A Hybrid Approach To Music Recommendation Using Sentiment Analysis

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***Abstract*— In today 's fast - paced scenario, music systems allow quick access to huge volumes of content. They are always trying to enhance music organization and search management, dealing with the issue of choice and making it easier to discover new music pieces. Recommendation systems are becoming increasingly common, assisting consumers in selecting acceptable soundtracks for all times. But although, there seems to be a void in customization and suggestion based on mood of the end user. Music has a powerful impact on people and is extensively utilized for relaxation, mood control, stress relief, and illness prevention, as well as to sustain mental and physical work. The creation of a personalized recommendation system based on listener's sentiments, moods, and activity settings will be proposed in this research paper. This recommendation system is being developed using the concept of sentiment analysis to assist people with music choices for everyday circumstances while also maintaining their mental and physical health.**

Keywords*— Sentiment analysis, music recommendation, collaborative and content-based filtering, hybrid approach.

I. INTRODUCTION (*HEADING 1*)

There has been a large number of studies done on the physiological and emotional effects of music on humans. Music listening has a tremendous impact on an individual's moods and ideas, influencing mental and physical health, and the concept of music wellness support is gaining prominence.

In the treatment of depression, music therapy is seen to be a beneficial adjunct to regular care. This system can be recommended for a variety of purposes, including intellectual and physical job assistance, learning, activities, relaxation, anxiety and weariness reduction, music therapy, etc.

We propose the creation of a customized mood based music recommendation system in this paper. The recommender's primary goals are to handle the choice dilemma, explore new music pieces, promote emotional and physical welfare, and aid in the improvement of working processes. The design incorporates a hybrid approach to music recommendation using sentiment analysis, and treatment methodologies. The article explains how to use mood-driven personalization in the music selection process.

This paper develops a hybrid method using sentiment analysis to music recommendation by combining the advantages of collaborative filtering with content-based filtering. Additionally, this technique gives greater variance in selections, giving the consumer more opportunities for exploration.

The section that follows discusses design interfaces for the recommendation system as well as discussion about sentiment analysis. The third section offers a discussion of the implementation and user interface of the recommender system. The fourth section depicts the recommendation system's architecture. The final section of this study discusses the future scopes, references and conclusion.

II. DESIGN INTERFACE

The user interface, or frontend, was maintained basic and with the advent of Web Services Technologies, it is now possible to handle the aforementioned difficulties by utilizing a new set of technological solutions. The creation of a personalized recommendation system based on listener's sentiments, moods, and activity settings will be proposed in this research paper. User interfaces can be created using HTML, CSS, JavaScript and other technologies. Similarly, there are several options for backend development, but in this project we used Python as backend along with Django

framework. The frontend is the part of the site that visitors can see and interact with, such as the graphical user interface (GUI) and the order line, which includes the plan, menus, messages, photographs, recordings, and so on. Contrary to popular opinion, the backend is the part of the site that clients cannot see or communicate with. The language used for development of Mood Based Music Recommender System is HTML, CSS, JavaScript and Python.

A. HTML and CSS

The majority of websites are written in HTML. HTML is used to create and maintain functional web pages. It stands for Hypertext Markup Language. Hypertext is a method of linking at least two website pages (HTML documents) altogether. CSS stands for Cascading Style Sheets, and it's a simple plan language used to make pages look good. The design and feel of a website page is controlled by CSS.

B. JAVASCRIPT

JavaScript is a sophisticated programming language for personal computers. It's a lightweight feature of pages whose implementations allow customer-side content to collaborate with the user and create webpages. It's an object-oriented programming language that can be interpreted.

C. PYTHON

Python is a high-level, general-purpose programming language that is interpreted. The use of considerable indentation in its design philosophy prioritizes code readability. Its language elements and object-oriented approach are aimed at assisting programmers in writing clear, logical code for both small and large-scale projects.

D. DJANGO FRAMEWORK

Django is a free and open-source web framework based on Python that uses the model–template–views (MTV) architectural paradigm. Django's main purpose is to make building complex, database-driven websites easier. The framework prioritizes component reusability, low coupling, explosive growth, and the "don't repeat yourself" philosophy.

Hybrid Approach to Music Recommendation System:

There are various disadvantages of only relying on collaborative filtering to recommend music. The "Cold Start" is the most serious issue. Music songs are only labelled as frequently as users find or listen to them. In other words, there are few or no 'tags' present to characterize new music or music that has yet to be found. Furthermore, users are more ready to provide tags for music they appreciate the most than for tunes they enjoy either marginally or not at all. As a result, it is difficult for a collaborative filtering system to deliver reliable suggestions when there are insufficient music tags available for a recording music.

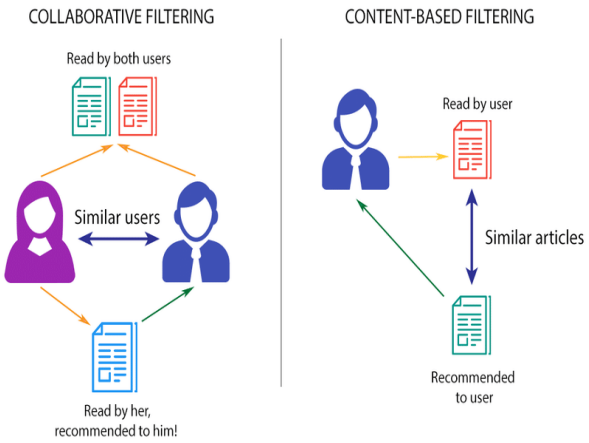

Fig. 1. Collaborative filtering vs Content-based filtering

Content-based recommendation systems that depend largely on automated extraction of auditory elements need more processing time and resources. Scalability issues will arise in systems that use manual extraction of music characteristics. More resources are needed to assess new songs as more content is created and freely accessible (in shops and online).

A hybrid technique is presented, which will take use of the advantages of user-supplied music tags (collaborative filtering) and automatic extraction of acoustic data (content-based filtering). This approach will address the shortcomings of system that depends exclusively on one or the other.

Sentiment Analysis:

The phrase "Sentiment Analysis" implies that it is an examination of the numerous feelings expressed by people on the internet, as well as the opinions/feedback provided by consumers to various commercial firms. In our daily lives, a simple example of sentiment analysis is when you browse for film reviews prior enjoying it; there are specific tools available exclusively to evaluate the movie reviews. On a larger level, emotional analysis or opinion mining employ data mining and natural language processing (NLP) tools to identify, extract, and synthesize thoughts and feedback from the huge textual content of the internet these days.

Sentiment analysis enables us to follow people's views and sentiments on the internet. People create blog entries, comments, reviews, and tweets about a wide range of subjects. We can track items, businesses, and individuals to see if they are being appreciated or badly on the internet.

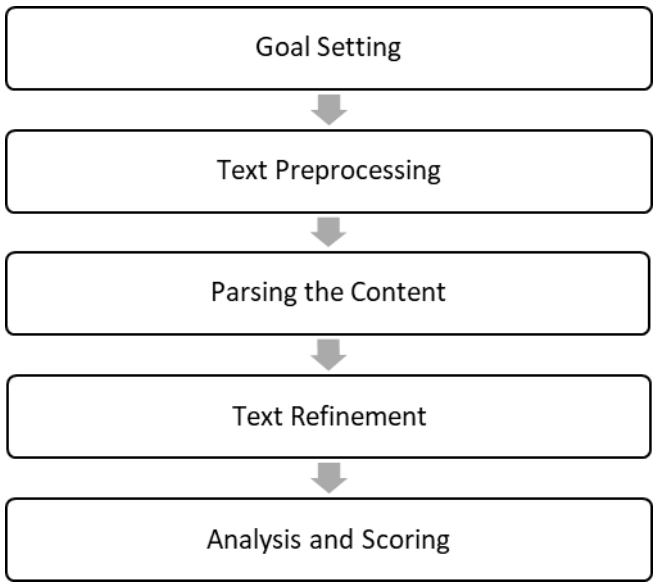

Fig. 2. General workflow of the Sentiment Analysis Process

III. IMPLEMENTATION

User Interface:

Figure no. 3 is the user interface of the home page. User will click on the "Get Started" button for using this application.

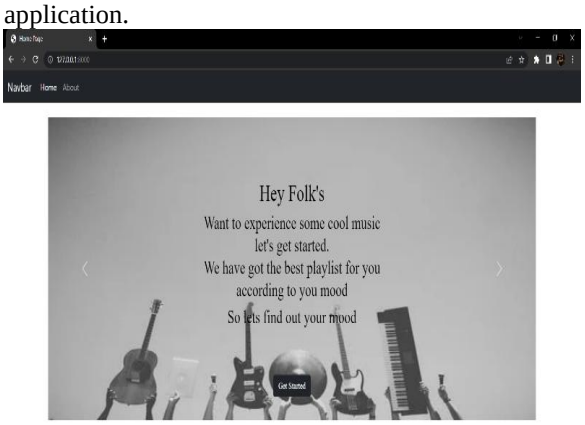

Fig. 3. Home Page

In figure no. 4 user will be asked a question randomly and user will give the answer in single sentence and then user will click on "Submit Text" button and if user wants to respond the question by speaking then he can click on "Submit Audio" button.

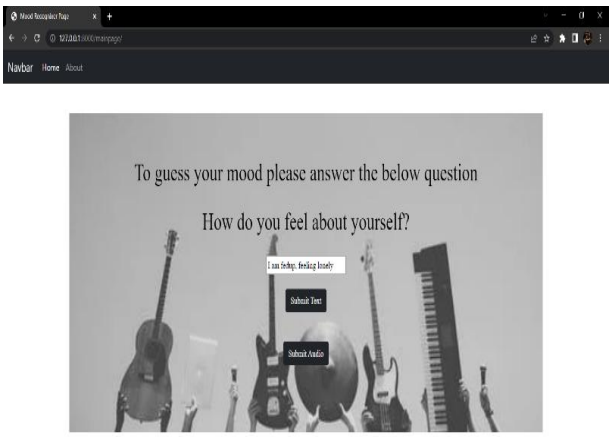

Fig. 4. Entering the current feeling in UI

In this figure, current mood of user is displayed along the "Play Music" button. User needs to click on "Play music" button to play the music.

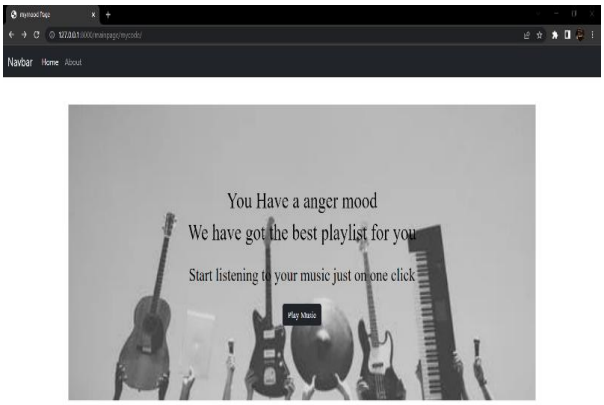

Fig. 5. Displaying the mood of user

Data flow diagram:

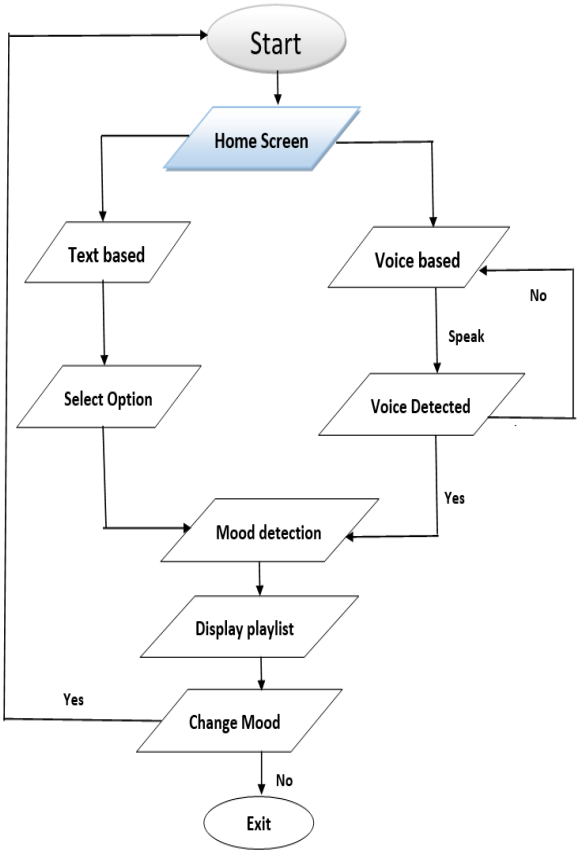

Fig. 6. Dataflow diagram

IV. Conclusion And Future Scope

Music can be recommended for a variety of purposes, including intellectual and physical job assistance, learning, sports, relaxation, stress and weariness reduction, music therapy, and many more. We propose the creation of a customized emotion-driven music recommendation system in this paper. The recommender's primary goals are to handle the choice dilemma, explore new music pieces, promote emotional and physical welfare, and aid in the improvement of working processes. This thesis explains how to use emotion-driven personalization throughout the music suggestion process. The goal of this study is to construct a music recommendation system that can recognize the user's current state of mind and then propose a soundtrack depending on the identified emotion.

In future study, developing a new mood recommender system that provides high accuracy at all sentiment statuses while providing high precision value at pleasant emotion. To identify emotions with amazing precision, we need to create our system with a large number of songs and locate additional songs that match the feelings.

Furthermore, we have to make our approach more particular to the time users stream music, such as selecting if he is travelling, on weekend trip, or at the workout and suggesting songs depending on time and mood. In addition, we may employ Flink approaches to accelerate the process of identifying the best music for the users and measuring response time.

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