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VibeSync-Mood Based Song Recommendation System

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Abstract

VibeSync is an AI-powered music recommendation system that suggests songs based on the user's current mood, identified through facial expression analysis. The system uses computer vision and machine learning techniques to detect emotions such as happiness, sadness, anger, and neutrality by analyzing real-time input from the user's webcam. These emotional states are mapped to mood categories, which are then used to generate customized song recommendations from a predefined music database.

VibeSync features a user-friendly interface that displays the detected mood and provides relevant song suggestions instantly. Unlike traditional recommendation systems that rely on user input or listening history, VibeSync responds to real-time emotional cues, offering a more dynamic and personalized listening experience.

This project showcases the effective integration of facial expression detection, emotion classification, and multimedia processing. It demonstrates how artificial intelligence can be used to create emotionally intelligent applications that enhance user engagement, promote mental wellness, and personalize digital experiences.

Introduction

1.1 VibeSync

VibeSync is a mood-based music recommendation system that detects a user's facial expression in real-time and suggests songs based on their emotional state. By analyzing facial features using computer vision techniques, the system identifies moods such as happy, sad, or relaxed and recommends suitable songs from a predefined music database. With a simple interface and accurate mood detection, VibeSync offers a personalized and emotionally engaging music experience. It highlights the practical use of AI and computer vision in multimedia applications.

1.2 Existing System

In the current music recommendation systems, suggestions are primarily based on user behavior such as listening history, likes, search patterns, or manually selected genres and moods. Applications like Wynk, Gaana, and Apple Music offer users the option to choose from predefined mood categories; however, this approach relies entirely on manual input. These systems lack the ability to understand the user's real-time emotional state, which means they cannot adapt to the user's immediate feelings or facial expressions. Moreover, personalization in these systems develops gradually over time and often lacks emotional context, leading to a less immersive experience.

Proposed system

VibeSync, introduces a novel approach by incorporating facial expression recognition to detect the user's mood in real-time. By using computer vision techniques through the device's webcam, VibeSync can identify emotions such as happiness, sadness, calmness, or anger without requiring any manual input. Based on the detected mood, the system then recommends songs from a predefined music database that match the user's emotional state. This real-time

mood detection and automatic music suggestion creates a highly personalized and emotionally responsive user experience. VibeSync enhances traditional recommendation methods by integrating artificial intelligence and emotion-aware computing, resulting in a smarter, more engaging music experience.

Design

- Design represents the number of components we are using as a part of the project and the flow of request processing i.e., what components in processing the request and in which order.
- An architecture description is a formal description and representation of a system organized in a way that supports reasoning about the structure of the system.
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3.1 Software Architecture

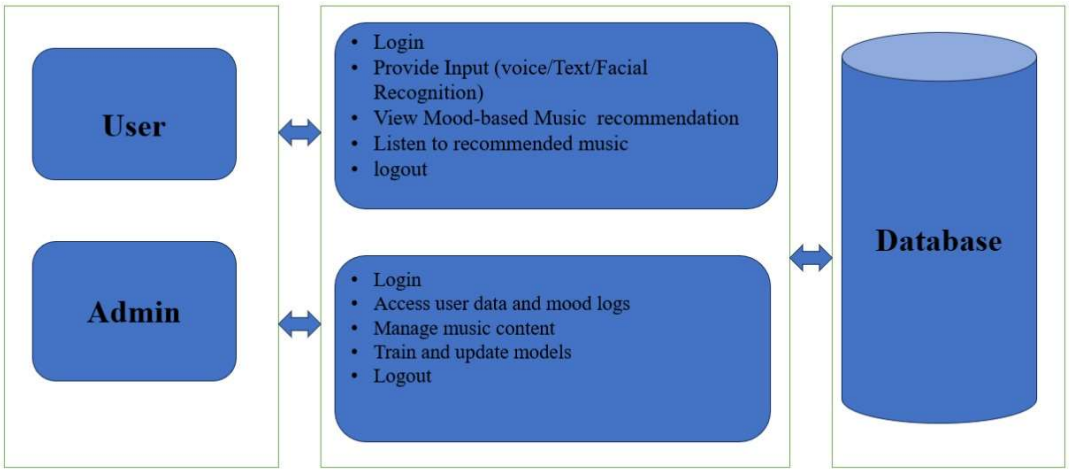

Fig.no.3.1

3.2 Technical Architecture

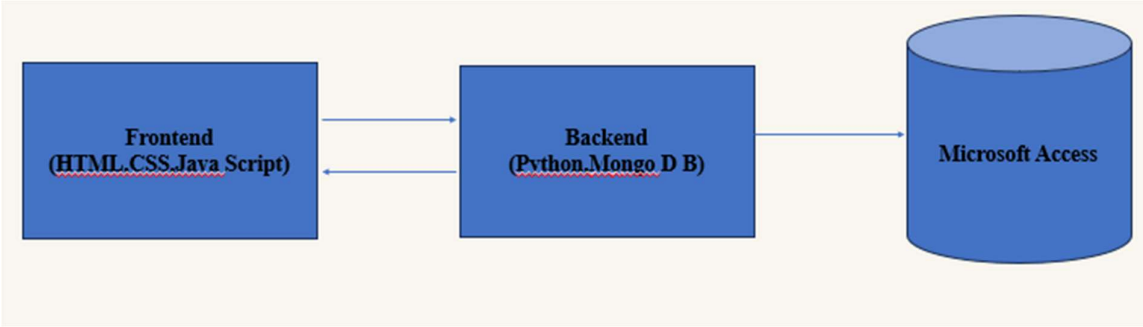

Fig.no.3.2

.Implementation

4.1 Technologies

Our system VibeSync uses multiple modalities for emotion detection — including facial expressions (via DeepFace and OpenCV), voice input (via SpeechRecognition), and text (via

Hugging Face's emotion classification model). These detected emotions are used to recommend personalized music to users. The system backend is powered by Node.js, Python, and MongoDB for real-time functionality

Technology	**Purpose in VibeSync**
Node.js	Handles backend communication and routes between user interface and ML services.
Python 3.8+	Hosts all AI/ML functionalities including emotion detection and model execution.
MongoDB	Stores user data, emotion history, and personalized song recommendations.
Virtual Environment	Isolates Python libraries for clean and conflict-free execution.
.env File	Holds credentials (e.g., Mongo URI, API keys) securely.
DeepFace	Detects **facial emotions** from camera input using computer vision models.
OpenCV	Used for **capturing live video** from the webcam and processing image frames.
SpeechRecognition	Converts **spoken input** to text (e.g., "I feel stressed today") for emotion analysis.
Hugging Face Model	(j-hartmann/emotion-english-distilroberta-base) — detects emotion from user **text**.

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6. **Test Cases**
7.

Test Case ID	**Test Case Description**	**Test Data**	**Expected Result**	**Actual Result**	**Pass/Fail**
TC01	Facial mood detection for happy emotion	Smiling face	Detects "happy" → Shows happy playlist	Playlist with energetic songs displayed	Pass
TC02	Facial mood detection for sad emotion	Sad face	Detects "sad" → Shows sad playlist	Playlist with mellow songs displayed	Pass
TC03	Facial mood detection for angry emotion	Angry face	Detects "angry" → Shows calming playlist	Playlist with soothing songs displayed	Pass
TC04	Facial mood detection for neutral emotion	Neutral face	Detects "neutral" → Shows neutral playlist	Playlist with lo-fi/chill songs displayed	Pass
TC05	Voice input saying “I am happy”	Speech: "I am happy"	Detects "happy" from text → Shows happy playlist	Playlist with joyful songs displayed	Pass
TC06	Voice input saying “I am sad”	Speech: "I am sad"	Detects "sad" from text → Shows sad playlist	Playlist with emotional songs displayed	Pass
TC07	Voice input with background noise	Speech with noise	Cannot transcribe → Shows retry prompt	"Please try again" message shown	Pass
TC08	Text input expressing anger	Text: "I’m really angry today"	Detects "angry" → Shows calm playlist	Playlist with soft music displayed	Pass
TC09	Text input expressing happiness	Text: "I’m feeling awesome today"	Detects "happy" → Shows happy playlist	Playlist with upbeat songs displayed	Pass
TC10	Text input with no emotion	Text: "Search trending songs"	No emotion → Show default playlist	Generic/trending playlist displayed	Pass

TC11	All inputs used at once (facial, text, voice)	Happy face + Sad text + Neutral voice	System processes latest/selected input → Mood matched	Playlist based on selected input shown	Pass
TC12	Internet disconnected	Any input (face, text, voice)	Connection fails → Show error	"No internet connection" message shown	Pass

Screenshots

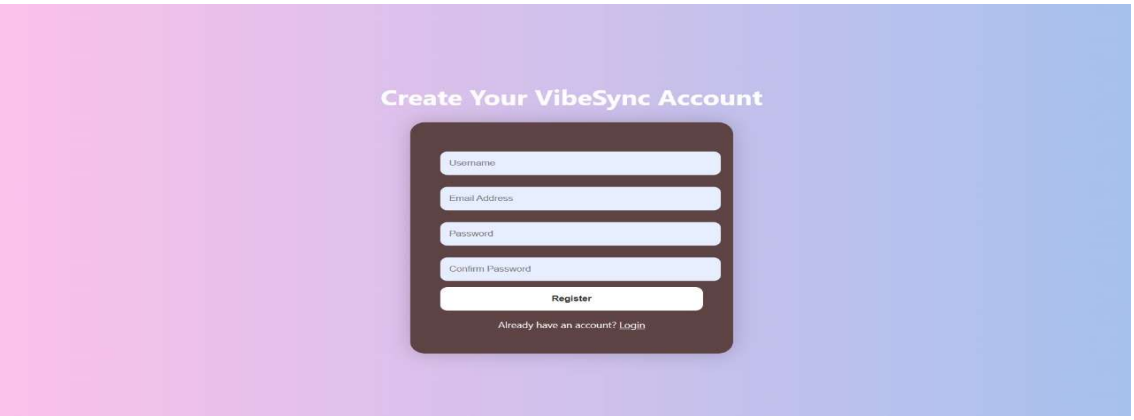

Fig 6.1 Signup page

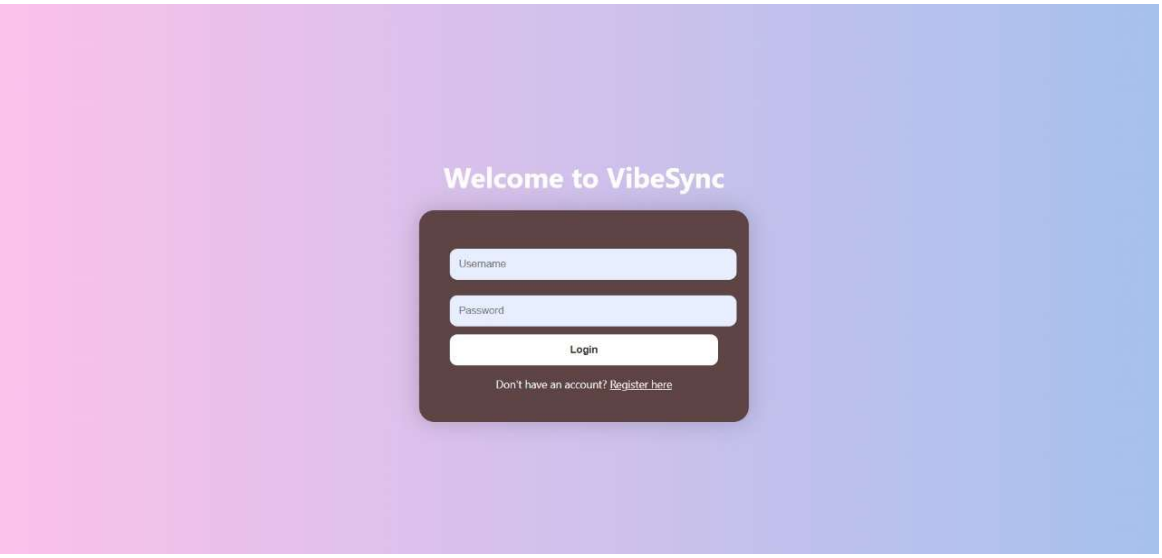

Fig.6.2 Login Page

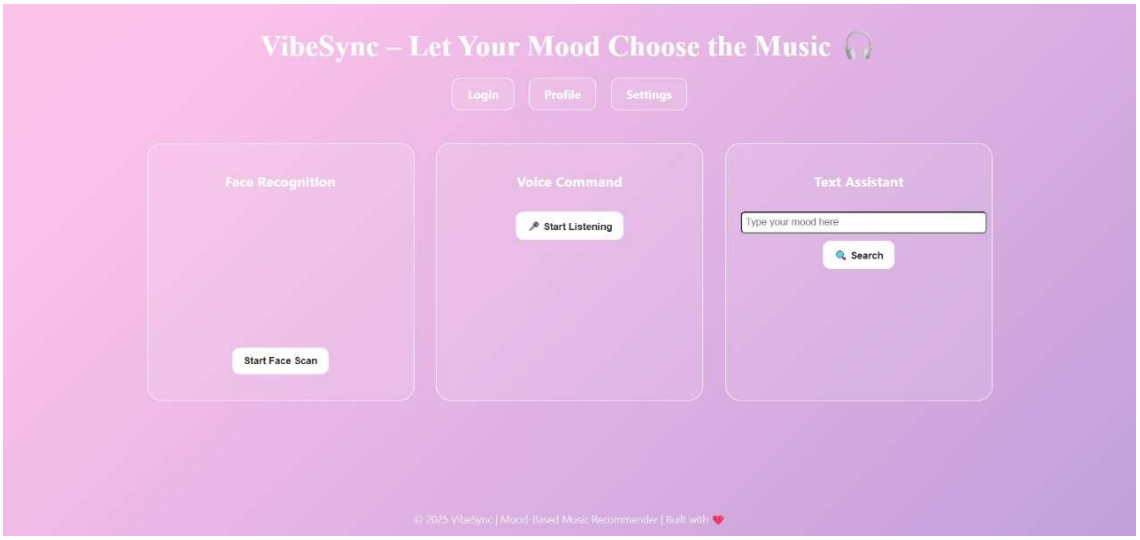

Fig.6.3 Homepage

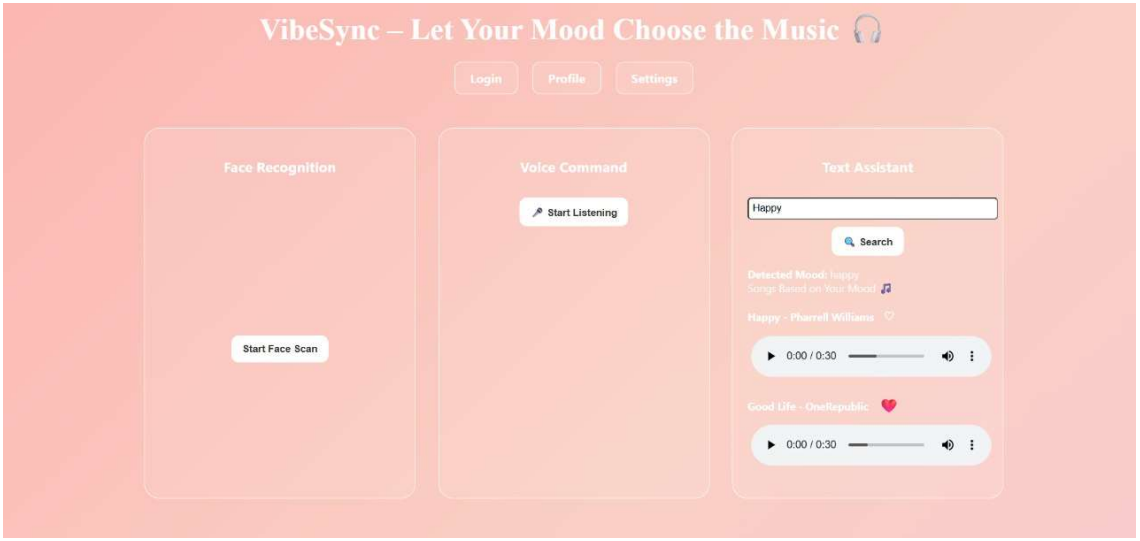

Fig.6.4 Homepage

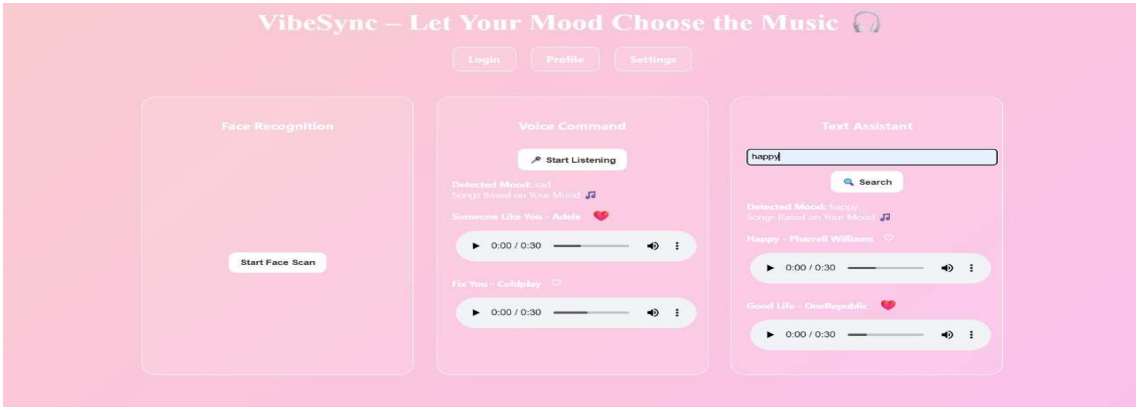

Fig.6.5 Voice search

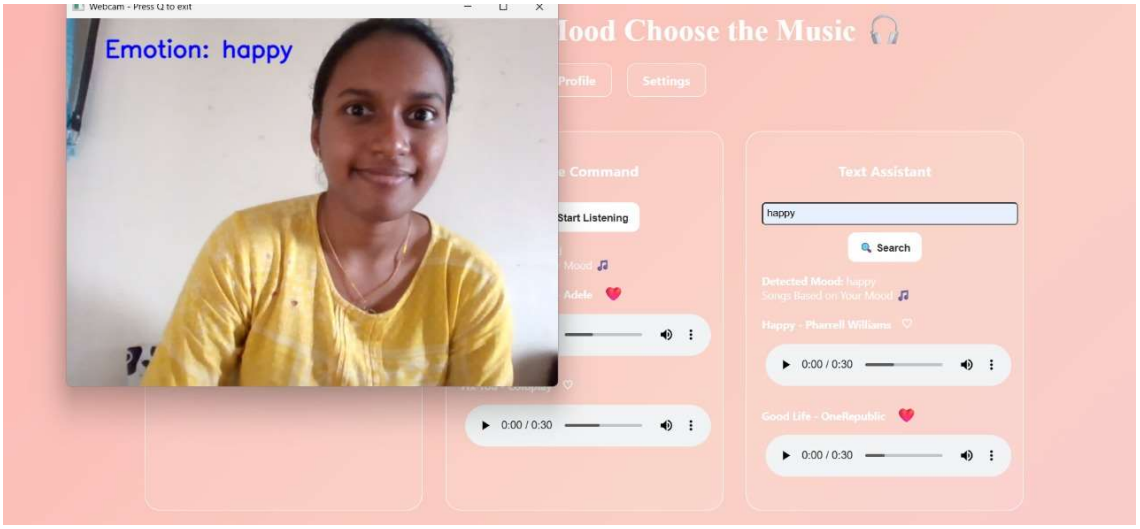

Fig.6.6 Mood detection By Facial Analysis

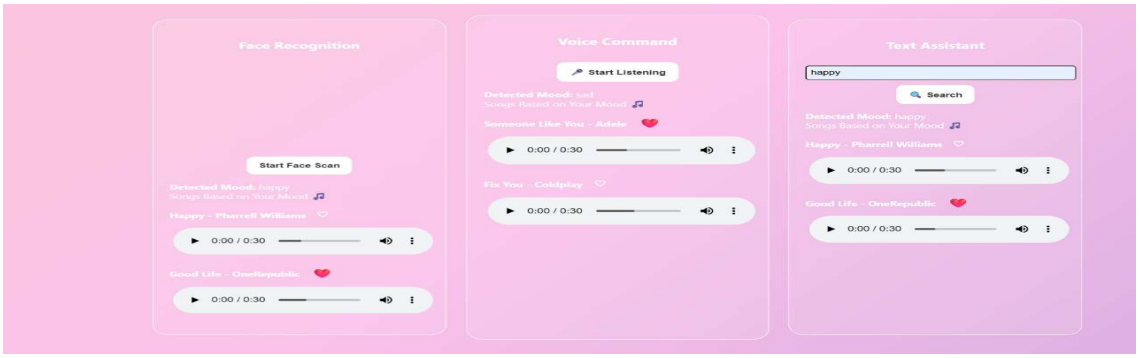

Fig.6.7 Songs Recommendations

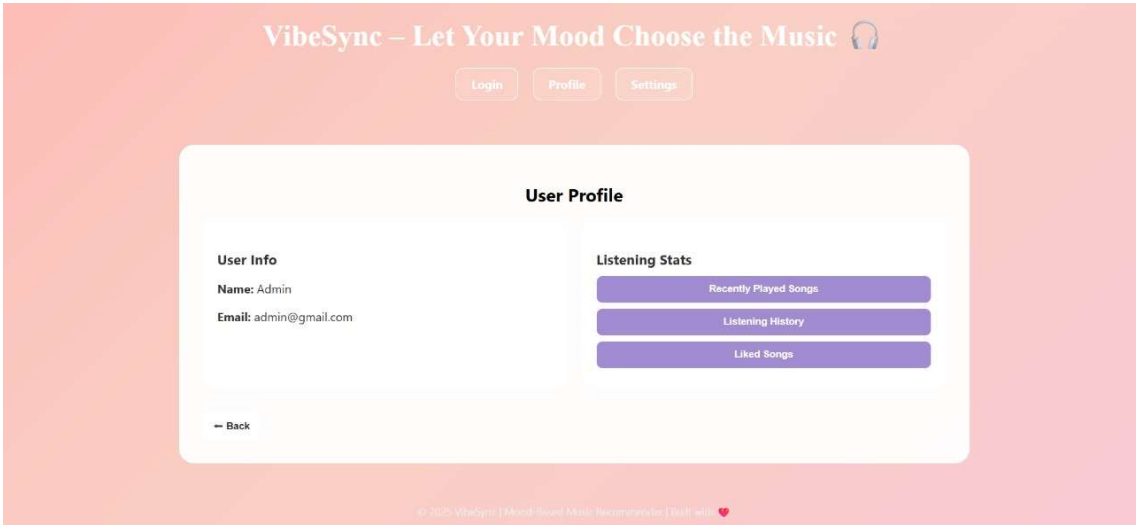

Fig.6.8 Profile Page

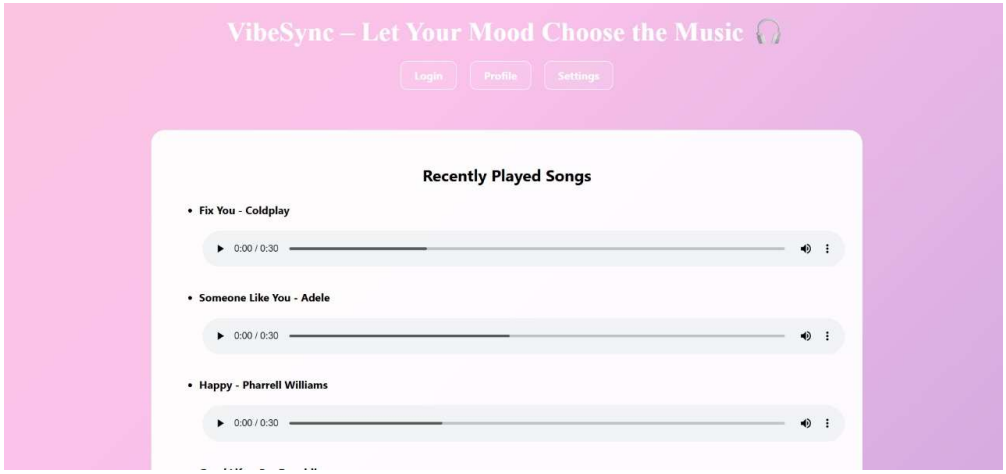

Fig.6.9 Recently Played Songs

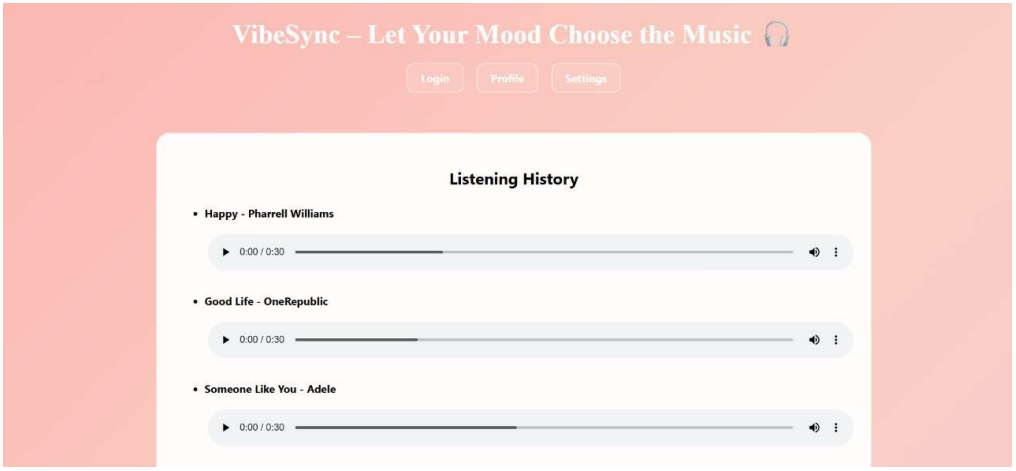

Fig.6.10 Listening History

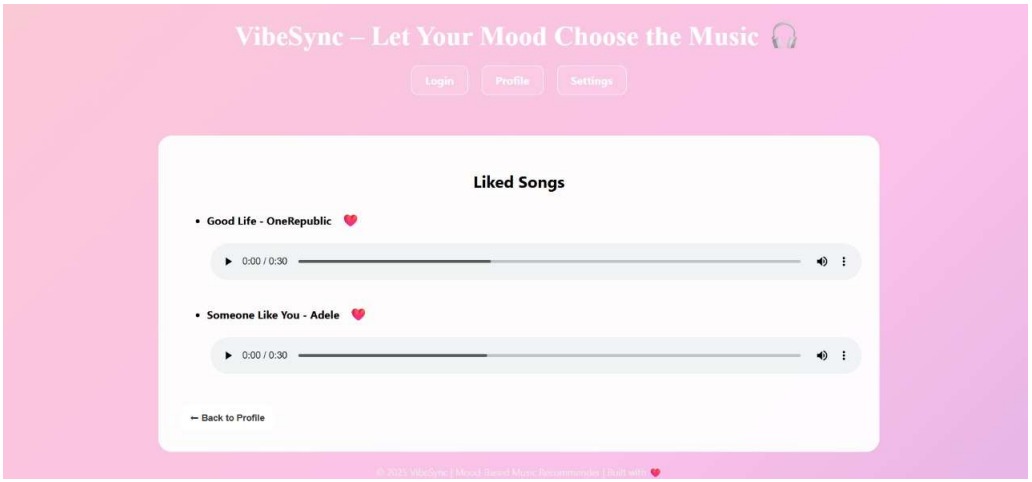

Fig.6.11 Liked Songs

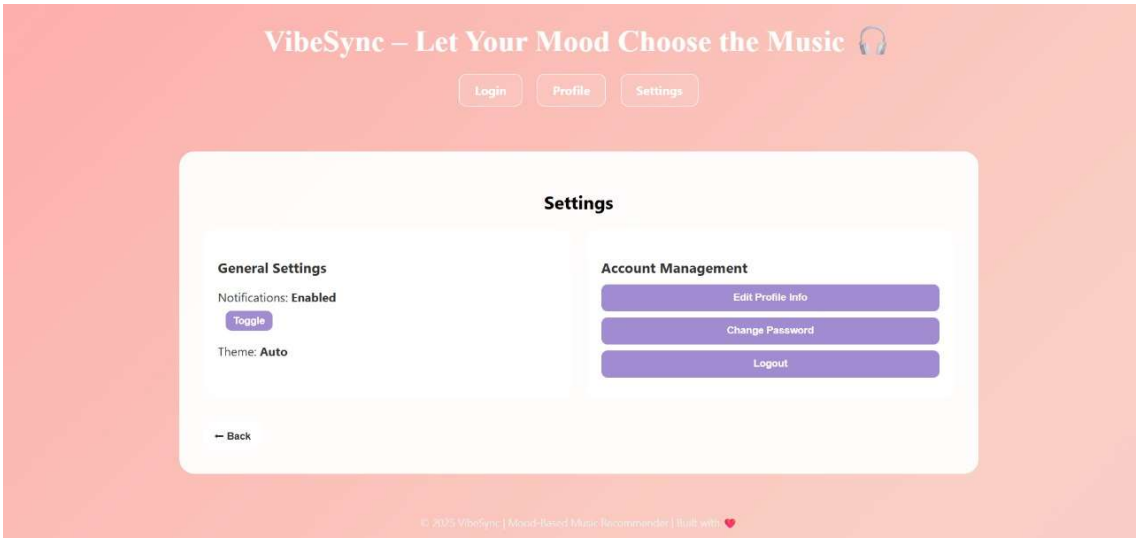

Fig.6.12 Settings page

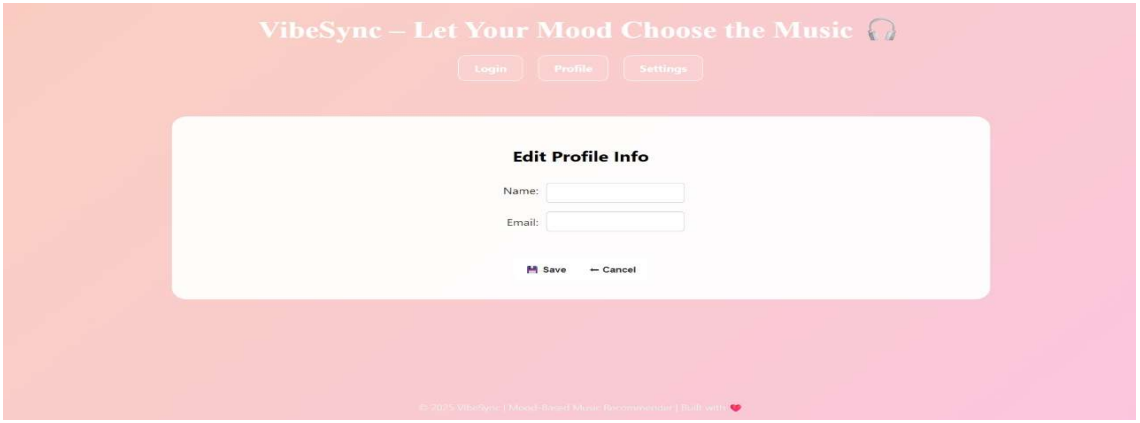

Fig.6.13 Edit Profile Page

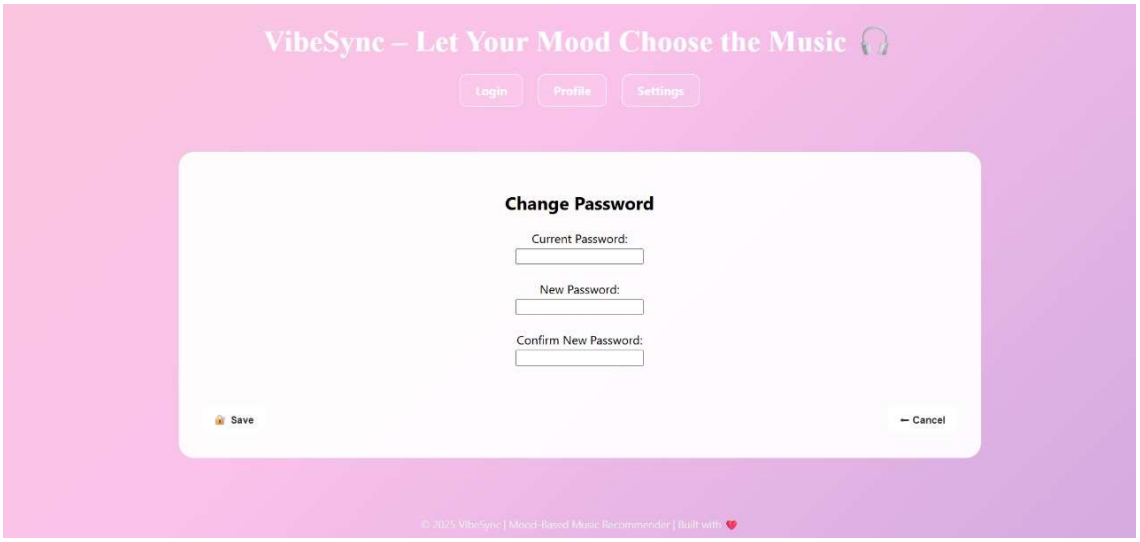

Fig.6.14 Password Settings

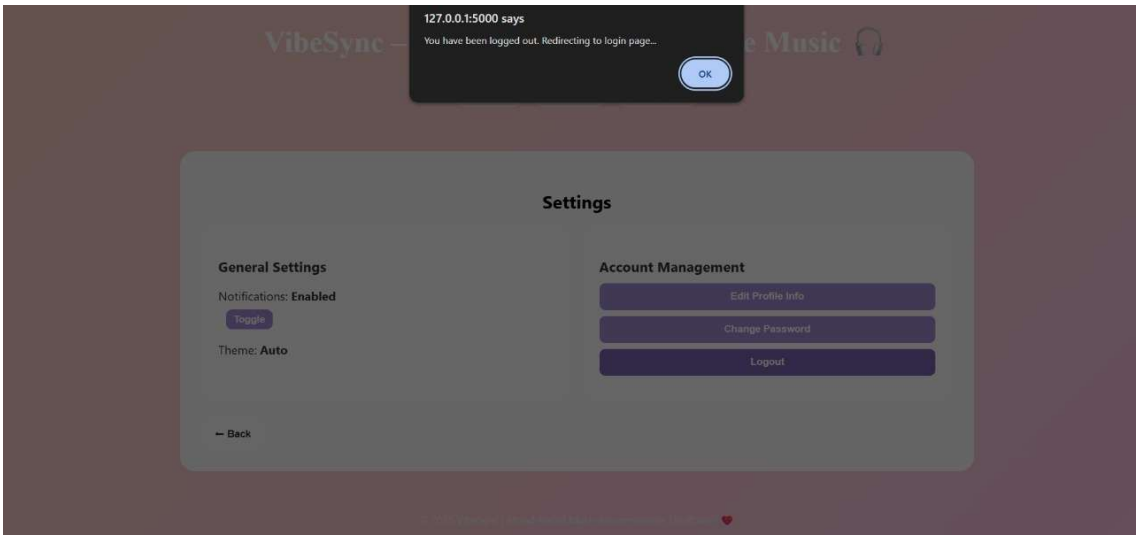

Fig.6.15 Password Changed – Logged out

Conclusion & Future Scope

7.1 Conclusion

VibeSync successfully demonstrates how emotional intelligence can be integrated into user-centric applications using technologies like facial recognition, speech processing, and text analysis. By allowing users to interact naturally—through their expressions, voice, or typed emotions—the system offers a personalized music experience tailored to their mood. The application ensures simplicity, accuracy, and user engagement, proving that mood-based recommendation systems can enhance digital interaction and emotional well-being.

7.2 Future Scope

- **Add more languages**
  - Support voice input in different regional and international languages.
- **Improve mood detection**
  - Make the system better at detecting mixed or strong emotions.
- **Mobile App Version**
  - Create a mobile app so users can enjoy VibeSync anywhere.
- **Connect with music apps**
  - Link VibeSync with Spotify or YouTube for better playlists.
- **Save mood history**
  - Show users a history of their moods and songs over time.
- **Offline use**
  - Let users access basic features even without internet.

8.References

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2) https://www.ijert.org/research/mood-based-music-recommendation-system-IJERTV10IS060253.pdf
3) https://www.jatit.org/volumes/Vol100No19/24Vol100No19.pdf