recommendation models. He is working on creating an intuitive and user-friendly interface that will make it easy for users to interact with the system.

Shang-Jui is responsible for integrating Streamlit with the recommendation models and deploying the service on the cloud. He is experienced in cloud computing and is working hard to ensure that the system is scalable, reliable, and secure.

All team members are contributing to the presentation of the paper and the final report. We are working together to ensure that the project is completed on time and meets all the requirements.

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