# Chatbot Song Recommendation System

ANUSHA
PG Scholar
Department of MCA
Dayananda Sagar College of Engineering,
Bengaluru
anushasnavada@gmail.com

DR.SRINIVASAN V
Assistant Professor
Department of MCA
Dayananda Sagar College of Engineering,
Bengaluru
srinivasan-mcavtu@dayanandasagar.edu

Abstract- Human emotions have recently become much more important. Emotions are based on human feelings, which can be expressed or not, and they serve as different types of behavioral indications. The exclusion of emotions aids in identifying a person's behavioral state. The main objective of this paper is to recommend appropriate music based on the user's emotional state using a suitable API that is readily available. This paper focuses on a chatbot that uses artificial to analyze the user's tone in text form as users increasingly interact with systems through text and voice assistants. A chatbot is a computer software created specifically for messaging networks that uses artificial intelligence to engage in conversations with humans. The chatbot saves the user's input after each interaction and uses a tone analyzer API to process the user's text response for subsequent interactions. A significant source of entertainment and motivation to move on, music has the power to significantly enhance and improve one's mood. Recent studies have shown that music has a positive effect on human brain activity and that people respond and react favorably to music.

Keywords - Chatbot, Song recommendation, last.fm API, playlist generation.

## I. INTRODUCTION

Humans possess the remarkable ability to perceive and interpret emotions, which plays a vital role in successful communication. In fact, it is estimated that approximately 93% of communication relies on the accurate expression and understanding of emotions. Emotion detection is a crucial aspect of this paper, demanding high levels of accuracy. Fortunately, facial expressions serve as a reliable means for humans to comprehend and interpret emotions.

The field of Artificial Intelligence (AI) and machine learning has experienced tremendous growth, enabling the automation of various complex and laborious tasks. Emotion recognition has gained significant relevance in recent times, as there are numerous applications where machines can outperform human interpretation. The ability of automated decision-making systems to assess a person's emotional state makes them useful in a wide range of applica

-tions, such as personalized recommendations. People today frequently prefer listening to music that resonates with their current moods and interests. [6] A system that suggests songs to users based on their emotional states is the focus of this paper. By using computer vision components to analyze text and interactions, this is achieved. Inside of a chatbot. The chatbot performs the function of a virtual assistant, capable of participating in conversations to address user needs. These chatbot programs can easily be integrated into well-known platforms like Facebook Messaging, Slack, and others. [8] They do this through streamlining interactions between customers and services, enhancing the overall customer experience while giving businesses opportunities to increase customer engagement and operational efficiency, ultimately resulting in a reduction in costs of customer service.

This paper specific schema entails the development of a custom chatbot, serving as a fundamental step in the learning process of constructing professional chatbots. This paper aim is to overcome the limitations of existing chatbots primarily designed for business purposes. This comprehensive chatbot service not only facilitates meaningful conversations but also offers song recommendations based on the user's tone or emotional state. [5]To enable this song recommendation feature, we leverage the Last.fm API, similar to the widely used Spotify API. Additionally, we utilize the IBM Tone Analyzer API for analyzing the tone and emotions expressed in the conversation.

Collaborating with these APIs is crucial, as modern chatbots go beyond simple data-driven conversations, incorporating user-oriented features. This paper incorporates the process of emotion detection through text analysis, leveraging the capabilities of these APIs to enhance the chatbot's functionality.

I.

## II. LITERATURE SURVEY

Most mainstream audio and video recommender systems, such as Spotify, Netflix, Gaana, and YouTube, predominantly rely on search queries and user preferences, often overlooking the emotional aspect of user needs. However, a novel CNN- based model has been proposed to address this gap by detecting emotions and generating playlists tailored to the user's emotional state. This innovative model integrates specialized modules designed for detecting emotions conveyed through facial expressions as well as sentiments expressed during interactions with a chatbot. By incorporating these modules, the model enhances the overall

performance and robustness of the music recommender system, ensuring that users' emotional needs are effectively met.

This study introduces an alternative approach for song selection based on the association of colors with emotions, implemented through a Color-to-Music application. This project was divided into three stages: first, producing a music library that links colors to feelings and music; second, developing two different types of graphical user interfaces (GUI) for color selection; and third, gathering information from the 120 trial participants. The overall accuracy of the Color-to-Music Library is only 51.11 percent, which is a low accuracy rate. Methods (B)'s linkages between the HSV model and the fundamental aspects of music need to be improved. [1] Music Recommendation Based on Color – October 2020.

A human emotion recognition system is proposed, utilizing 2D-Linear Discriminant Analysis (LDA) embedded with 2D-Principal Component Analysis (PCA). Simulated results indicate that this method surpasses its counterparts, namely 2D-LDA and 2D-PCA, when employed for feature extraction. The KNN classifier demonstrates better performance compared to SVM when used with our proposed feature extraction method.

This paper presents a novel music emotion recognition model specifically designed for Scratch-generated music. Scratch offers a music module that enables children to create background music of their liking. The model utilizes a main melody extraction algorithm to build a dataset of Scratch-generated music. For each music piece, underlying features are extracted and input into a CNN module. The final classification results are then obtained by feeding the learned features from the CNN into an RNN. The RNN collects sequential information, whereas the CNN module concentrates on learning significant musical aspects. The emotion recognition model for music created using Scratch is not very accurate generally. Various emotion models may have various effects on MER tasks due to the complicated link between music emotion and the underlying elements of music. In addition, some musical qualities are lost during the creation of the Scratch-generated music dataset. Additionally, music emotion is not entirely encoded in the audio; as such, merely examining the audio data cannot reveal the full emotion of the music. [2] A Novel Music Emotion Recognition Model for Scratch-generated Music – August 2020.

The innovative competence-based song suggestion problem is presented in this paper. They created a singer profile that accounts for voice pitch, intensity, and quality to represent a singer's vocal prowess. To train a speech quality

evaluation function that could be calculated at query time, we presented a supervised learning approach. Additionally, a scaled-down vocalist profile is suggested to lessen the recording task in competency modeling.[3] Competence-Based Song Recommendation: Matching Songs to One's Singing Skill – March 2015

A chatbot is an AI-powered computer program that engages in conversations with humans, typically through messaging platforms. This schema explores the application of Artificial Intelligence and Machine Learning advancements to enhance various services. The chatbot program utilizes WordNet to match the input statement with the closest matching response and selects a suitable response from a known set of statements. The project's objective is to implement an online chatbot system that assist users accessing a college website, leveraging AI techniques such as Natural Language Processing.

## III. PROPOSED METHODOLOGY

Definitions:

A chatbot is a conversational software program designed to replicate human communication skills. It engages people in discussion automatically. It's a modern, innovative method of customer service that makes use of a chat interface and artificial intelligence. [10]AI-powered chatbots have the ability to understand natural language, discern meaning and emotion, and formulate smart responses. Customers don't have to wait in phone lines or send a lot of emails to get answers to their questions, for instance, and may do it in a comfortable way. Chatbots can reduce call volume, average handling times, and customer service expenses. It is not simple, though, because achieving these traits calls for a variety of complex system interactions. The word 'AI chatbot' is used in this study as a synonym for a conversational agent or advanced dialogue system.

Taxonomy of Chatbot:

Two significant developments have contributed to the rising interest in chatbots. First of all, the expansion of messaging services has been growing in recent years. It includes features like payments, purchasing, and booking that require a different program or website. In order to avoid downloading several applications, users can carry out tasks like making purchases, bookings at restaurants, and question-asking all through their chosen chat apps[9]. The most well-known applications include Line, WeChat, WhatsApp, and Facebook Messenger. Second, the ability to understand and make decisions using inexpensive computer power purchases, bookings at restaurants, and question-asking all through their chosen chat apps. The most well-known applications include Line, WeChat, WhatsApp, and Facebook Messenger. Second, the ability to understand and make decisions using inexpensive computer power has significantly improved

thanks to a combination of deep learning, machine learning, and advanced AI techniques. It can manage the massive amount of data and process it to generate results that are better than those created by people.

Objective:

The purpose of our application is to identify the user's expressed mood, and after that, songs are played to match that mood. This program, in contrast to others, attends to the fundamental requirements of music listeners without upsetting them. Increase consumer happiness and involvement. Make as much of your platform as you can unique. Provide customers with an engaging, high-quality streaming experience. Develop the trust and listening abilities of your users.

Architectural Design:

The implementation of the proposed system utilizes machine learning, a prominent application of Artificial Intelligence, enabling systems to learn and adapt autonomously without requiring explicit programming by a developer. This system aims to construct a song recommendation system that suggests songs to users based on their behaviors, activities, or preferences. By leveraging information such as user similarity and previous playlist data, the system predicts user preferences, facilitating the recommendation of songs that align with their tastes.
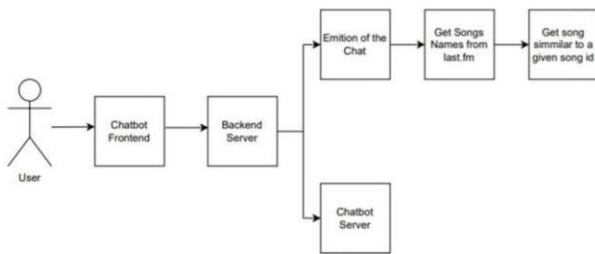
Fig 1: Architectural design of chatbot song recommendation system

Dataset: Songs that are based on conversations and emotions require datasets. In this case, the chatbot is capable of generating responses because it has already received training on a dataset of talks, which exposes it to a variety of dialogue samples. The emotion dataset also includes positive, negative, and neutral polarity. As a result, the dataset contains instances of exchanges and facial expressions that communicate emotions in all three directions: Positive (happy, excitement, or joy), Negative (sadness, wrath, or frustration), and Neutral (neutrality, indifference, or objectivity).

The chatbot can be programmed to recognize and react to various emotional cues in a conversation by including these emotion datasets into the model's training. Depending on whether the lyrics are meant to induce positivity, negativity, or neutrality, it can produce music lyrics that reflect the appropriate emotional tone. These datasets are used to improve the chatbot's capacity to produce songs that effectively capture the necessary conversational and emotional elements. The model may be made to comprehend and produce lyrics that correspond to particular conversational tenses and emotional tones by training it on these datasets.

| Conversation | | Emotion Dataset | | |
|---|---|---|---|---|
| Dataset | | Dataset | | |
| ID | Message | Bot replay | Emotion | Polarity |
| 001 | Hi | Hello | Positive | Positive |
| 002 | How are You? | I'm Fine, Thanks. | Negative | Neutral |
| 003 | I feel Sad. | Oh no, What's wrong? | Neutral | Negative |

Fig 2: Example conversation with chatbot

Last.fm: Setting up the Last.fm Songs API allows us to provide personalized song recommendations to users based on their tone or emotion. By utilizing this API, we can offer song suggestions without the need to gather extensive data, possess significant computational resources, or invest excessive time in web scraping for songs aligned with specific tone information previously extracted. In the Last.fm API, we use the "songs input" tag to retrieve songs.

Chatbot Server: Using flexible code that permits conditioning of the model's replies based on any categorical variable, the chatbot is built using Keras and TensorFlow. Cake Chat acts as the backbone for chatbots that can communicate their emotions. It offers a framework that makes it possible to incorporate emotional cues into the chatbot's responses, improving the effectiveness of how it expresses emotions. The code is flexible and enables developers to build chatbots with dynamic emotional capabilities by utilizing Keras and TensorFlow.

- The chat uses linguistic analysis to detect emotional and language tones in written text. Chatbot Server is a backend for chatbots the are able to express emotions via conversations. Based on emotion detected it will recommend the song from last.fm.Chatbot system has 2 module there are admin and user. Both module can login to system and access the features of the respective modules.
- Login: Here user allowed to access chatbot system. User can verifies themselves by providing their username and password.
- Admin: Admin can login by their login credentials then if any update is required admin can modify it, also admin can see the login details of the users.



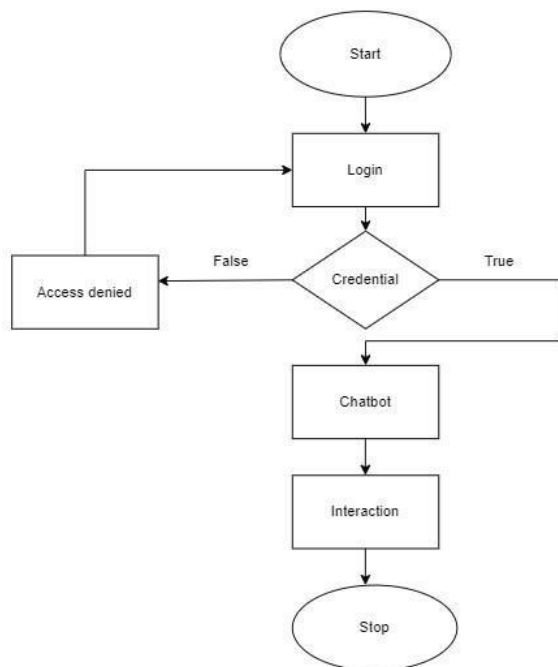Fig 3: Flowchart of chatbot song recommendation system

- Once the user login successfully user can redirected to chatbot page. Then the user can start the conversation with the chatbot. Chatbot receive the message from the user and it detects the emotion of the text message after that it recommends song along the text message.
- The dialogue context feature vector is assessed using cosine similarity to articles in the database.
- If the similarity is more than the cutoff, end the conversation and output dialogue context; otherwise, carry on speaking with the chatbot.
- Chatbot recommended songs are from playlist of the last.fm. User can exit the chatbot system by clicking on logout button.

## IV. RESULT

The chatbot song recommendation system would aim to

provide personalized music recommendations to users based on their preferences and listening history. It would integrate the Last.fm API, which offers access to a vast music database and user listening data.The result of the chatbot system would typically involve generating song recommendations based on various factors, such as user preferences, favorite artists, genres, or even current mood.

The system could use collaborative filtering techniques, content-based filtering, or a combination of both to generate relevant recommendations. The Chatbot song recommendation system predicts the song based on the tone of the user text and list of recent played song and new playlist is displayed at both side .By chatting with the user, the chatbot can determine the user's mood. The chatbot will recommend songs to the user after analyzing the user's input and current emotion or mood.

| ID | Favorite Artists | Genres | Listening History |
|----|------------------|--------|-------------------|
| 1 | Radiohead, Muse | Alternative rock, Indie | Karma Police,Uprising |
| 2 | Beyonce, Rihanna | R&B, Hip-hop | Formation, Work |
| 3 | Ed Sheeran | Pop,Singer-songwriter | Shape of You |

Fig 4: User Preferences and Listening History

Discussion:

The debate over a Last.fm API-based chatbot music recommendation system might touch on a number of different topics.

- Recommendation accuracy: A key topic of discussion would be the recommendation system's efficacy and accuracy. The performance of the system might be evaluated by looking at user feedback and satisfaction with the recommendations. Consider metrics like recall, precision, and user engagement.
- Personalization: An significant subject would be how much the algorithm adapts recommendations to the preferences of certain individuals. To improve the system's capacity to deliver pertinent recommendations, personalization techniques like collaborative filtering, user profiling, or machine learning algorithms should be investigated.

- User experience: The conversational capabilities and user interactivity of the chatbot would also be discussed. It would be beneficial to evaluate the chatbot's capacity to comprehend user inquiries, answer appropriately, and participate in a natural and meaningful discussion.

- Integration with Last.fm API: The Last.fm API's integration into the chatbot server's implementation specifics may be the topic of discussion. This would include subjects including maintaining effective communication between the chatbot and API, dealing with API queries, retrieving and processing data, and handling authentication.

- Ethical considerations: Discussion topics would include the effect of the recommendation system on user privacy, data security, and the potential for biased or filter bubble-like recommendations. It would be essential to address these moral concerns and put in place suitable protections.

Overall, the effectiveness, personalization capabilities, user experience, technical implementation, and ethical issues of a chatbot song recommendation system employing the Last.fm API and a chatbot server would be the main topics of discussion.

## V. CONCLUSION

Chatbots have emerged as valuable tools for simplifying human work through effective communication. While current research primarily emphasizes response improvement, there is a pressing need to explore linguistic aspects like emotional and sentiment analysis. Incorporating these features can enhance user experience by enabling chatbots to provide personalized and empathetic interactions. Additionally, leveraging artificial intelligence offers a promising avenue for enhancing chatbot capabilities and services. This research direction can lead to intelligent and efficient chatbots that cater to diverse user needs. Moreover, the proposed work on human emotion recognition can be extended to effectively recognize mixed emotions, enabling a deeper understanding of individuals' emotional states. By considering these avenues, chatbots can evolve into powerful assistants, simplifying tasks and offering valuable support to humans in various domains.

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