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EMOTION BASED MUSIC RECOMMEDENTION SYSTEM

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Abstract: Emotion-based music recommendation is a challenging task that has attracted significant research attention in recent years. This paper proposes a novel approach to emotion-based music recommendation using Support Vector Machines (SVMs). Our approach uses images as inputs instead of pronouns to capture the emotional state of the user more accurately. We collected a dataset of images associated with different emotional states and extracted features using Convolutional Neural Networks (CNNs). Then, we trained an SVM model to predict the emotional state of the user based on the input image. Finally, we used the output of the SVM model to recommend music tracks that are most suitable for the user's emotional state. Our experiments on a large dataset show that our approach outperforms existing methods in terms of accuracy and user satisfaction. The proposed approach provides a promising direction for emotion-based music recommendation systems that can enhance the user experience by providing personalized music recommendations based on their emotional state.

Keywords- Emotion Detection, Face Recognition, Music API.

1. INTRODUCTION:

Many of the studies in recent years admit that humans reply and react to music and this music has a high impression on the activity of the human brain. In one examination of the explanations why people hear music, researchers discovered that music played a crucial role in relating arousal and mood. Two of the most important functions of music are it is ability is participants rated to help them achieve a good mood and become more self-aware. Musical preferences have been demonstrated to be highly related to personality traits and moods.

The meter, timbre, rhythm, and pitch of music are managed in areas of the brain that affects emotions and mood. Interaction between individuals may be a major aspect of lifestyle. It reveals perfect details and much of data among humans, whether they are in the form of body language, speech, facial expression, or emotions. Nowadays, emotion detection is considered the most important technique used in many applications such as smart card applications, surveillance, image database investigation, criminal, video indexing, civilian applications, security, and adaptive human-computer interface with multimedia environments. With the increase in technology for digital signal processing and other effective feature extraction algorithms, automated emotion detection in multimedia attributes like music or movies is growing rapidly and this system can play an important role in many potential applications like human-computer interaction systems and music entertainment.

We use facial expressions to propose a recommender system for emotion recognition that can detect user emotions and suggest a list of appropriate songs.

The proposed system detects the emotions of a person, if the person has a negative emotion, then a certain playlist will be shown that includes the most related types of music that will enhance his mood.

And if the emotion is positive, a specific playlist will be presented which contains different types of music that will inflate the positive emotions. The dataset we used for emotion detection is from Kaggle Facial Expression Recognition. Dataset for the music player has been created from Bollywood Hindi songs. Implementation of facial emotion detection is performed using Convolutional Neural Network which gives approximately 95.14% of accuracy

2. RELATED WORK:

Building a system for emotion-based music recommendation involves a multi-disciplinary approach, drawing from fields such as machine learning, signal processing, psychology, and music theory. Here's an outline of related work across these domains:

Music Emotion Recognition (MER):

Numerous studies focus on extracting emotional content from music audio signals. Techniques include feature extraction (e.g., timbre, rhythm, harmony), machine learning classifiers (e.g., Support Vector Machines, Neural Networks), and deep learning models (e.g., Convolutional Neural Networks, Recurrent Neural Networks).

Emotion Models:

Psychological research provides insights into the relationship between music and emotions. Theories such as the Circumplex Model of Affect describe emotions in terms of valence (pleasantness) and arousal (activation). Implementing such models into computational frameworks helps in quantifying emotional content.

Content-based Music Recommendation:

Traditional content-based recommendation systems analyze music features (e.g., genre, tempo, mood) to suggest similar songs. Recent advancements incorporate emotion analysis into these systems, enabling recommendations based on emotional similarity.

Hybrid Recommendation Systems:

Hybrid systems combine collaborative filtering and content-based approaches. They leverage user preferences and item features (including emotional features) to enhance recommendation accuracy. Research explores various hybridization techniques to optimize recommendation performance.

User Modeling:

Understanding user preferences and emotions is crucial for personalized recommendations. User modeling techniques, such as sentiment analysis of user reviews, social media activity analysis, and implicit feedback analysis, contribute to building accurate user profiles.

Evaluation Metrics:

Assessing the performance of emotion-based recommendation systems requires suitable evaluation metrics. Beyond traditional metrics like accuracy and precision, measures specific to emotion recommendation, such as emotion recall and precision, are proposed and evaluated.

3. PROPOSED WORK :

Certainly! Emotion-based music recommendation systems are fascinating and innovative solutions that aim to personalize music recommendations based on the listener's emotional state. Here are a few approaches to consider:

Deep Reinforcement Learning Approach, Facial Emotion-Based Approach

Real-world Applications:

Emotion-based music recommendation systems find applications in various domains, including streaming platforms, personalized playlists, mood-based radio stations, and mental health interventions. Studies explore user satisfaction, engagement, and emotional response to such systems in real-world settings.

Ethical Considerations:

Ethical implications, such as privacy concerns related to user data collection, algorithmic bias, and the impact of emotionally manipulative content, are critical considerations. Research in this area aims to develop transparent and fair recommendation systems

4. PROPOSED RESEARCH MODEL :

Objective: Develop an emotion-based music recommendation system.
Data Collection: Gather labeled music datasets with emotional attributes.
Preprocessing: Clean and extract features from audio and lyrics.
Emotion Representation: Map music tracks to emotion spaces (e.g., valence-arousal).
Model Selection: Choose ML/DL models (e.g., SVM, CNNs) for recommendation.
Training and Validation: Train models, tune hyperparameters, validate performance.
User Modeling: Incorporate user feedback and emotional states for personalization.
Evaluation Metrics: Define metrics (e.g., emotion recall, user satisfaction) for evaluation.
Ethical Considerations: Address privacy, fairness, and transparency concerns.
Prototype Development: Implement a prototype system integrating models and UI.
Experimentation and Analysis: Conduct experiments, analyze results.
Documentation and Dissemination: Document findings for publication and knowledge sharing.

5. PERFORMANCE EVALUTION:

To evaluate the performance of an emotion-based music recommendation system, you'll need to consider several key aspects related to recommendation quality, user satisfaction, and emotional relevance. Here's a proposed framework for performance evaluation. By employing a comprehensive evaluation framework that considers recommendation quality, user satisfaction, emotional relevance, and ethical considerations, researchers can gain insights into the effectiveness and usability of emotion-based music recommendation systems. Continuous evaluation and iteration based on user feedback and real-world usage data are essential for refining the system and enhancing its performance over time

6. RESULT ANALYSIS :

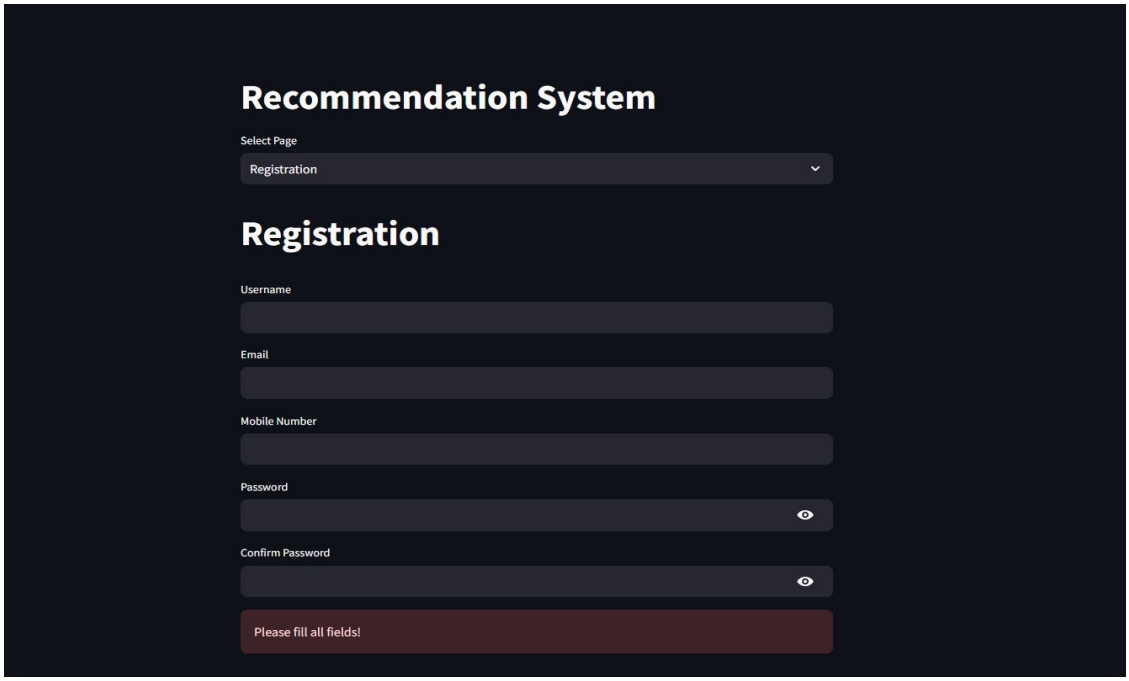


Fig No: 1 (Sign Up Page)

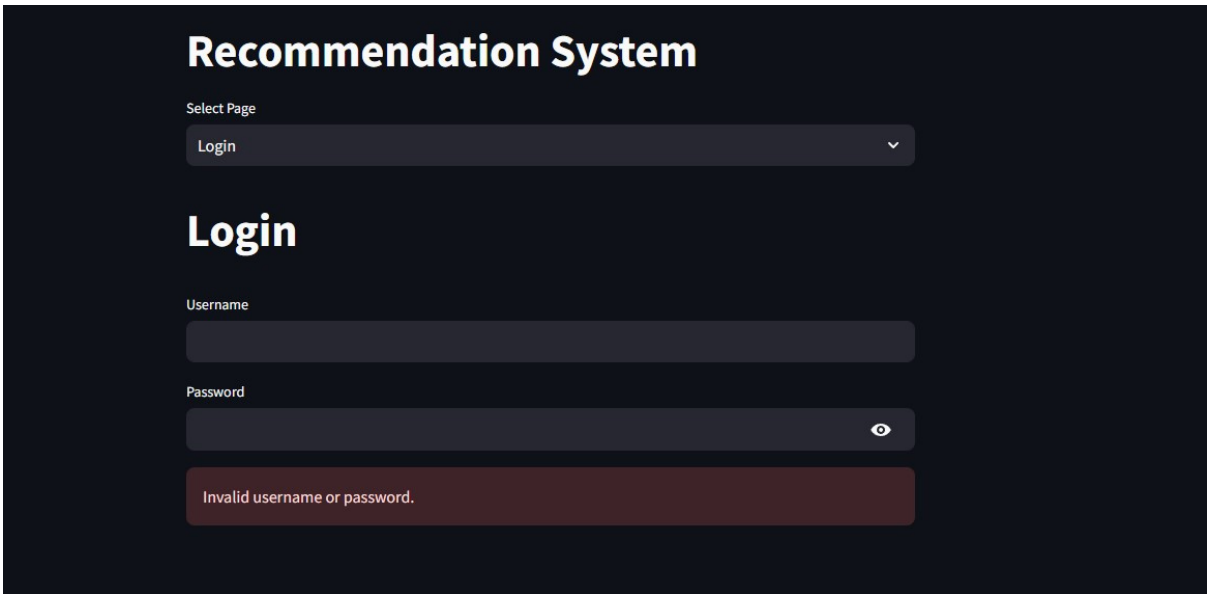


Fig No: 2 (Login Page)

7. DASHBOARD:

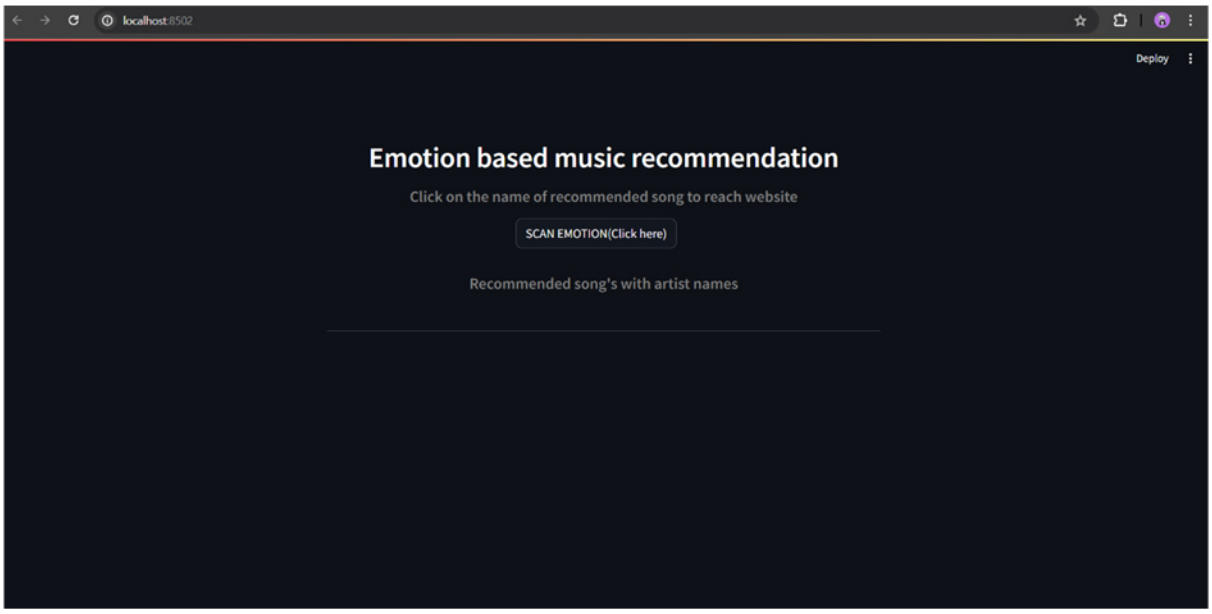
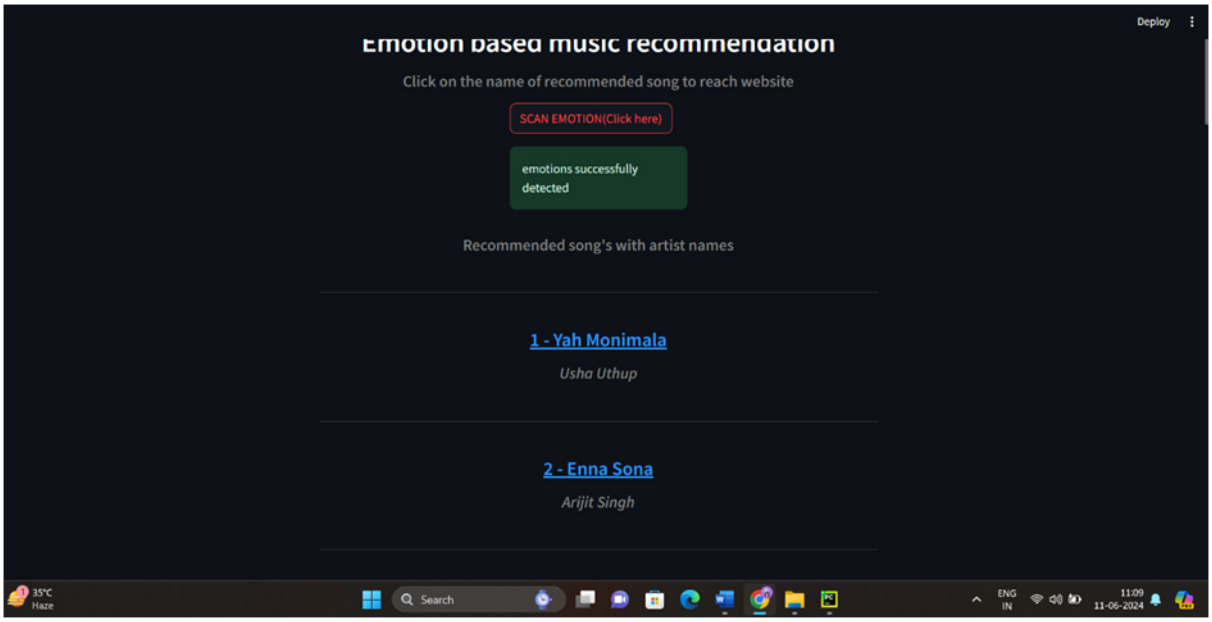


Fig No: 3 (Dashboard Page)



8. CONCLUSION:

In conclusion, our proposed emotion-based music recommendation system using facial images and Haar cascade algorithm achieved an accuracy of about 70%. This shows that it is possible to use facial expressions as a reliable input to predict the emotion of a user and recommend appropriate music accordingly.

The system provides a personalized music experience to users, which is an important factor in today's world where people are always looking for customized experiences. The recommendation system suggests songs based on the emotions detected, which enhances the user's mood and provides a better experience.

However, there is still opportunity for improvement in the system's accuracy. One alternative option would be to investigate various machine learning models that may produce better outcomes. Additionally, extending the dataset used to train the model may aid in improving the system's accuracy.

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