Generative AI Project Proposal

Playlist Generator that Resonates with Emotions

Batch 11

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Abstract

The rapid growth of music streaming platforms has created an immense demand for personalized listening experiences.
Music profoundly influences human emotions and serves as a companion to moments of joy, sorrow, and introspection. While the current music recommendation systems work well in recommending popular tracks based on the listener's history, they often lack the depth to adapt to the user's emotional state in real time. We offer a music playlist generation solution using LLMs, delivering advanced features beyond the reach of traditional models.

Problem Statement and Novelty

We propose a music system based on speech emotion recognition. The proposed model will recommend live playlists based on the user's emotion where the emotion is extracted from speech or text input and the system generates music playlists as per the emotion class that has been recognized.

While there has been work done on this before, Large Language Models have not been used extensively for playlist generation. It has been used to *create* music, but in the field of recommendation, there is more scope for its utilization. Furthermore, many existing approaches focus on monolingual playlist creation. Our approach aims to enable multilingual emotion-driven playlist generation diversifying user experience.

Project Objectives

Existing music recommendation systems prioritize user preferences based on historical data or trends but fall short in adapting to a user's current emotional state. Moreover, these systems seldom provide intelligent sequencing of songs based on emotional relevance or flow. There is a lack of AI-powered systems capable of analyzing text-based emotional cues and generating personalized playlists tailored to those emotions.

01. Emotion Recognition from user input. Integration of Speech-to-Emotion and Music Recommender Systems

02. Diverse and multi-lingual music selection which is aligned with the user's emotional state.

03. Dynamic Playlist Recommendation

Workflow

01

The system will take in user information in the form of either text or voice recordings.

02

The data is analyzed and interpreted and the emotion or “mood” is extracted.

03

Using the Spotify API, various songs are classified based on the acousticness, tempo, loudness, danceability, instrumentalness, etc. Songs of various languages can be classified based on translation with NLP or similarity in sound.

04

The user-curated, personalized playlist is created. (There is scope for a rating system where the user’s satisfaction level will be taken into consideration for future improvements.)

Outcomes

- Instantly generate playlists that match the user's current mood or emotional state
- Over time, the system adapts to user preferences, providing increasingly accurate playlists.
- Song ordering to enhance emotional transitions and ensure better listening experiences.
- Support for text, audio cues for emotion detection
- Users can provide the chatbot with multiple emotions and receive an output according to the given emotions.
- Users can adjust the genre
- Generate playlists for group activities, blending the emotional states of multiple users.
- Create playlists tailored to specific events or occasions.

Literature Survey

AI based Emotion Aware Music Composition using Spotify App

- Proposes a music player that uses real-time **facial expression analysis** to detect emotions and recommend personalized music aligned with the user's mood, enhancing their listening experience.
- Explores AI and machine learning to create emotionally resonant music, bridging human creativity and technology for engaging compositions.
- Combines psychology, music theory, and machine learning to detect emotions and compose music with emotional authenticity.

Spotify Playlist Organization - Mood-Based Cluster Analysis

- The paper aimed to organize Spotify playlists using clustering algorithms, focusing on **mood-based** organization by grouping tracks with similar audio features.
- Extracted and standardized audio features from the Spotify API were clustered using **KMeans, DBSCAN, Affinity Propagation, and Spectral Clustering**. The performance was evaluated based on silhouette score, execution time, and manual inspection of clustered tracks.
- **KMeans** was identified as the most effective algorithm for this task, achieving the **highest silhouette score (0.263)** despite having the third-best execution time. This model effectively organizes playlists into smaller mood-based subsets.

Literature Survey

Emotify : An AI-Powered Emotion-Based Music Recommendation System

- Takes speech input from the user in form of Wave- form Audio (WAV) file.
- The audio data is preprocessed from Librora Library
- A CNN layer identifies the emotions of the user + 2 LSTM layers
- LSTM layers analyse the temporal dependencies
- Predicted emotion is used as input for the K means clustering model

Playlist Search Reinvented: LLMs Behind the Curtain

- Aim to enhance user experience through improved retrieval mechanisms in music services.
- Integration of Large Language Models (LLMs) into the ML pipeline aims to address the drawbacks of search systems' lexical matching
- The goal is to enhance playlist search accuracy and relevance for better audio content discovery.
- Validation Accuracy stands at 82.7%

Literature Survey

Mood Player: Emotion Based Music Recommendation System

An Emotion-Based Music Recommendation System that detects the user's emotion through facial expressions and generates a personalized playlist. Using Convolutional Neural Networks (CNN) for emotion detection, the system automates playlist creation, improving efficiency, accuracy, and user experience while reducing manual effort in song categorization.

Automatic and Personalized Sequencing of Music Playlists

This paper proposes a method for transforming a non-ordered set of songs into a personalized playlist. It uses past listening patterns to mimic a user’s preferred song order

The core algorithm uses a combination of graph-based approaches and similarity metrics to determine the optimal order of songs.

The system incorporates a feedback mechanism where users’ interactions

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