Music Recommendation using Facial Recognition

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Project Guide

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CERTIFICATE

*This is to certify that the report titled "**Music Recommendation using Facial Recognition**" is a bonafide record of work done by **Shikha Shukla (2147153), Sandeep Sutradhar (2147130), Sunny Dahit(2147135)** of CHRIST (Deemed to be University), Bengaluru, in partial fulfillment of the requirements of V Trimester MCA during the year 2022.*

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ABSTRACT

Face recognition technology has widely attracted attention due to its enormous application value and market potential. It is being implemented in various fields like security systems, digital video processing, and many such technological advances including music recommendation systems. Additionally, music is a form of art, which is known to have a greater connection with a person's emotions. It has got a unique ability to lift up one's mood. Relatively, this project focuses on building an efficient music recommendation system that determines the emotion of the user using facial recognition techniques. This project is based on the principle of detection of human emotions using the image and video processing with a Convolutional Neural Network (CNN), and playing music that is appropriate for enhancing that emotional state. This project will extract the user's facial expression and features to determine the current mood of the person. We have found the Spotify dataset for the project, which consists of seven kinds of emotions. Here, we will have to perform some data pre-processing and connect with the Spotify API as we have planned to implement in the web application. Once the emotion is detected, a playlist of the song which is suitable to the mood of the user can be presented to the user.

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INTRODUCTION

Humans have the natural ability to read someone's mood by looking at their face. This ability, if taught by an electronic device, has real-world applications. Music, as an elicitor of emotions and feelings, is far more potent than language. Music has the ability to reach deep into our emotional core as humans.

As a result, listening to good music can help us improve our mood. To make this problem easier to understand, we are trying to develop an application that uses facial expression recognition algorithms to capture the user's emotions. Following the capture of the emotion, a list of songs is suggested based on the emotion.

1.1. PROBLEM DESCRIPTION

Music plays an important role in shaping one's emotions in different aspects of life. It is a way to express how the user is feeling, and traditional music players or digital music service applications in a way help anyone enjoy the music on the go, but they do not personalize the playlist according to the user's emotion/mood. Instead, there are a series of selections to be made in order to get desired songs automatically in the playlist. This often makes the user experience unpleasant and also is time-consuming. With the increasing usage of artificial intelligence and machine learning in different day-to-day applications. There is a need for music players to be smarter and have a better user experience. The project "Playemos" is to develop an Emotion Based Music recommendation system which is a web-based application meant for users to minimize their efforts in searching large playlists. This application is not targeted for a specific group or audience but for the general users as a whole.

1.1. EXISTING SYSTEM

Spotify is one of the most popular digital music player applications in the world. It is an upgrade over the traditional music player which completely depends on downloaded music in the system.

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Spotify being a digital music player provides user access to millions of songs, but it lacks the ability to recommend songs to users based on their mood rather it has the same traditional approach to create desired playlists manually. Song recommendations have existed for a long time, but in majority of the scenarios the recommendation is determined after learning the user preferences over a period of time, like looking at his past song preferences, time the user listens to the music etc.

1.1. PROPOSED SYSTEM

In the proposed new approach to song recommendation, where the mood of a person is determined from his picture and based on the mood predicted song recommendations are made that best suit the mood predicted. This approach makes the system user friendly and easier for the user to interact with the application.

2. SYSTEM ANALYSIS AND REQUIREMENTS

2.1. PROBLEM DEFINITION

Stressed people have a tough time finding or searching a song for relaxing their mood. Also, some time it became too depressive where a person cannot share their problem with anyone. This creates a big problem for Stressed people as it can be big issues when you are sad or stressed for a longer time.

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2.2. <u>REQUIREMENT SPECIFICATIONS</u>

2.2.1. <u>FUNCTIONAL REQUIREMENTS</u>

Functional requirements define the functionality of a system or one of its subsystems. It also depends upon the type of software, expected users and the type of system where the software is used. Functional system requirements describe clearly about the system services in detail. The functional requirements contain Login modules. They are the login module, registered users' module, normal users' module, administrator module and server module.

- Registration Module
- Login Module
- Dashboard Module
    - o Image recognition
    - o Emotion detection
    - o Playlist Suggestion

2.2.2   <u>SYSTEM REQUIREMENTS</u>

<u>Hardware Requirements:</u>

- Processor: Intel i5 processor or higher
- RAM: 8 GB or higher
- Disk space : 10GB HDD

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- Webcam

<u>Software Requirements:</u>

Frontend:

- HTML5
- CSS
- React
- JavaScript
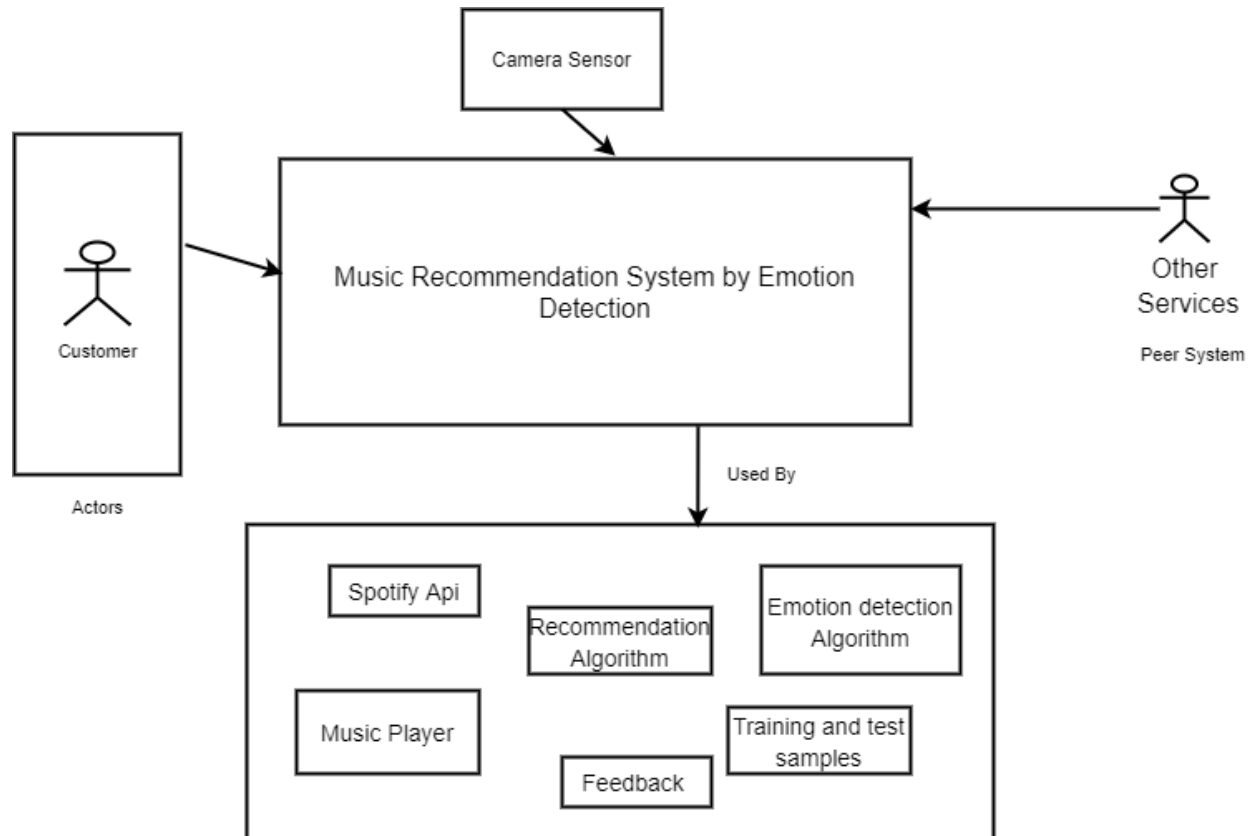
Backend:

- Django 4.1.3
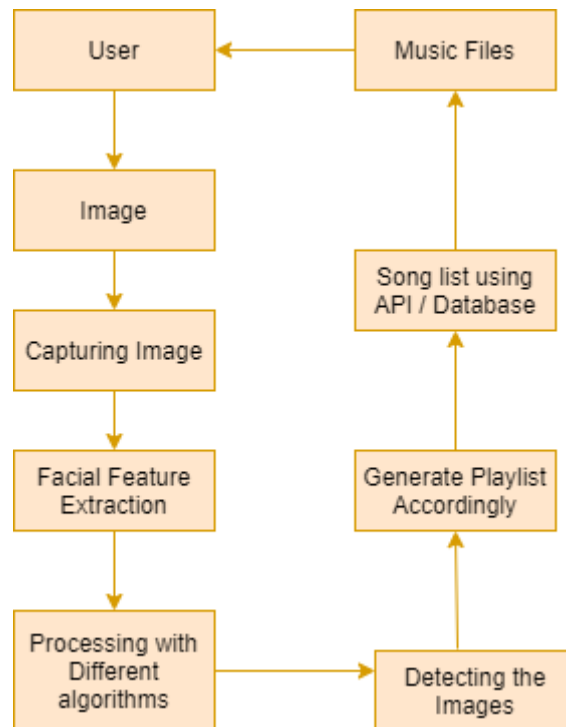- sqlite3

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3. <u>DETAILED DESIGN</u>

3.1 <u>SOLUTION ARCHITECTURE</u>

A solutions architect creates the overall technical vision for a specific solution to a business problem.
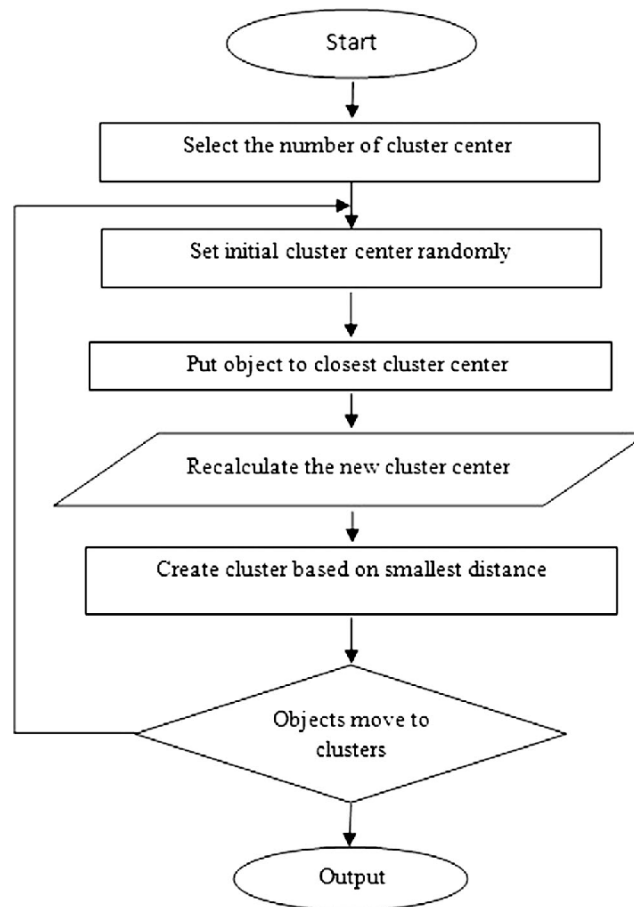

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3.2. **FLOW DIAGRAM**

Flow chart or flow diagram is a diagram that visually displays interrelated information such as events, steps in a process, functions, etc., in an organized fashion, such as sequentially or chronologically.

3.2. ALGORITHM AND DATA STRUCTURE

Start

Select the number of cluster center

Set initial cluster center randomly

Put object to closest cluster center

Recalculate the new cluster center

Create cluster based on smallest distance

Objects move to clusters

Output
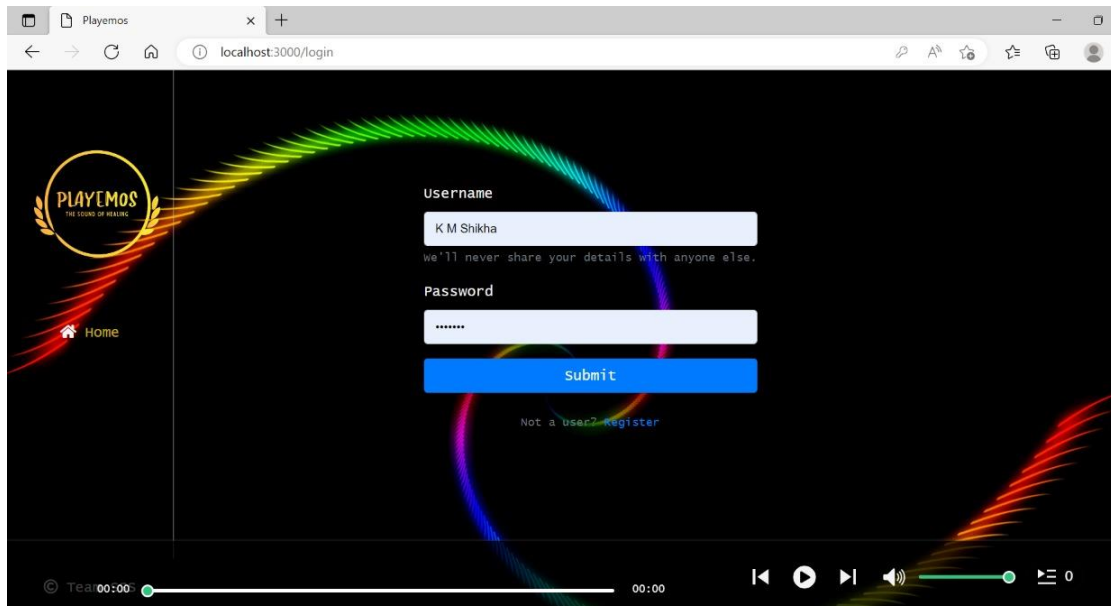
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3.2. **DFD DIAGRAM**

A data flow diagram (DFD) is a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement.
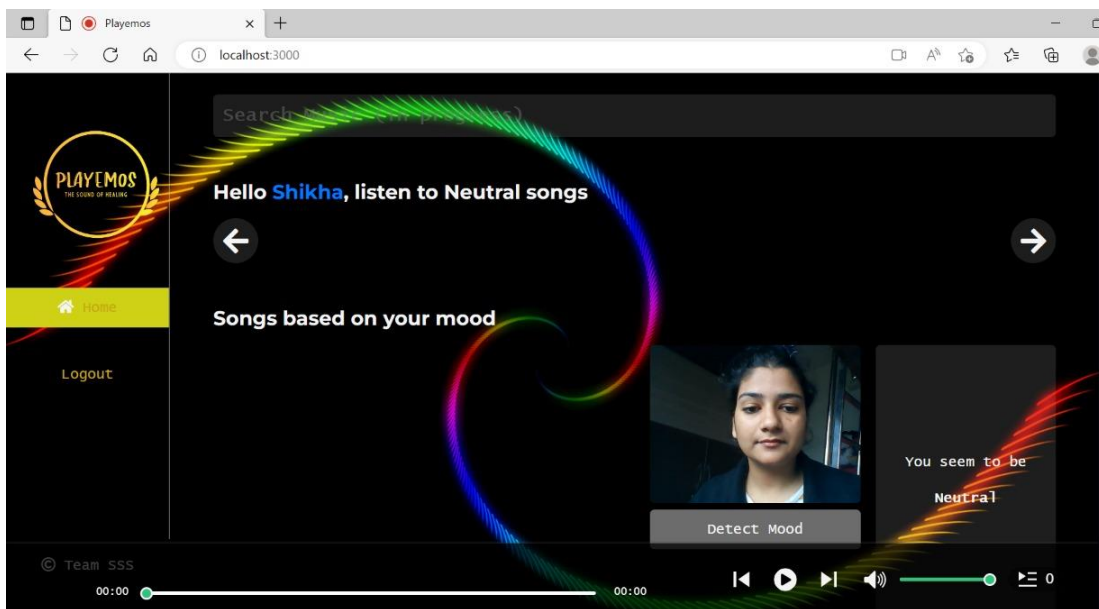

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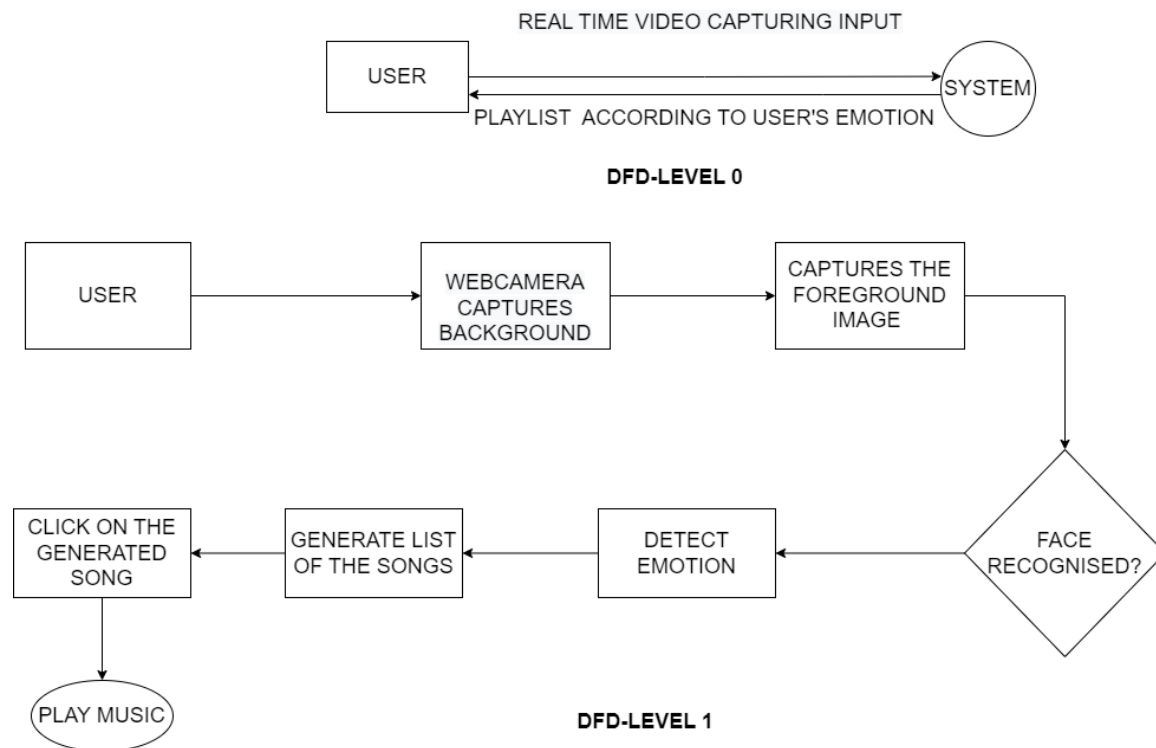
3.2. <u>INTERFACE DESIGN</u>
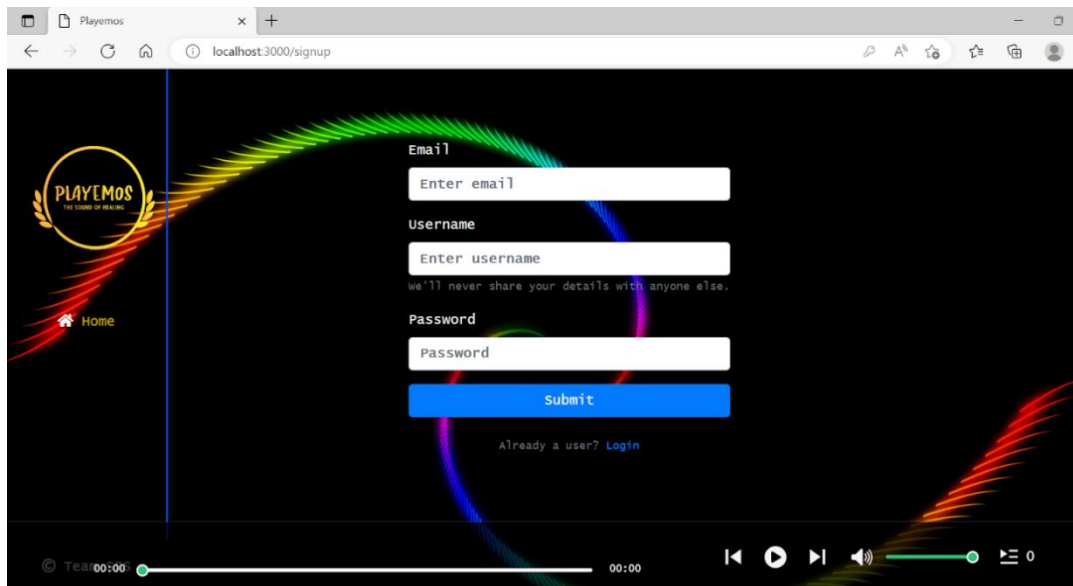
Registration Page

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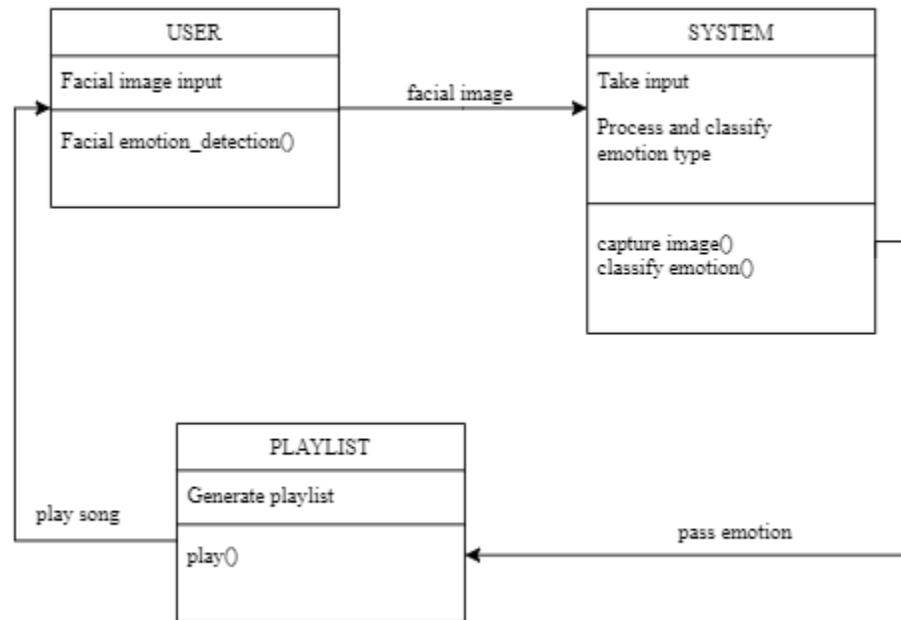

Login Page

Emotion Detection (1)

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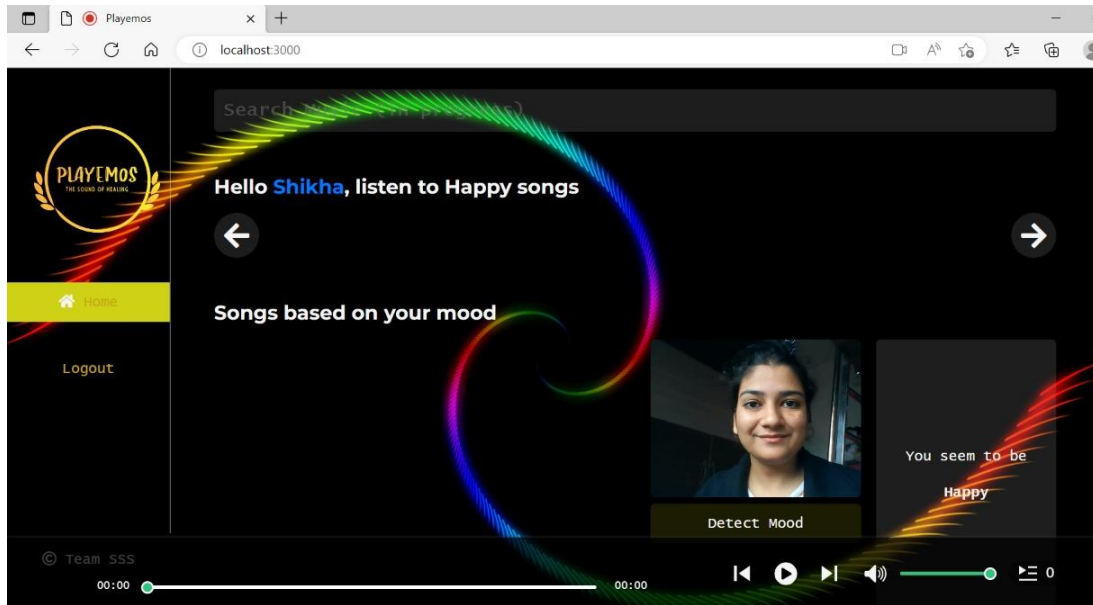
Emotion Detection (2)

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3.2. **CLASS DIAGRAM**

Class diagrams are the blueprints of your system or subsystem. You can use class diagrams to model the objects that make up the system, to display the relationships between the objects, and to describe what those objects do and the services that they provide.

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4.PROJECT SPECIFICATIONS

4.1. SPECIFICATION CONCEPTS

1. **Facial Emotion Recognition:** Facial Emotion Recognition is a technology used for analyzing sentiments by different sources, such as pictures and videos. It belongs to the family of technologies often referred to as 'affective computing', a multidisciplinary field of research on computer's capabilities to recognize and interpret human emotions and affective states and it often builds on Artificial Intelligence technologies.

2. **Face detection:** It is based on the analysis of facial landmark positions (e.g., end of nose, eyebrows). Furthermore, in videos, changes in those positions are also analyzed, in order to identify contractions in a group of facial muscles.

3. **Facial expression detection:** Facial expressions can be classified to basic emotions (e.g., anger, disgust, fear, joy, sadness, and surprise) or compound emotions (e.g., happily sad, happily surprised, happily disgusted, sadly fearful, sadly angry, sadly surprised also facial expressions could be linked to physiological or mental state of mind (e.g., tiredness or boredom).

4.2 MODULE DESCRIPTION

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- **Registration Module:** To register new users to the system. The basic purpose of the Registration is to assemble important details of the Playemos. It includes options to register a new user. The details captured are automatically stored in the corresponding database and used for the profile details.

- **Login Module:** Registered users are authenticated in order to access the system. It comprises input fields for Username and Password. The further approach towards posting requests or resources can be carried forward only if Playemos has logged into their account. Otherwise, a dialogue box pops-up asking the user to login

- **Dashboard Module:** It displays the First name of the user as it is obtained from the database. It also displays the user face for the detection and playing music option based on the suggestion.

  - Image recognition
  - Emotion detection
  - Playlist Suggestion
  - Play song

REFERENCES

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en_brand_contextual_text&utm_medium=paidsearch&utm_campaign=alwayson_asia_in_premiu
mbusiness_core_brand_neev+contextual+in-
en+google&gclid=Cj0KCQiAveebBhD_ARIsAFaAvrHw9FD31_n3AzQ3qtkFFubVJ5o5P8Sp29z
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-->Videos

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