

DESIGN AND IMPLEMENTATION OF EMOTION BASED MUSIC RECOMMENDATION SYSTEM

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Abstract:

Internet has brought numerous changes into our day-to-day life. As part of it, life changes in people took place. Unhealthy cultures, Unhealthy relations among people, and Irregular sleep touched off internal issues and to fight these problems people use the internet as an escape. The Internet has made our lives simpler by furnishing a plethora of apps and services, backed in carrying instant communication and numerous further. Entertainment consumption from the Internet especially music helps in dwindling stress, anxiety, or depression. harkening to right music at the right time improves internal health. To make music consumption accessible we're developing a System that plays music applicable to the stoner's emotion. stoner's emotion can be detected by facial expressions. These expressions can be captured from the camera. Machine literacy/Deep literacy provides colorful ways to descry mortal emotion. One similar fashion is CNN with Keras, which generates a small size trained model. Our proposed emotion-grounded music player system using CNN performs real time emotion discovery and plays a suitable song. It can be an fresh point to being music players in our bias. By suggesting suitable song to honored emotion druggies satisfaction can be bettered.

Keywords: Machine Learning/Deep Learning, CNN with Keras, real time

1. INTRODUCTION

An emotion-based music recommendation system is an innovative approach to music recommendation that uses machine learning algorithms to recommend music based on the emotional state of the listener. The system analyzes various features of a song, such as a tempo, rhythm, melody, and lyrics, to determine its emotional content, and then suggests music that matches the listener's current emotional state. The idea behind this system is to create a personalized music experience for the listener, helping them discover new music that resonates with their current mood and emotions. This type of recommendation system is particularly useful for individuals who use music as a means of emotional regulation, such as those with anxiety or depression. With the increase in consumption of Music, Music Industries have developed new technologies for personalized music. Many social media companies like YouTube, Instagram, and E-commerce companies like Amazon, and Ajio provide users with personalized recommendations based on their tastes and history. Whereas music companies like Spotify, and Gaana use Machine Learning and

Deep Learning techniques to provide appropriate recommendations.

2. LITERATURE SURVEY

1. Speech Emotion Based Music Recommendation

In this Paper, methodology involves using a Siamese network, a meta-learning model, for speech emotion recognition (SER) based on the RAVDESS dataset. Spectrograms are generated from speech signals, and the Siamese network is trained to recognize emotions. The Siamese network employs a contrastive loss function for effective learning with limited data. The recognized emotions are then mapped to music moods, and a recommendation module suggests songs based on user emotions. The recommendation system considers user feedback to enhance future recommendations. The approach aims to address the challenges of SER by leveraging meta-learning techniques, specifically Siamese networks, and extends the application to emotion-based music recommendation. Experimental results indicate promising accuracy in emotion recognition and music recommendation.

2. Music Emotion Prediction based on Hybrid Approach Combining Lyrical and Acoustic Approaches

The paper proposes an emotion-based prediction system using music lyrics and its acoustic features for mood improvement. The study employs Natural Language Processing (NLP) techniques for lyrics analysis and various machine learning classifiers for emotion prediction. The analysis includes sentiment analysis using NLP, classification algorithms such as Support Vector Classifier (SVC), Random Forest, Multinomial Naive Bayes, and more. The dataset comprises 1777 songs with features like lyrics, tempo, energy, danceability, loudness, valence, arousal, etc. The results indicate high accuracy for both lyrics and acoustic-based emotion prediction

models. The hybrid approach, combining lyrics and acoustic features in a 40:60 ratio, shows improved accuracy compared to individual models.

3. Facial emotion recognition using convolution neural network

The research paper introduces a system for Facial Emotion Recognition (FER) using Convolutional Neural Networks (CNN). Facial expressions are crucial for human communication, and the proposed system aims to recognize and interpret these expressions through advanced neural network techniques. The CNN, known for its pattern recognition capabilities, is chosen for its effectiveness in handling facial emotion recognition, even in non-frontal or odd angles.

The paper discusses the challenges associated with CNN-based detectors, specifically their computational heaviness, especially when dealing with video inputs. The proposed system aims to overcome these challenges by implementing FER using CNN on a dataset. The potential applications of the system include sentimental analysis, clinical practices, product reviews, and more.

The methodology involves image processing, where input images are converted into arrays of pixel values. Neural networks, inspired by the human brain, are discussed with layers like Convolutional Layer, ReLU Layer, Pooling Layer, and Fully Connected Network. The importance of activation functions and the concept of convolution operations in images are also explained.

4. Emotional Detection and Music Recommendation System based on User Facial Expression

The paper presents an emotion-based music recommendation system leveraging facial expression detection. The authors argue that music has a profound connection with emotions and that recommending songs based on a user's mood enhances their listening experience. The proposed system employs a neural network approach,

specifically a Convolutional Neural Network (CNN), to detect facial expressions from webcam or camera images. The system comprises three main components: face detection using HAAR cascades, emotion detection using a six-layer CNN model, and music recommendation based on the detected emotion.

The authors discuss related work, citing various approaches, including sentiment analysis from social media, physiological data from wearable sensors, and deep learning models for emotion detection. The proposed system aims to overcome existing limitations, such as real-time processing issues and playlist creation based on the user's current emotional state.

The implementation involves a dataset with images of different emotions, a face detection module using HAAR cascades, a CNN model for emotion detection, and a music recommendation system. The system waits for seven to ten seconds to detect a stable expression before recommending music based on the user's mood.

5. Emotion Based music Recommendation system

The proposed methodology aims to develop an Emotional Detection and Music Recommendation System based on user facial expression. The system captures user emotions through facial expressions using a webcam and recommends music that fits the user's mood. The process involves image capture, facial feature extraction, emotion classification, and music recommendation. The system is trained using datasets like CK+ and HELEN for emotion detection and facial landmarks.

The system's architecture consists of modules for emotion extraction, audio extraction, and emotion-audio integration. The Emotion Extraction Module captures user facial expressions and classifies emotions using a trained classifier. The Audio Extraction Module recommends music based on the detected emotion, and the Emotion- Audio Integration Module displays emotion-specific song lists to the user.

Experimental results show promising accuracy in real-time emotion detection scenarios. However,

limitations include challenges in correctly recognizing inner emotions and the system's sensitivity to lighting conditions and image quality. Future work may focus on reducing classifier training time, incorporating EEG signals for enhanced emotion detection, and addressing current limitations.

6. Feeling based Music Recommendation System using Sensors

The "Feeling-Based Music Recommendation System using Sensors" aims to enhance the user experience in music recommendation by incorporating physiological signals obtained through sensors. The proposed methodology leverages sensor data to understand and interpret users' emotional states, providing personalized music recommendations accordingly.

The system involves the use of sensors, presumably physiological sensors like heart rate monitors or galvanic skin response sensors, to capture real-time data reflecting the user's emotional state. These sensors detect physiological changes associated with different emotions. The acquired data is then processed to extract relevant features indicative of the user's feelings.

To develop a robust recommendation model, machine learning algorithms are employed to analyze and classify the emotional states based on the sensor data. The model is trained on a diverse dataset that correlates physiological patterns with specific emotional responses. This training enables the system to accurately infer emotions from real-time sensor inputs. The music recommendation component utilizes the identified emotions to suggest songs that align with the user's mood. This recommendation system enhances personalization by dynamically adapting to the user's emotional shifts in real time. The integration of sensors offers a more direct and immediate insight into the user's feelings, potentially leading to a more accurate and responsive music

recommendation experience.

4. METHODOLOGY

To create a smart music player system, this project intends to take advantage of the user and music player interaction that is already possible. The system's goal is to take accurate photos of the face using the camera. Convolutional Neural Network processes the captured pictures to predict emotions. After that, a playlist of songs is generated using the emotion extracted from the taken image

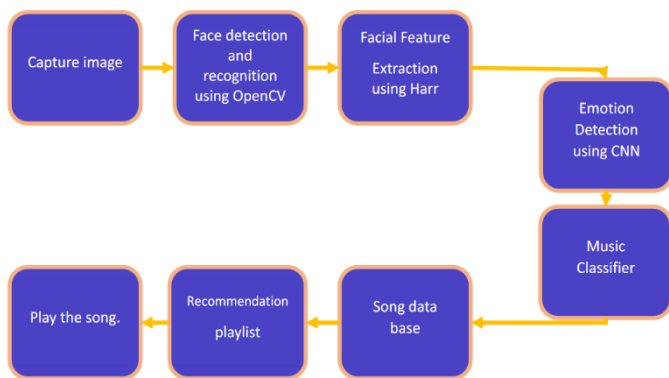


Fig 3.1 Block Diagram

5. CONCLUSION

A thorough review of the literature shows that there are many approaches to implementing an Emotion Based Music Recommender System. Many Developers and scientists have shown different ways to implement and design of this emotion-based music system and from the finding of all these ways the main objective of the system has been fixed. As the power and advantages of AI-powered applications are trending our project will show the utilization of this new technology. This project will give an overview of how music can affect anyone's mood and how it helps to improve anyone's mood when they get to listen to the right tracks at the right time. The system that has been implemented will detect the user's emotion. The emotions that the system can detect are happy, sad,

angry, neutral, surprise, disgust and fear. After detecting the emotion of the user, the system will provide the user with a playlist which contains the music choices that match the mood of the user. Processing a huge dataset is memory as well as CPU intensive. This will make the development more challenging. The main motive is to create this entire device in the cheapest way possible and also in a complete standard way possible. The device will reduce the user's effort of searching the music and also managing the playlists whenever needed according to their mood

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