**Facial Recognition to Detect Mood and Suggest Songs Accordingly**

**A Project Work Synopsis**

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# Abstract

Facial recognition technology has made remarkable strides in recent years, with applications spanning from security to healthcare. This paper introduces a novel application of facial recognition technology aimed at enhancing the user's emotional experience through personalized music recommendation. The system utilizes deep learning algorithms to analyse facial expressions and discern the user's current mood in real-time. By integrating this mood analysis with a vast music database and recommendation engine, the system suggests songs that align with the user's emotional state.

The key components of this system include facial feature extraction, emotion classification, and music recommendation. Facial feature extraction employs state-of-the-art convolutional neural networks (CNNs) to identify and track facial landmarks.

The music recommendation engine incorporates user preferences, historical listening habits, and the detected mood to curate a personalized playlist. This recommendation system employs collaborative filtering, content-based filtering, and hybrid filtering techniques to ensure that the suggested songs are both relevant to the user's mood and aligned with their musical tastes.

The proposed system enhances user engagement by offering a seamless and emotionally resonant music experience. It can be deployed in various scenarios, such as streaming platforms, in-car entertainment systems, or smart home devices, where music plays a significant role in enhancing the user's emotional well-being. Additionally, user privacy and data security are paramount, and this paper discusses the ethical considerations and best practices for implementing facial recognition technology responsibly, including user consent and data protection.

In conclusion, this research demonstrates the potential of facial recognition technology to transform the way we experience music by providing personalized recommendations that are emotionally attuned to the user's current mood. This innovative approach not only offers a more engaging music experience but also highlights the importance of responsible AI implementation in enhancing user well-being and satisfaction.

**Keywords:**

Facial recognition, mood detection, personalized music recommendation, deep learning algorithms, emotion classification, facial feature extraction, CNNs, recommendation engine, user preferences, content-based filtering, hybrid filtering, user engagement, emotional well-being, responsible AI implementation.

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# 1. INTRODUCTION

## 1.1 Problem Definition

* In today's digital age, music is an integral part of daily life, offering entertainment, relaxation, and emotional support.
* However, the challenge lies in selecting the right music that matches an individual's current mood and emotional state.
* This project seeks to address this issue by developing a system that employs facial recognition technology to accurately detect a user's mood and suggest songs that resonate with their emotions.

The rapid advancement of facial recognition technology has opened innovative applications across various domains.

One such application is the utilization of facial recognition to detect and interpret human emotions in real-time.

This project aims to leverage facial recognition to detect the user's mood and suggest music that aligns with their emotional state, thereby enhancing the music listening experience.

## 1.2 Problem Overview

Music is an integral part of our daily lives, providing solace, energy, and a medium for emotional expression. Yet, the challenge persists in ensuring that the music we listen to resonates with our current emotional state. Existing music recommendation systems predominantly rely on historical data and explicit user preferences, often overlooking the user's immediate emotional context.

The central problem at hand involves developing a sophisticated system that can seamlessly blend facial recognition technology with music recommendation to enhance the user's music listening experience. This system must accurately detect the user's mood through facial expressions, classify these emotions effectively, and offer song recommendations that align with the user's emotional state at that very moment.

The primary goal of this project is to address this issue by developing a groundbreaking system that utilizes facial recognition technology to detect a user's mood in real-time and suggest songs that harmonize with their emotional context. This system, at its core, aims to enhance the user's music listening experience by providing personalized and emotionally resonant recommendations.

## 1.3 Hardware Specification

Implementing a Facial Recognition system to detect mood and suggest songs accordingly requires specific hardware components to ensure efficient performance. Here are the essential hardware requirements for such a system:

* **Camera or Webcam:** A high-quality camera or webcam is crucial for capturing clear and detailed facial images. It should have a high resolution to capture facial expressions accurately.
* **Computer or Server:** A computer or server with sufficient processing power is essential for real-time facial recognition and emotion classification.

CPU: A multi-core processor (e.g., Intel Core i7 or equivalent) is recommended for real-time processing.

RAM: Adequate RAM (16GB or more) is necessary for handling large datasets and model training.

* **Storage:** An SSD (Solid State Drive) is preferable for faster data access and retrieval, especially when working with large datasets and model files.
* **Graphics Display:** A high-resolution monitor is useful for system setup, debugging, and user interface development.

## 1.4 Software Specification

* **Operating System:** A compatible operating system such as Windows, macOS, or Linux.
* **Development Environment:** Integrated Development Environment (IDE) for software development, e.g., Python IDEs like PyCharm or Jupyter Notebook.
* **Facial Recognition Library:** OpenCV for face detection and tracking.
* **Deep Learning Framework:** A deep learning framework like TensorFlow or PyTorch for training and deploying emotion classification models.
* **Emotion Classification Model:** A pre-trained or custom deep learning model for emotion classification based on facial expressions.
* **Music Recommendation Engine:** Development of a music recommendation engine using programming languages like Python and libraries such as scikit-learn for recommendation algorithms.

# 2. LITERATURE SURVEY

## 2.1 Existing System

## 2.2 Proposed System

## 2.3 Literature Review Summary (Minimum 7 articles should refer)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year and**  **Citation** | **Article/ Author** | **Tools/ Software** | **Technique** | **Source** | **Evaluation Parameter** |
|  |  |  |  |  |  |
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|  |  |  |  |  |  |

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# 3. PROBLEM FORMULATION

The central problem revolves around the need for a comprehensive system that utilizes facial recognition technology to accurately detect a user's mood through facial expressions. This system must further incorporate deep learning algorithms to classify these emotions and recommend music that corresponds to the user's current emotional state. The problem statement can be divided into several key components:

**3.1. Facial Recognition System:** The first challenge is to develop a robust facial recognition system capable of identifying and tracking facial landmarks in real-time. This system must capture facial expressions accurately, as these expressions are indicative of the user's mood. Achieving high accuracy and speed in facial recognition is essential for the system's success.

**3.2. Emotion Classification:** The next challenge is to train a deep learning model that can interpret and classify a wide spectrum of emotions based on the captured facial expressions. This model must be highly accurate and able to recognize subtle variations in facial cues to determine the user's emotional state. Emotions such as happiness, sadness, anger, surprise, and more must be classified effectively.

**3.3. Music Recommendation Engine**: The heart of the system lies in the development of an intelligent music recommendation engine. This engine must consider the user's detected mood, historical listening habits, and musical preferences to curate a personalized playlist. It should employ collaborative filtering, content-based filtering, and hybrid filtering techniques to ensure that the recommended songs are not only emotionally aligned but also relevant to the user's musical tastes.

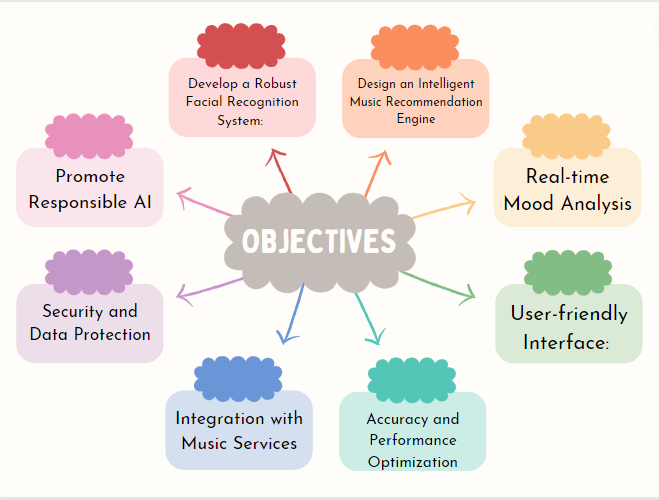
**3.4. Ethical Considerations:** Alongside these technical challenges, it is imperative to address ethical concerns associated with facial recognition technology. The system must prioritize user privacy, data security, and informed consent. Responsible AI implementation is crucial to ensure the ethical use of facial recognition for mood detection

# 4. OBJECTIVES

The objectives of the project "Facial Recognition To Detect Mood And Suggest Songs Accordingly" are to:

* **Develop a Robust Facial Recognition System:** Create a facial recognition system that can accurately identify and track facial landmarks in real-time, enabling the detection of the user's mood through facial expressions.
* **Train an Emotion Classification Model:** Train a deep learning model capable of accurately classifying a broad range of emotions based on the user's facial expressions, ensuring high classification accuracy.
* **Design an Intelligent Music Recommendation Engine:** Develop a music recommendation engine that integrates with the facial recognition system. The engine should consider the user's detected mood, historical listening habits, and musical preferences to suggest emotionally aligned songs.
* **Real-time Mood Analysis:** Ensure that the system can perform real-time mood analysis, allowing it to continuously adapt music recommendations as the user's emotional state changes.
* **Integration with Music Services:** If applicable, integrate the system with popular music streaming platforms or services to make it accessible to a wider user base.
* **Security and Data Protection:** Implement robust security measures to protect user data and ensure secure transmission and storage of sensitive information.
* **Promote Responsible AI:** Advocate for the responsible use of facial recognition technology and share insights on ethical considerations in AI and machine learning.

By achieving these objectives, the project aims to create a cutting-edge system that enhances the music listening experience by intuitively understanding and responding to the user's emotions, all while upholding ethical standards and user privacy.



# 5. METHODOLOGY :

The methodology for the "Facial Recognition To Detect Mood And Suggest Songs Accordingly" project involves a systematic approach to developing and implementing the system. Here is a step-by-step methodology for the project:

1. Project Planning and Requirements Gathering

2. Data Collection and Preparation

3. Facial Recognition System Development

4. Emotion Classification Model

5. Music Recommendation Engine

6. User Interface (UI) Design

7. Ethical Considerations

8. Real-time Processing and Integration

9. Testing and Validation

10. Performance Optimization

11. Deployment

12. User Training and Documentation

13. Continuous Improvement

14. Compliance and Monitoring

15. Knowledge Sharing and Dissemination

- Contribute to the responsible use of facial recognition technology by sharing best practices and ethical considerations.

Throughout the project, collaboration among multidisciplinary teams of software developers, machine learning engineers, UI/UX designers, and legal experts is essential to ensure a holistic approach to development, addressing both technical and ethical aspects.

# 6.EXPERIMENTAL SETUP

# 7.CONCLUSION

## 8. TENTATIVE CHAPTER PLAN FOR THE PROPOSED WORK

**CHAPTER 1: INTRODUCTION**

**CHAPTER 2: LITERATURE REVIEW**

**CHAPTER 3: OBJECTIVE**

**CHAPTER 4: METHODOLOGIES**

**CHAPTER 5: EXPERIMENTAL SETUP**

**CHAPTER 6: CONCLUSION AND FUTURE SCOPE**

## REFERENCES

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