ACROPOLIS INSTITUTE OF TECHNOLOGY AND RESEARCH

Department of Computer Science Engineering (DS)

Synopsis on: A system that can recommend music based on real-time emotions and behavioural patterns.

1. INTRODUCTION

1.1 Overview

Music is known to affect human emotions and behaviour. A music recommendation system that interprets facial expressions and behaviour can enhance user experience by providing songs that match their current mood. This system bridges the gap between user emotions and music, creating a personalized listening experience

In today's fast-paced world, music is more than just entertainment—it's an emotional companion that can match, enhance, or change our mood. With advancements in technology, music recommendation systems have become more personalized.

However, these systems often rely on user-provided data like playlists, likes, or previous listening habits. They lack the ability to adjust music dynamically based on real-time emotional changes.

This project proposes a novel music recommendation system that to monitor facial expressions and behavioural patterns. The system automatically detects emotions such as happiness, sadness, excitement, or relaxation and suggests music accordingly, providing a highly personalized, real-time music experience [1].

1.2 Purpose

The purpose of this project is to create an intelligent, dynamic music recommendation system that adapts to the user's emotional state. It offers an automated solution for matching music to mood, reducing the need for manual input and enhancing user engagement. The system canused

in various environments such as personal listening experiences, therapeutic settings, fitness centres, or retail stores, providing an emotionally tailored atmosphere [2].

To develop a music recommendation system that analyses facial sentiments and behavioural cues to suggest appropriate music. To create an algorithm that can recognize emotions like happiness, sadness, anger, and relaxation from facial expressions. To offer a real-time user-friendly interface that suggests music dynamically as the user's mood shifts [2].

2. LITERATURE SURVEY

2.1 Existing Problem

Current music recommendation systems primarily rely on static inputs such as listening history, genre preferences, or manually created playlists. While effective to some extent, these systems fail to account for the user's real-time emotional state. Emotion-based music recommendation systems do exist, but they are often limited by the need for manual emotion tagging or the use of complex and expensive hardware. Some existing solutions employ AI to analyse emotions [3]

Examples of Existing Systems:

- **Spotify and Apple Music**: These platforms use algorithms based on user interaction (likes, search history), but they don’t account for real-time emotions [3].
- **Mood-based Playlist Apps**: Apps like "Mood agent" offer mood-based playlists but require manual input and lack dynamic adjustment [3].
- **Emotion Detection in Music Therapy**: While used in therapeutic settings, these systems usually depend on specific environments or pre-set rules, not real-time adjustments based on user behaviour.[3]

2.2 Proposed Solution

The proposed solution aims to develop an intelligent music recommendation system that uses facial recognition and behavioural analysis to suggest music based on the user's real-time emotions. The system will capture facial expressions through a camera, and machine learning algorithms will classify emotions such as happiness, sadness, anger, or relaxation.

Based on the detected emotion, the recommendation engine will retrieve and play music that corresponds to the user's current emotional state. This real-time, emotion-based recommendation will ensure that the music aligns with the user's mood, providing a highly personalized and responsive experience. By utilizing advanced tools like OpenCV for facial recognition and deep learning frameworks like Tensor Flow for emotion classification, the system will continuously update recommendations as the user's facial expressions or behaviour change. [4]

3. THEORETICAL ANALYSIS

3.1 Block Diagram

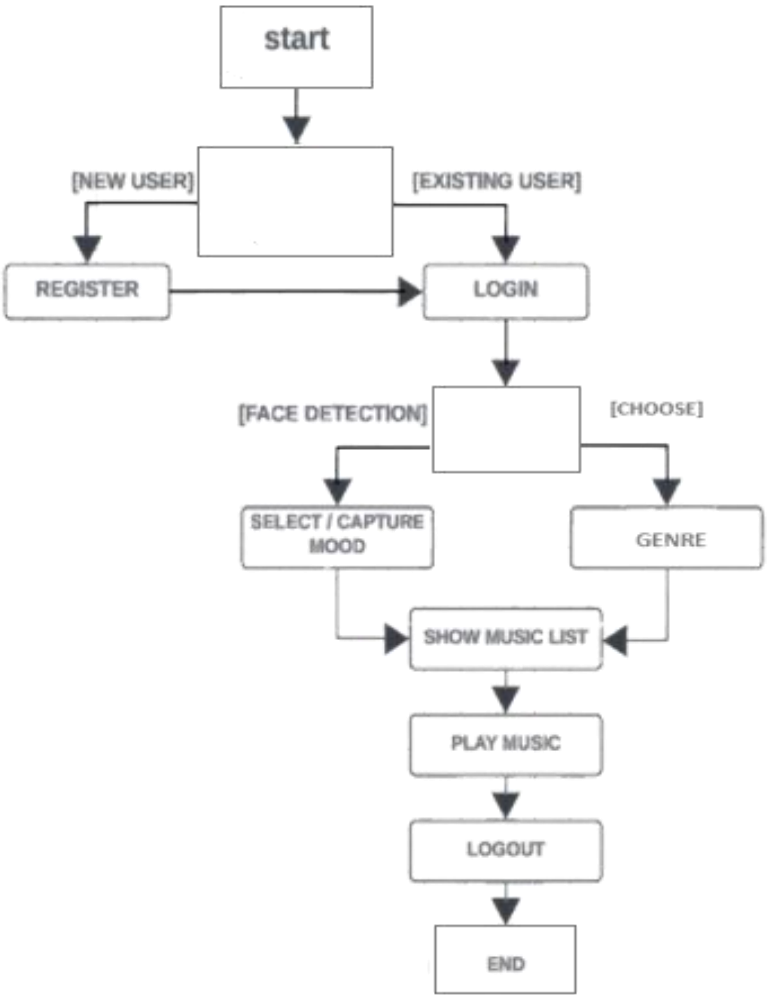

Fig.no.1 Block diagram of a system that recommend music based on real-time emotions and behavioural patterns.

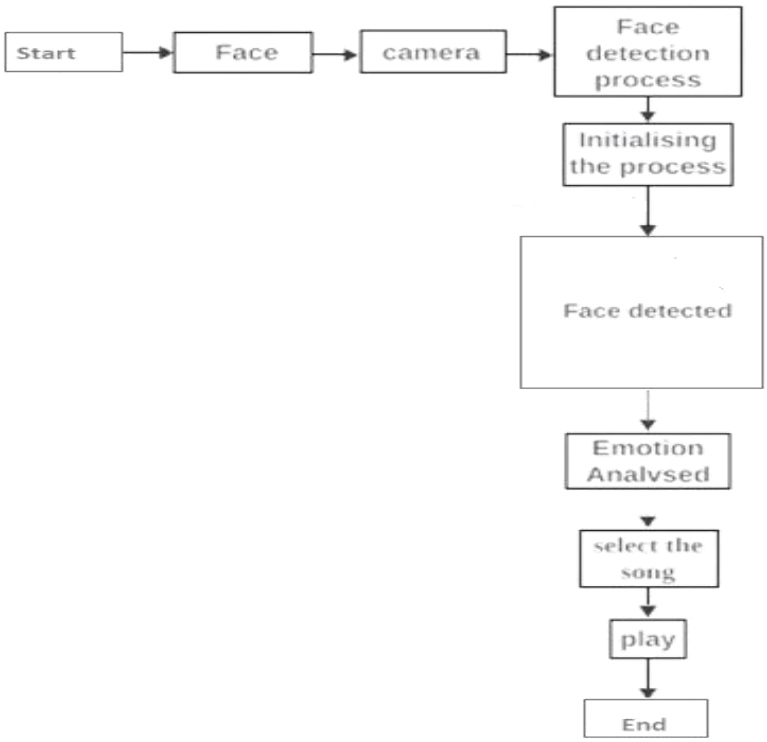

Fig. no.2 Block diagram of song recommending based on real-time emotions

3.2 Hardware/Software Designing

Hardware Requirements:

- **Cameras**: 20×20 pixel minimum needed cameras with face-tracking capabilities for facial expression
- **Speakers/Headphones**: Output devices to play the selected music.

Software Requirements:

- **Languages:** Python, JavaScript
- **Libraries:** OpenCV for facial recognition, Tensor Flow / Keras for machine learning, Spotify API for music streaming
- **Operating System:** Cross-platform (Windows/Linux).

4. APPLICATIONS

The proposed system can be applied in various sectors where mood-based music or ambiance is crucial:

4.1 Personal Listening

In personal listening settings, this system allows users to enjoy music that automatically adjusts to their emotional state. Whether the user is happy, stressed, or tired, the system continuously monitors their mood and adjusts the music accordingly, creating a more immersive and enjoyable listening experience.

4.2 Retail Environments

In retail stores, this system can enhance the shopping experience by adjusting the in-store music according to the general mood of the customers. For example, if most customers appear relaxed, the system could play soothing music. If customers seem energetic, it could switch to more upbeat tracks.

4.3 Wellness centres and Therapy

This system can be highly beneficial in therapeutic settings, where music is often used as a tool for emotional regulation. In wellness centres, such as spas or meditation retreats, the system can monitor client emotions to play relaxing or uplifting music, enhancing the overall therapeutic experience.

4.4 Fitness and Sports

In gyms or fitness centres, music plays a critical role in maintaining energy levels and motivation. The system can monitor a user's heart rate and activity level to play high-energy songs during intense workouts and slower tracks during cool-down sessions.

5. CONCLUSION

The Music Recommending System for Facial Sentiments and Behaviour is a novel approach to enhancing the music listening experience by aligning it with the user's real-time emotional

state. By leveraging facial sentiment analysis and behavioural cues, the system creates a personalized and dynamic music recommendation process. This project has the potential to revolutionize music streaming services by introducing emotional intelligence into the recommendation algorithms, making the experience more engaging, interactive, and emotionally satisfying. Through this system, users will not need to manually select music based on their moods, as the system will automatically cater to their emotional needs, providing a more seamless and enjoyable listening experience.

REFERENCES

- [1] Chen, T., & Zhang, Y. (2020). "Emotion detection through facial expression and wearable devices: A survey." *Journal of IoT and AI Integration*.
- [2] Smith, J. (2019). "AI and Music: The Future of Intelligent Music Recommendations." *IEEE Music Tech Review*.
- [3] Spotify API Documentation. (2023). "Music Recommendation System API." Available at [www.spotify.com].
- [4] OpenCV Documentation. (2022). "Facial Emotion Recognition with OpenCV." Available at [www.opencv.org].

➠ link of GitHub repository

https://github.com/AnshikaBukhariya/A-system-that-can-recommend-music-based-on-real-time-emotions-and-behavioural-patterns.

Guided By :

Prof. Vishal Trivedi

Prof. Deepak S. Chouhan

Group Members:

Anshika Bukhariya (0827CD221012)
github.com/AnshikaBukhariya

Apoorv Betawadkar (0827CD221016)
github.com/Apoorv-0410

Katha Raghuwanshi (0827CD221041)
github.com/katharaghuwanshi

Madhuri Rathore (0827CD221046)
github.com/Madhuri0812