

EMOTION BASED MUSIC RECOMMENDATION SYSTEM

Tadi Lahari¹, Sri Vaishnavi Garaga², Pedapati Vara Lakshmi Manasa³, Sudina Keerthi sri⁴

^{1,2,3,4}Department of Information Technology, Shri Vishnu Engineering College for Women Bhimavaram
Andhra Pradesh, 534202, India.

ABSTRACT

In today's fast-paced world, music serves as a universal language, accompanying us through moments of joy, solace, and everything in between. However, amidst the vast ocean of musical choices, finding the perfect song to match our current emotional state can often feel like searching for a needle in a haystack. Recognising the deep connection between music and emotions, our project introduces an innovative Emotion-Based Music Recommendation System. This system utilizes the cutting-edge technology of Convolutional Neural Networks (CNN) to analyse user's facial expressions in real-time, identifying their current emotional state. By analysing user's facial expressions captured through webcam streams, the system provides music playlist tailored to their current moods and preferences. Seamlessly integrated with popular streaming services like YouTube and Spotify, this music system aims to redefine the music discovery process, offering users a realistic and engaging experience that resonates with their emotions.

Keywords: Emotion Detection, Music Recommendation, Emotion Recognition

1. INTRODUCTION

In today's digital age, music recommendation systems have become indispensable tools for music enthusiasts seeking personalized playlists. However, conventional systems often overlook the emotional aspect of music, providing recommendations solely based on genre or popularity. This project aims to address this limitation by developing an emotion-based music recommendation system. By leveraging emotional analysis techniques, this system strives to offer users music suggestions that resonate with their emotional preferences, thereby enhancing their listening experience. This is an innovative system that combines real-time emotion recognition with personalized music recommendation, offering users a unique and immersive music listening experience. By analysing facial expressions captured through a webcam stream, the system detects user's emotional states and curates music playlists tailored to their moods. Through seamless integration with popular streaming platforms, such as Spotify and YouTube, This project transforms the way users interact with music, providing a dynamic and emotionally resonant journey through their favourite tunes.

2. PROPOSED SOLUTION

The proposed system marks a significant departure from traditional approaches to music discovery. While existing recommendation systems primarily rely on factors like user listening history, artist preferences, and song popularity, they often overlook the emotional dimension of music. In today's digital age, where personalized playlists are a staple for music enthusiasts, this limitation becomes apparent. However, this project seeks to revolutionize the landscape by introducing an emotion-based music recommendation system. By harnessing advanced emotional analysis techniques, the system aims to provide users with music suggestions that deeply resonate with their emotional preferences, thereby enriching their listening experiences. This innovative system represents a fusion of cutting-edge technology and personalized music curation. Through the use of webcam technology, the system can accurately detect user's emotional states by analysing their facial expressions. This allows it to dynamically curate music playlists tailored to match the user's moods. With its emphasis on emotional connection and personalized recommendations, this system has the potential to redefine how we interact with music in the digital age. By prioritizing the emotional aspect of music, it offers users a more holistic and fulfilling listening experience. As users navigate through their favourite tunes guided by their own emotions, they embark on a journey of self-discovery and musical exploration. This project represents a significant step forward in the evolution of music recommendation systems, promising to enhance the way we engage with and appreciate music.

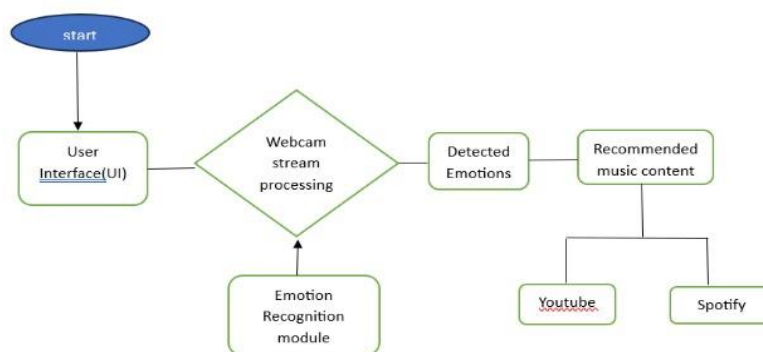
3. LITERATURE SURVEY

The existing landscape of music recommendation systems predominantly relies on user interaction, primarily through manual song selection or explicit feedback mechanisms like ratings and likes. However, traditional algorithms often exhibit limitations, particularly in their personalization capabilities and consideration of users' emotional states and contexts. These systems tend to offer generic recommendations based on aggregated user preferences, overlooking the nuanced emotional responses and individual preferences of users. Moreover, the integration of user context, such as current emotional states or situational factors, is often ineffective, leading to less relevant recommendations.

In response to these shortcomings, the proposed system introduces an innovative approach to music recommendation. Recognizing the growing importance of personalized playlists in today's digital age, the system aims to bridge the gap by prioritizing the emotional aspect of music selection. By leveraging advanced emotional analysis techniques, the system seeks to provide users with music suggestions that align closely with their emotional preferences, thereby enhancing their overall listening experience. Central to the proposed system is the integration of real-time emotion recognition technology with personalized recommendation algorithms. Through the analysis of facial expressions captured via a webcam stream, the system can accurately detect users' emotional states in the moment. Leveraging this data, the system then curates tailored music playlists designed to resonate with the user's current mood and emotional disposition. This integration of real-time emotion recognition not only adds a dynamic dimension to the music listening experience but also ensures that recommendations are highly relevant and engaging. Furthermore, the proposed system offers seamless integration with popular streaming platforms such as Spotify and YouTube. This integration facilitates easy access to a vast catalogue of music while ensuring a cohesive user experience across different platforms and devices. By transforming the way users interact with music, the system provides a dynamic and emotionally resonant journey through their favourite tunes. Overall, the advantages of the proposed system include real-time emotion recognition, music recommendation based on emotional cues, seamless integration with streaming platforms, and context-aware music selection, all of which contribute to a more immersive and personalized music listening experience for users.

4. METHODOLOGY

The project commenced with the development of an emotion detection model utilizing the VGG architecture from the Convolutional Neural Network (CNN) algorithm. This model was trained using a diverse dataset of facial expressions to accurately identify emotions in real-time. Subsequently, a web application was created using the Streamlit framework, providing an intuitive interface for users to interact with the emotion-based music recommendation system. To enhance the user experience, Streamlit_extras was employed for designing various UI elements such as buttons and logos, ensuring a visually appealing and user-friendly interface. Additionally, Streamlit_webrtc was integrated into the web application for real-time emotion capturing. This feature enabled users to have their emotions detected directly through their webcam feed, adding a dynamic and interactive dimension to the recommendation process.



To capture frames from the webcam feed and detect faces within these frames, MediaPipe was utilized. This module facilitated accurate and efficient face detection, enabling the emotion detection model to analyse facial expressions effectively. In addition to emotion detection, the web application incorporated language buttons created using Streamlit_extras, allowing users to select their preferred language for the interface. This feature enhanced accessibility and user engagement by accommodating diverse language preferences. Moreover, the music player functionality was integrated using the st_player feature of Streamlit, enabling the embedding of YouTube playlists directly within the web application. Furthermore, the iframe feature was utilized to embed Spotify playlists, providing users with seamless access to their favourite music content from both platforms. Overall, the combination of VGG-based emotion detection, Streamlit framework, Streamlit_extras for UI design, Streamlit_webrtc for real-time emotion capturing, MediaPipe for face detection, and st_player and iframe for embedding music playlists resulted in a comprehensive and immersive emotion-based music recommendation system with a user-friendly interface and seamless functionality.

5. RESULT

This system leverages cutting-edge facial analysis technology to precisely discern users' emotions in real-time. By analysing facial expressions captured through a webcam feed, the system accurately determines the user's emotional state. Once the emotional state is identified, the system dynamically adjusts its recommendations to match the user's

feelings. Furthermore, the system considers the user's preferences regarding the platform and language. Users can select their preferred platform, such as Spotify or YouTube, and choose their preferred language for the interface. Based on these selections, the system tailors its recommendations accordingly. For instance, if a user is feeling low, the system will suggest playlists with soothing and calming music to uplift their mood. Conversely, if the user is full of energy, the system will recommend playlists with upbeat and energetic tracks to match their vibe. This personalized approach ensures that users receive music recommendations that resonate with their current emotional state, enhancing their overall listening experience. Moreover, the system ensures accessibility by providing playlists in the user's preferred language. Whether users prefer English, Telugu, or any other language, the system caters to their linguistic preferences, making the interface more inclusive and user-friendly. In summary, regardless of whether users are feeling downcast or energized, this system ensures that they have access to the perfect playlist tailored to their emotions. With personalized recommendations available in their preferred language and compatible with their chosen platform, users can immerse themselves in a truly customized musical journey.

6. CONCLUSION

The Emotion-Based Music Recommendation System showcased here represents a monumental advancement in the realm of online music discovery and enjoyment. By seamlessly merging facial recognition technology with carefully curated music playlists, the system offers users a personalized and immersive listening journey. Its capability to adapt to user emotions not only heightens engagement but also underscores its potential to shape the future landscape of music recommendation platforms. Through this innovative fusion of technology and music curation, the system opens up new avenues for users to explore and connect with music in ways that resonate deeply with their emotions and preferences. With its promise of enhancing user satisfaction and engagement, this system stands as a significant milestone in the evolution of music recommendation systems.

7. FUTURE SCOPE

Looking forward, there are several promising directions for further research and development. Firstly, there is potential to explore and integrate more advanced facial recognition and emotion detection algorithms, such as those based on deep learning and neural networks. By leveraging state-of-the-art techniques, the accuracy and sensitivity of the emotion-based music recommendation system could be substantially enhanced, leading to even more personalized and relevant recommendations for users. Additionally, the system could be expanded to encompass a broader range of music genres and styles, catering to diverse user preferences. This expansion could involve the incorporation of additional data sources and collaborative filtering techniques to provide users with a richer and more varied selection of music recommendations. Future research efforts could focus on integrating user feedback mechanisms to continually refine and optimize the system. By soliciting and incorporating user input, the system can evolve in real-time to adapt to changing preferences and trends, ensuring its ongoing relevance and effectiveness. The future scope of this research could include the development of user login functionality to enhance personalization and user engagement. By implementing user accounts, the system can store and analyse individual listening history and preferences, further refining its recommendations over time. Additionally, user login can facilitate the integration of social features, allowing users to share and discover music recommendations from friends and connections within the platform. Overall, the future holds immense potential for further innovation and refinement of the Emotion-Based Music Recommendation System. With ongoing advancements in technology and data analytics, coupled with a deep understanding of user needs and preferences, the system is poised to continue revolutionizing the way users discover and engage with music online.

8. REFERENCES

- [1] Anagha S.Dhavalikar and Dr. R. K. Kulkarni, "Face Detection and Facial Expression Recognition System" 2014 International Conference on Electronics and Communication System (ICECS -2014).
- [2] F. Abdat, C. Maaoui and A. Pruski, "Human- computer interaction using emotion recognition from facial expression", 2011 UKSim 5th European Symposium on Computer.
- [3] F. Abdat, C. Maaoui and A. Pruski, "Human- computer interaction using emotion recognition from facial expression", 2011 UKSim 5th European Symposium on Computer.
- [4] Yong-Hwan Lee, Woori Han and Youngseop Kim, "Emotional Recognition from Facial Expression Analysis using Bezier Curve Fitting" 2013 16th International Conference on Network-Based Information Systems.
- [5] Anagha S.Dhavalikar and Dr. R. K. Kulkarni, "Face Detection and Facial Expression Recognition System" 2014 International Conference on Electronics and Communication System (ICECS -2014).