Emotion Based Smart System To Access Music

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Abstract— **An intelligent framework called the Smart Space with Emotion-Adaptive Music System was created to improve human-computer interaction by utilizing adaptive response and emotional awareness. The system recognizes and deciphers real-time facial expressions and emotions, including joy, sorrow, stress, and excitement, by combining computer vision and natural language processing (NLP) technologies. It provides a customized and engrossing auditory experience by dynamically choosing and modifying music in response to these emotional cues. By gradually learning from user behavior and preferences, the system continuously improves its suggestions, guaranteeing increased precision and emotional resonance. Strong security and privacy measures are also put in place to protect user information and guarantee clear consent at all times.This study demonstrates how emotion-aware AI can enhance emotional health, boost output, and build smart environments that can adapt to human emotions naturally.**

Keywords— Emotion adaptive music system, Facial expression, personalized listening experience, NLP, Human computer interaction.

I. INTRODUCTION

In today's fast-changing world of artificial intelligence, human-computer interaction is moving from simple commands to more natural and emotionally aware communication. This shift allows machines to understand and respond to human emotions, leading to innovative systems that can sense and adjust to users' feelings. Building on this idea, the proposed project introduces a smart music access system that uses emotions to improve user experience through responsive interaction.

The system uses computer vision, audio processing, and machine learning to detect and interpret a user's emotional state in real time. By analyzing facial expressions and emotional signals, it identifies moods such as happiness, sadness, or calmness. Based on the identified emotion, the system recommends or plays suitable music, making sure that the audio experience matches the user's mental and emotional state. Integration with popular music streaming platforms like Spotify provides easy access to personalized playlists, further enhancing the interactive experience.

This emotion-aware framework is a step toward creating empathetic AI systems that connect human emotions with digital environments. Beyond increasing user satisfaction, it helps emotional well-being by selecting music that fits or boosts mood states. Ultimately, this project shows how emotionally responsive artificial intelligence can make everyday digital interactions more personal, engaging, and human-focused, pointing to the potential of AI in fostering a more connected and emotionally intelligent future.

Several studies have explored the use of emotion-based smart systems to take care of emotional well-being, and

II. LITERATURE SURVEY

the system is used in personalized music listening experiences.

In[1], Jose Martin, Ryan Rhay, Elmer P. Dadios, Paolo Joshua, Anna Rovia V, proposed the paper title A Smart Space with Music Selection Feature Based on Face and Speech Emotion and Expression Recognition. Their research paper focused on the emotion-aware music recommendation system offers several advantages that make both pratical and impactful in real world senarios.its a real time processing capability.

In [2], Vaishnavi Gaikar, Astha Dhengle, Namrata Mhatre, Sujata kullur**.**proposed the paper titled Music Recommendation System Based On User,s Facial expression.Their research paper focused on the highly personialized user expressionby recommending music that aligns with the user,s real-time emotion state, reducing the need of the manual playlist selection.

In [3], Yutai Wang, Xinghai Yang, Jing Zou.,proposed the paper titled Research of Emotion Recognition Based on Speech And Fcial Expression.Their research focused The paper highlights the accuracy of the emotion recognition,the study of biomodal fusion approach the both facial and speech expression analysis.(GMM),which combines the strength of speech and visual cues.the use of basic prosodic feature such as pitch,energy,and formants making the light weight and accessible for real time application

In [4], Esarapu Bhuvan Goud, Bombotula Venkatesh, Bodakunta Madhukar, B.Durga Prasad. The paper titled as the Emotion Based music recommendation System.Their research focused on the collecting the user basic preferences such as desired singer and preferred language .the system web cam is used to capture the user,s facial expression in the real-time using the pipe library,facial landmark and hand gestures in are detected and processed.

These all the research paper gives the idea on the Emotion based smart system access music using the user's facial expression .the system is used on the detecting the emotion of the user's to suugest the music according to ther mood.

III. PROPOSED WORK

The proposed system is designed to generate the Emotion Based Smart System Access Music according to the user mood there were used hardware implementation and the software implementation and the AIML(Artificial Intelligence and Machine Learning)Embedded system have been proposed thesystem.

A Raspberry pi camera module (input) the camera is used to capture the real-time images or video of a person's face.And functions as the primary data input for the emotion detection.

The captured images or video are send to the Raspberry Pi module.

Raspberry pi module (4GB RAM) it is serves as the main processing unit for the system. It processes the camera input and run the required algorithms.The all data algorithm were stored on it.

Emotion detection algorithm it analyzes the visual data which is captured by the Raspberry Pi camera.It uses the facial expressin recognition technique to determine the user's current emotional status(for example, happy,sad, angry, neutral,etc).

Music Database it contains a library of songs categorized based on the different emotions.After the emotion were detected the system used to select the suitable songs from the database that matched the detected mood.

Touchscreen Display Wave share 3.2inch resistive touchscreen.It displays the selected music or the relevant user's interface elements.and allows the user interaction to the shows the output .

Bluetooth speaker(output) plays the selected music output.

Ensures the Wireless audio output for better user's experiences.

The developed system is successfully demonstrate the user's emotion to access the revelant sopngs due to the mood of the user. And ensure the emotional state of the user to playthe data list which has been stored.

Overall, the system provides an efficient, flexible, and accessible way to generate the music which is relevant to the user's emotional condition and the mood of the user.
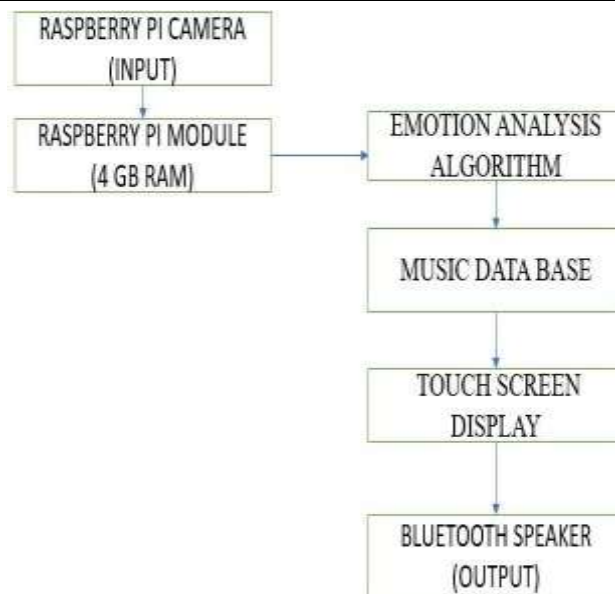

Fig1:Block Diagram

IV. IMPLEMENTATION OF THE PROPOSED SYSTEM

The implementation of the proposed system involves both hardware assembly and software programming. The Raspberry Pi camera (input) collect the inputn of the user and the Raspberry Pi module 4GB RAM used as the store hub of the database were the all the data were stored.It will use the database of the required algorithm due to the facial emotion of the user.

The music data base will suggest the song which is similar to user's emotion or the mood of the user.touchscreen is used to display the selected music and the system recommends the music.the Bluetooth speaker player the playback music which has been selected by the user.

The software the open CV is used to identify the user's emotion based on the appendix which has been used based on the python programming language.

The process begins here .It identifies the emotion recognition and suggest the song.The system reads and accept the input image .this image is intended for emotion detection through the user's facial analysis. The system checks the image to see the present if the face is detected the flow continues to the next .If the face is not detected then the it again start to read the image.

The system analysis facial features to extract and identify the emotion shown(happy,sad ,angry,etc). If a song is matching the detected emotion is found in the database then the process moves forward.If the no related song was played then the flow return to the database to continues searching the valid songs.in last when the related song is identified the

System play the user's emotion based songthen the process completes.
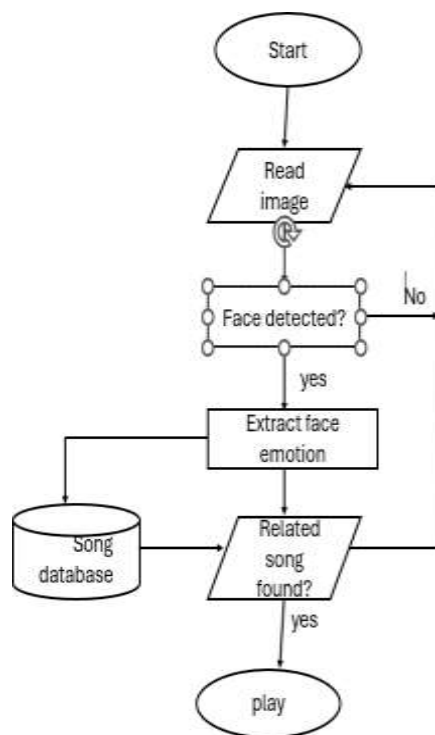
Fig.2: Execution of flow chart

V. EXPERIMENTAL RESULTS

Fig 3: Emotion based smart system

Fig 3 is the emotion based smart system that detect the real time image processing under the different lighting and facial expression conditions. The model successfully identified and classify the user's real-time emotion states into four primary categories :happy,sad,angry,neutral and etc.

During the testing the system identifies the reliable face detection and emotion classification.for each spacing bounding box was drawn with the corresponding emotion has displayed.Each emotion was colored coded for visual clarity.The green color for happy,gray color for neutral,blue for

sad,and red color for angry.Fig 4 illustrate the sample output of the system for four emotion categories.

Fig 4: expected output

The experiment gives the overall accuracy obtained the strong facial-expression model on an embedded plateform.The system also achieved an average processing the user's real image with a prediction latency enabling real-time interaction.

These results demonstrate that the proposed smart emotion-adaptive system is capable of performing efficient and accurate facial expression recognition on low-power embedded hardware ,making the smart environments, personalized music system and human-computer interaction interfaces.

These results gives the viability of the deep learning emotion based smart system to recogenize the user's real-time emotion on the low-power embedded hardware system.

Emotion	Accuracy (%)
Happy	95
Neutral	92
Sad	88
Angry	90
Overall Accuracy	**91.25%**

VI. CONCLUSION AND FUTURE SCOPE

The Emotion based smart system is intercts with the artificial intelligence and the embedded hardware to deliver the intelligent and emotion-aware music experiences.using the Raspberry Pi camera module the system is used to capture the real-time image of the user and analysis them with the open CV and deepface for the emotion detection and the Raspberry Pi module(4GB RAM) is used as main core of the storage unit and the managing the all the data base executing the database algorithms.then the touch screen wave(3.4) display the detected emotion and the control the play back music and navigate the playback music.the system shows the AI-driven emotion recognition with in the embedded hardware to personalized music recommendation on the user's mood and well demonstrate the Raspberry Pi capability in real time machine learning.

In the future, the smart system has the wide scope for future improvement and the innovation.The voice emotion recognition and physical sensors such as EEG can increase .the emotion detection accuracy.the system will also linked with the online sreaming platforms like (you tube,jio savan,spotify)for real time musi access.they can use the multimodel emotion detection in the combination of (face,voice).Then they can generate the personalized music accuracy based on their mood .They can contribute in the health and the wellness can support the emotional balance .Overall, these advantages will make a complete emotion - based smart AI platform,that promoting comfort,personalization music system.

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