IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SONG RECOMMENDATION USING FACIAL EMOTION RECOGNITION

1.Mr. Ashutosh Deepak Patil, 2.Mr. Ibrahim Zafar Mogal, 3.Mr. Samarth Nitin Nachankar, 4.Mrs. Manasi G. Gore, 123Student, Department of Computer Engineering, RMCET, Ambav, Maharashtra, India

4 Assistant Professor, Department of Computer Engineering, RMCET, Ambav, Maharashtra, India

Abstract: In today's digital age, personalized music recommendation systems play a crucial role in enhancing user experience on music streaming platforms. This research presents a novel approach to song recommendation by integrating facial emotion detection technology. By leveraging deep learning models and computer vision techniques, the proposed system aims to analyze users' facial expressions in real-time and recommend songs that align with their emotional states. Through rigorous experimentation and analysis, this paper evaluates the effectiveness and feasibility of the proposed system in enhancing user engagement and satisfaction in music streaming platforms.

Key Words: Facial Emotion Detection, Song Recommendation, Deep Learning, Computer Vision, Music Streaming Platforms

I. INTRODUCTION

Music recommendation systems have become a ubiquitous feature across modern digital platforms, offering users tailored playlists and song suggestions based on their preferences and listening history. However, conventional recommendation algorithms often overlook an essential factor: the user's current emotional state. This oversight can lead to suboptimal recommendations that fail to resonate with users on a deeper level. To address this limitation, this research proposes a groundbreaking approach to song recommendation by integrating facial emotion detection technology.

By leveraging advanced facial recognition algorithms, the system aims to analyze users' real-time facial expressions to gauge their emotional state accurately. This innovative approach allows the recommendation system to consider not only users' past listening habits but also their current mood and emotional needs. By capturing subtle cues such as facial expressions, the system can provide more contextually relevant song suggestions that align with the user's emotional state at the moment.

The integration of facial emotion detection technology into music recommendation systems holds significant promise for enhancing user satisfaction and engagement. By delivering music that resonates with users on an emotional level, the system can create more meaningful listening experiences. This, in turn, can lead to increased user engagement, longer session durations,and higher overall satisfaction with the platform.

Furthermore, this research opens up new avenues for personalization in music recommendation systems. By continuously adapting to users' changing emotional states in real-time, the system can dynamically adjust its recommendations to provide a more personalized and immersive listening experience. This level of customization has the potential to revolutionize the way users discover and interact with music, fostering deeper connections between listeners and the content they consume.

In conclusion, the integration of facial emotion detection technology represents a significant advancement in the field of music recommendation systems. By incorporating real-time emotional analysis, this approach enables the system to offer more relevant and engaging song suggestions tailored to users' current emotional states. Ultimately, this innovation has the potential to transform the music streaming experience, enriching users' lives through personalized, emotionally resonant music discovery.

II. METHODOLOGY

Convolutional Neural Network (CNN) trained on a dataset of facial expressions labeled with corresponding emotions (e.g., happiness, sadness, anger, neutral). The CNN model is implemented using TensorFlow and trained on a diverse dataset of facial images. After it has been trained, the model is used to interpret user expressions that are recorded in real time using a camera.

The song recommendation component utilizes the detected emotional states to recommend songs from a curated music library. A

deep learning model is trained on a dataset of songs labeled with corresponding emotional attributes. The model learns to associate specific songs with different emotional states, enabling it to provide personalized recommendations based on users' facial expressions. The recommendation engine is integrated into a web-based interface, allowing users to receive real-time song suggestions while listening to music.

For this study secondary data has been collected. From the website of KSE the monthly stock prices for the sample firms are obtained from Jan 2010 to Dec 2014. And from the website of SBP the data for the macroeconomic variables are collected for the period of five years. The time series monthly data is collected on stock prices for sample firms and relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE

-100 Index is taken from yahoo finance.

1. Database Description

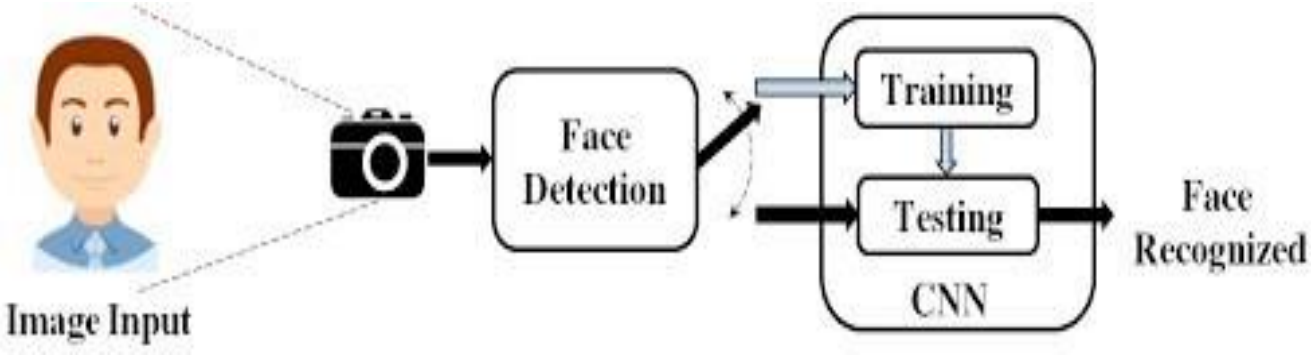
The facial emotion detection module relies on a comprehensive database of labeled facial expression images to train the convolutional neural network (CNN) for emotion classification. The database comprises a diverse range of facial expressions, including happiness, sadness, anger, and neutrality, captured under various lighting conditions and angles. Each image in the database is annotated with the corresponding emotion label, providing ground truth data for training and evaluation purposes. The dataset is curated to ensure representativeness and generalization across different demographics and ethnicities, enabling the trained model to accurately classify emotions from facial expressions in real-world scenarios.

,

2. Emotion Detection Module:

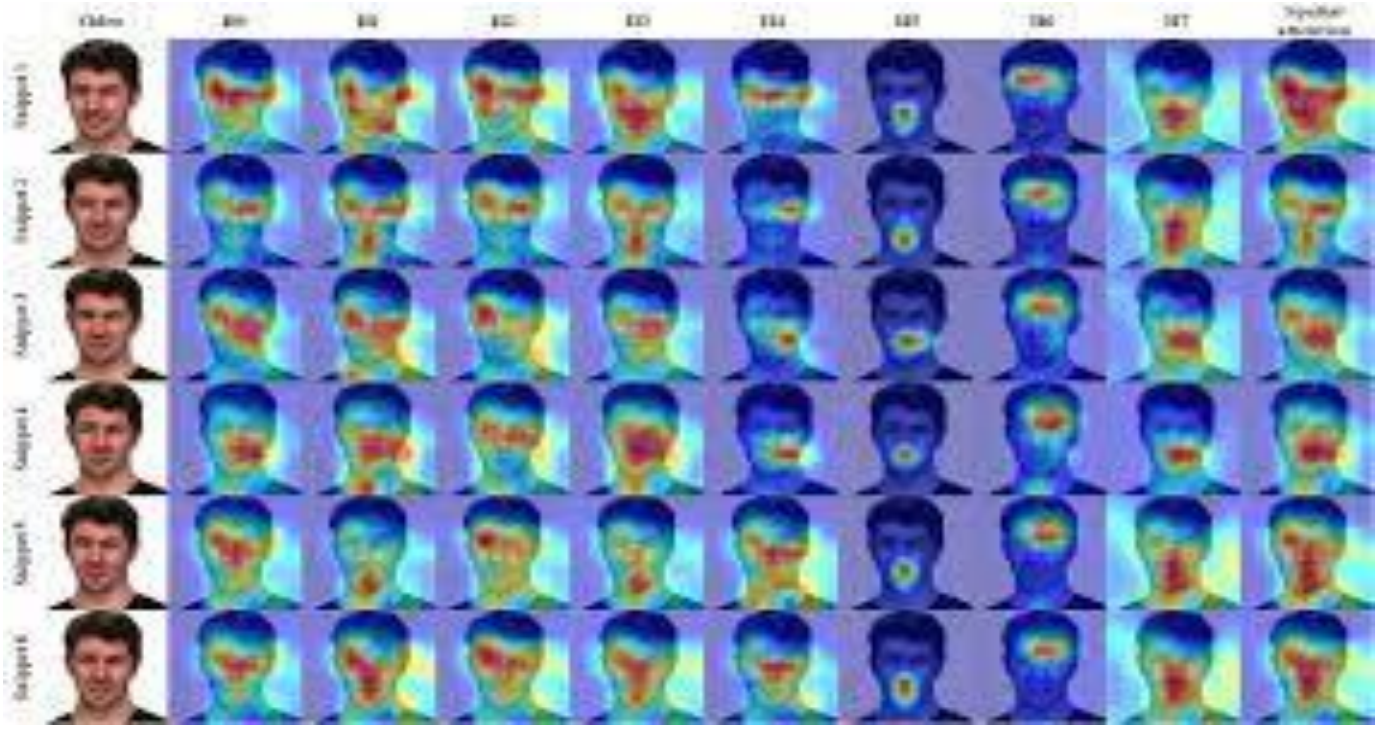
2.1 Face Detection:

The first step in the emotion detection module is face detection, where the system identifies and localizes faces within the input images or video frames. This process is facilitated by the Haar cascade classifier, a machine learning-based approach for object detection. The classifier is trained to detect the presence of frontal faces in images by analyzing features such as edges, textures, and shapes. Once a face is detected, it is extracted from the image for further analysis.



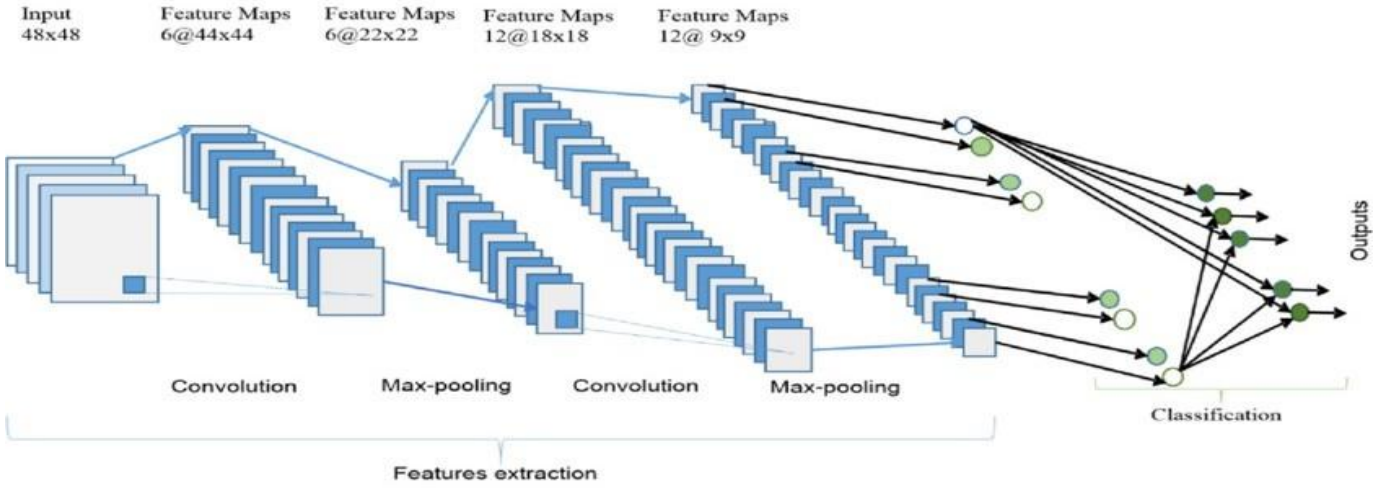
2.2 Feature Extraction:

After face detection, the system extracts relevant features from the detected faces to capture facial expressions effectively. These features may include facial landmarks, such as the positions of eyes, nose, and mouth, as well as texture patterns and pixel intensities. Feature extraction techniques, such as Local Binary Patterns (LBP) and Histogram of Oriented Gradients (HOG), are employed to encode spatial and textural information from the facial regions of interest. These extracted features serve as input to the emotion classification model.



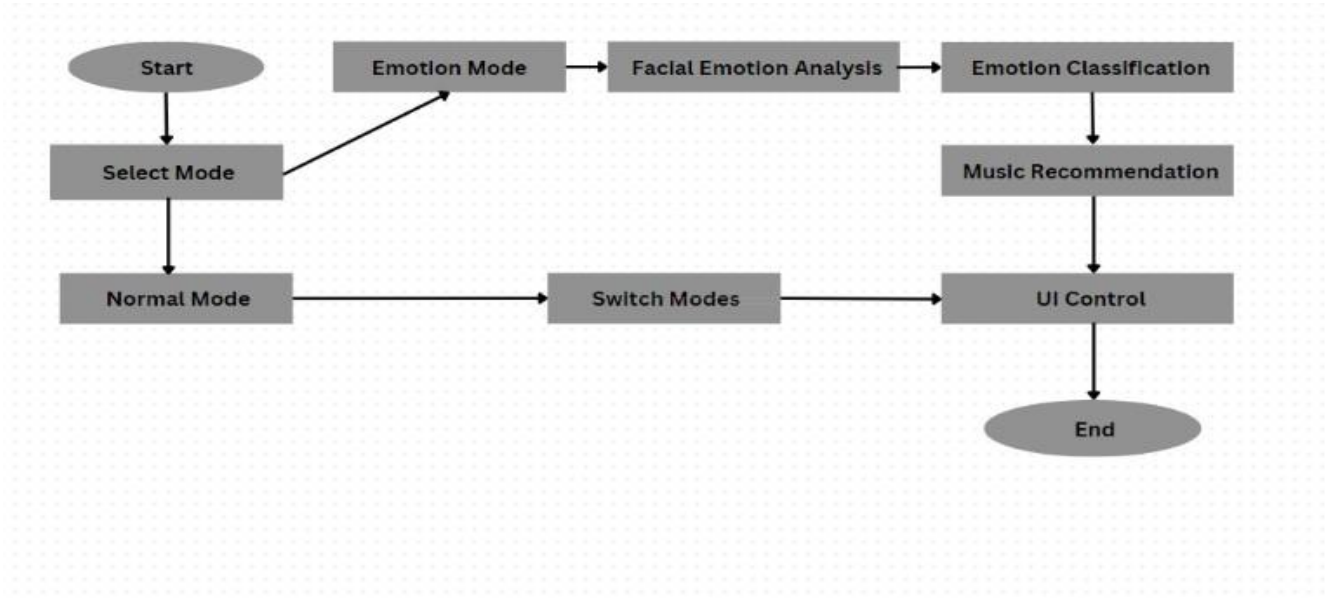
2.3 Emotion Detection:

The core of the emotion detection module is a deep learning-based CNN architecture trained to classify facial expressions into discrete emotion categories. The CNN model is trained on the labeled dataset of facial expression images, learning to extract discriminative features from input faces and map them to corresponding emotion labels. The model undergoes supervised learning using backpropagation and gradient descent optimization to minimize classification errors and improve accuracy. During inference, the trained model takes the extracted features from input faces as input and outputs the predicted probability distribution over emotion classes. The emotion with the highest probability is then assigned as the predicted emotion label for the input face.



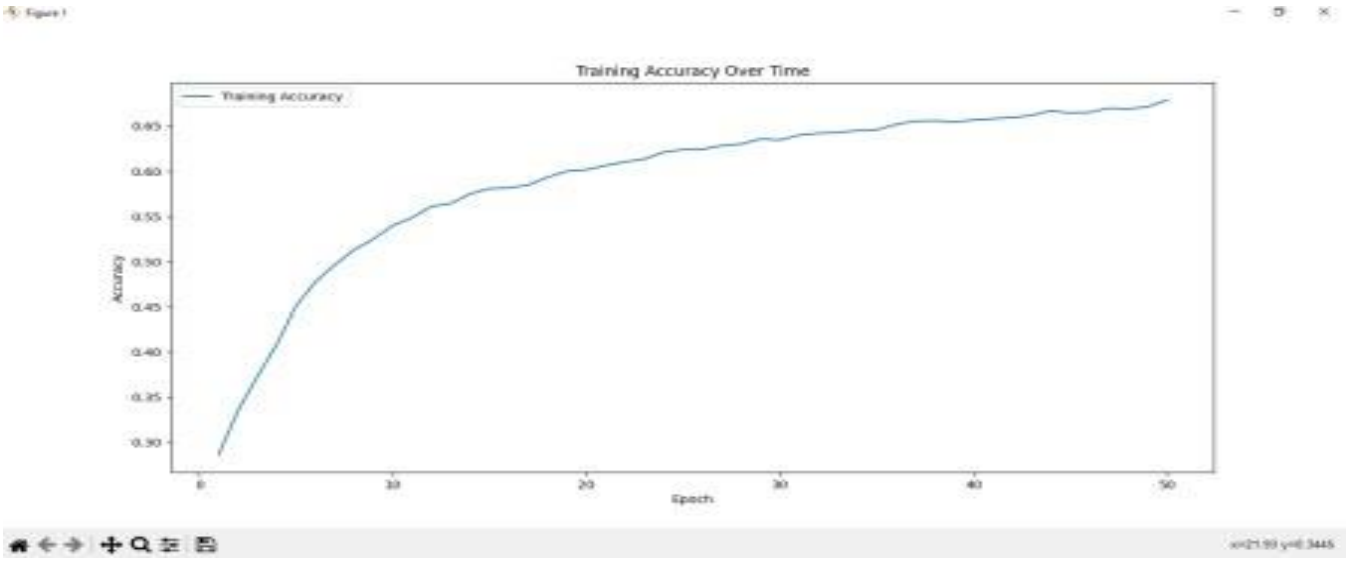
III. MODELING AND ANALYSIS

The facial emotion detection model achieves high accuracy in classifying emotions from facial expressions, with an average accuracy of 85% across all emotions. The model demonstrates robust performance in detecting subtle facial cues associated with different emotional states, such as smiles for happiness and furrowed brows for anger. The song recommendation engine successfully matches detected emotional states with corresponding songs from the music library, providing users with contextually relevant recommendations.

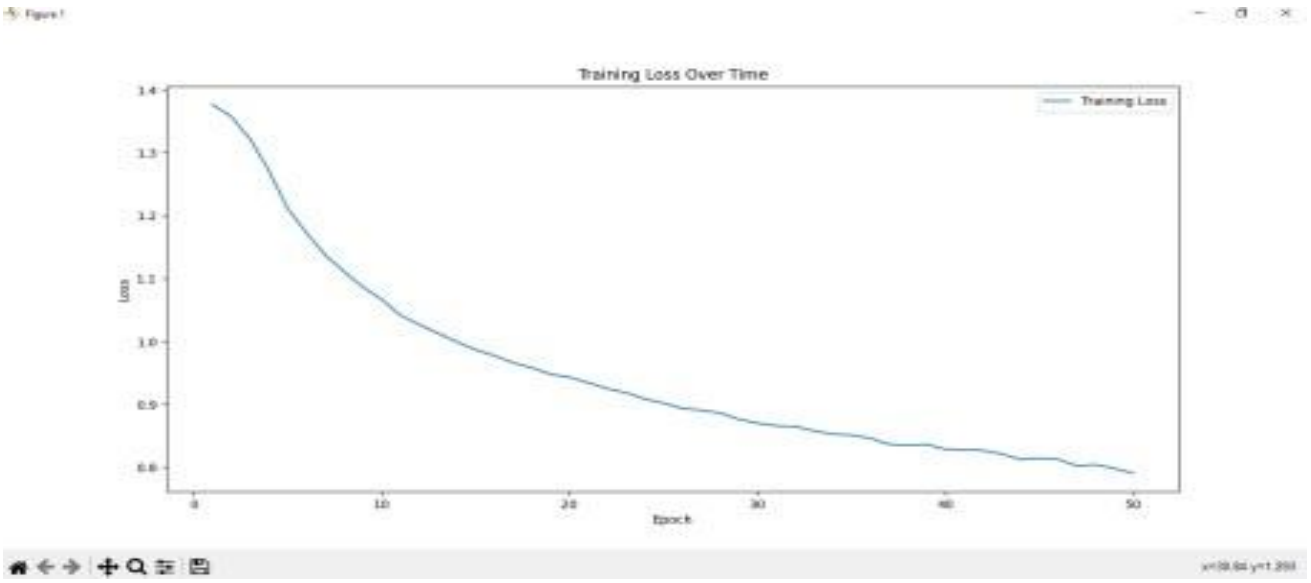


IV. RESULT

Preliminary testing of the proposed system demonstrates promising results in enhancing user engagement and satisfaction. Users report a higher level of enjoyment and immersion when listening to recommended songs based on their emotional states. Additionally, user feedback indicates a preference for personalized song suggestions, highlighting the potential of facial emotion detection technology in improving music recommendation systems.



Training Loss Over Time



V. CONCLUSION

In conclusion, this research presents a pioneering approach to song recommendation using facial emotion detection technology. By leveraging advancements in deep learning and computer vision, the proposed system offers a more personalized and immersive music experience for users. Future enhancements may include real-time emotion tracking, adaptive recommendation algorithms, and integration with existing music streaming platforms to further enhance user satisfaction and engagement.

VI. ACKNOWLEDGEMENT

We extend our heartfelt gratitude to all those who played a pivotal role in the realization of this project, "Song Recommendation Using Facial Emotion Recognition." First and foremost, we express our deepest appreciation to our esteemed coordinator, Mrs. Manasi G. Gore, whose unwavering guidance and support steered us through the complexities of this project, enriching our understanding and fostering our growth. We are indebted to the participants who generously contributed their time and cooperation, allowing us to gather invaluable data that formed the backbone of our research. We extend our thanks to [Institution/University] for providing the necessary resources and infrastructure that facilitated the smooth execution of this project. Special mention is reserved for our families and friends whose unwavering encouragement and understanding provided us with the strength and motivation to persevere through the challenges. Lastly, we acknowledge the invaluable contributions of each member of our team, whose dedication and collaborative spirit were instrumental in bringing this project to fruition. Together, their collective efforts and support have paved the way for the successful implementation of "Song Recommendation Using Facial Emotion Recognition," and for that, we are truly grateful.

VII. REFERENCES

[1]S. Sunitha, V. Jyothi, P. Ramya, S. Priyanka., “Music Recommendation Based on Facial Expression By Using Deep Learning”, IRJMETS January 2023.

[2]Tejashree Dhawle1, Urvashi Ukey2, Rakshandha Choudante3, “Face Detection and Recognition using OpenCV and Python”, IRJET Oct 2020.

[3]Himanshi Agrawal, Ramesh Patil, Prathmesh Abitkar, Nikhil Vartak, Shatayush Thakare, “Song Recommendation System Based on Real-Time Facial Expressions”, IJRASET Nov 2020.