Department of Computer Engineering

GOVERNMENT COLLEGE OF ENGINEERING

(Affiliated to DBATU, Lonere)

Dhamangaon Road, Yavatmal - 445001

A Report of Mini Project On

"EMOTION BASED MUSIC RECOMMENDATION "

Submitted by:-

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Government College of Engineering, Yavatmal

2022-2023

Department of Computer Engineering

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Dhamangaon Road, Yavatmal - 445001

CERTIFICATE

Certified that the reported work entitled

"EMOTION BASED MUSIC RECOMMENDATION "

is a Bonafide work carried out by

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The report has been approved as it satisfies the academic requirements in respect of the seminar work prescribed for the course.

Project Guided By :

Prof. Shital Gawarle

Internal Guidance :

Prof. Shital Gawarle

External Guidance :

This is to certify that the seminar report entitled

"EMOTION BASED MUSIC RECOMMENDATION "

SUBMITTED BY :

Mallinath Khonde
Renuka Dhule
Pallavi Kasture

In the partial fulfilment for the award of B.Tech in COMPUTER ENGINEERING. This mini project report is reward of the work carried out by themunder our Guidance and supervision during the year 2022-2023

PROF. Shital Gawarle (Project Guide)

Department of Computer Engineering
Government College of Engineering,
Yavatmal

Internal Examiner **External Examiner**

ACKNOWLEDGEMENT

I would like to express our deepest appreciation to all those who provided us with the possibility to complete this project report. A special gratitude I give to our final year project mentor, **Prof. Shital Gawarle,** whose contribution in stimulating suggestions and encouragement helped us to coordinate our project. He gave ussupport from the start to the end of this project and kept us on the correct path.

I would like to express my special thanks to **Prof. Shital Gawarle**, Project In- Charge of Computer Engineering, and **Prof. Chetan Andhare, Head of the Department, of Computer Engineering, Government College of Engineering, Yavatmal** who have invested their full effort in guiding the team in achieving the goal for all the timely support and valuable suggestions during the period of the project.

I would like to express our sincere thanks to **Dr. P. M. Khodke, Principal of Government College of Engineering Yavatmal**, for providing the Working facilitiesin the college.

We are equally thankful to all the staff members of the Computer Engineering Department, Government College of Engineering, Yavatmal for their valuable suggestions. Also, I would like to thank all of my friends for their continual encouragement and positive support.

Date:-

Place: - Yavatmal

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ABSTRACT

The objective of the **"EMOTION BASED MUSIC RECOMMENDATION "**

playing music automatically using facial emotion. Facial expressions are captured using an inbuilt camera. Feature extraction is performed on input face images to detect emotions such as happy, angry, sad, surprise, and neutral. Automatically music playlist is generated by identifying the current emotion of the user. The goal of the project is to record a person's facial expressions as they exhibit emotion. The web camera interface for computer systems is used by a music player to record human emotion. Music recommendation based on facial emotion recognition contains four modules.

• Real-Time Capture: In this module, the system is to capture the face of the user correctly.
• Face Recognition: Here it will take the user's face as input.
• Emotion Detection: In this section extraction of the features of the user image is done to detect the emotion and depending on the user's emotions, the system will generate captions.
• Music Recommendation: Song is suggested by the recommendation module to the user by mapping their emotions to the mood type of the song.

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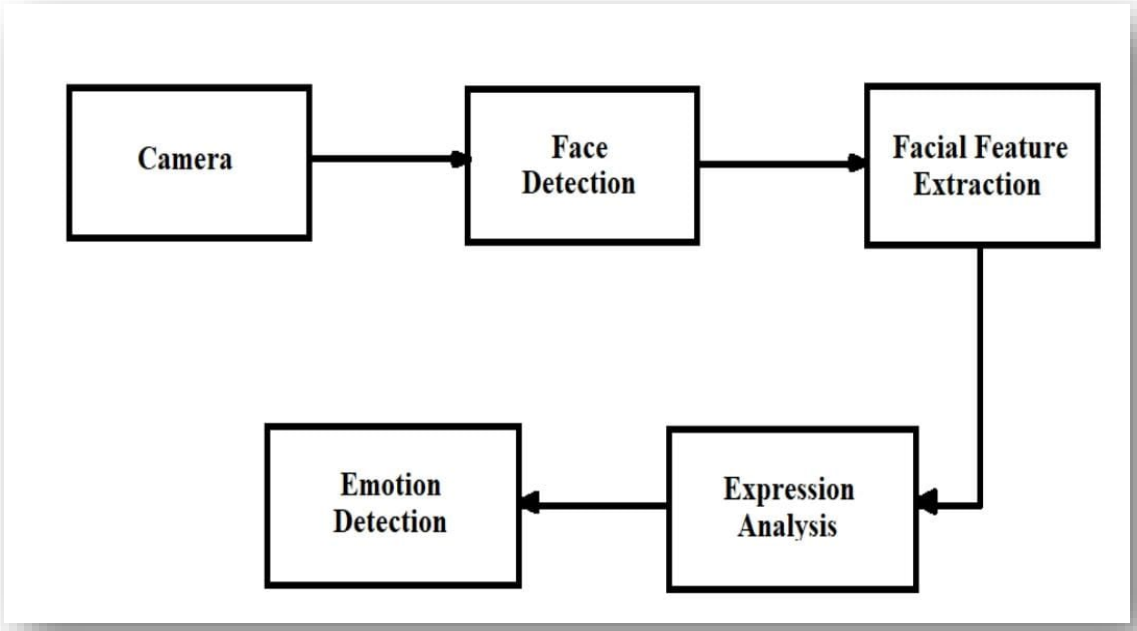
Chapter 1: INTRODUCTION

Many of the studies in recent years admit that humans reply and react to music and this music has a high impression on the activity of the human brain. In one examination of the explanations why people hear music, researchers discovered that music played a crucial role in relating arousal and mood. Two of the most important functions of music are it is ability is participants rated to help them achieve a good mood and become more self-aware. Musical preferences have been demonstrated to be highly related to personality traits and moods. We use facial expressions to propose emotion recognition system that can detect user emotions and suggest a list of appropriate songs.



Flow Chart Of Face -Detection

Emotion dection based on facial expression is one of the current topics in the various fields which provide a solution to various challenges. It expresses the human perspective or feelings and also his/her mental situation. Then system determines the mood of the user through expressions and eventually system recommands songs to user according to mood of the user which was earlier classified into different emotions.

Chapter 2 : PROBLEM STATEMENT

In old-style music players, a user had to manually browse through the playlist and select songs that would soothe his mood. In today‘s world, with ever increasing advancements in the field of multimedia and technology, various music players have been developed with features like fast forward, reverse, variable playback speed, local playback, streaming playback with multicast streams and including volume modulation, genre classification etc. These features may satisfy the user‘s basic requirements, but the user has to face the task of manually browsing through the playlist of songs and select songs based on the current mood and behaviour.

However most of the people facing the difficulty of songs selection, especially songs that match the individuals current emotions looking at the long list of unsorted music, individuals feel more demotivated to look for the songs they want to listen to. Most user will just randomly pick songs available in the song folder and play it with music player. Most of the times the songs played does not match user current emotion for example when a person is sad he would like to listen some heavy rock music to release his sadness. It is impossible for the individuals to search from his long playlist for all heavy rock music

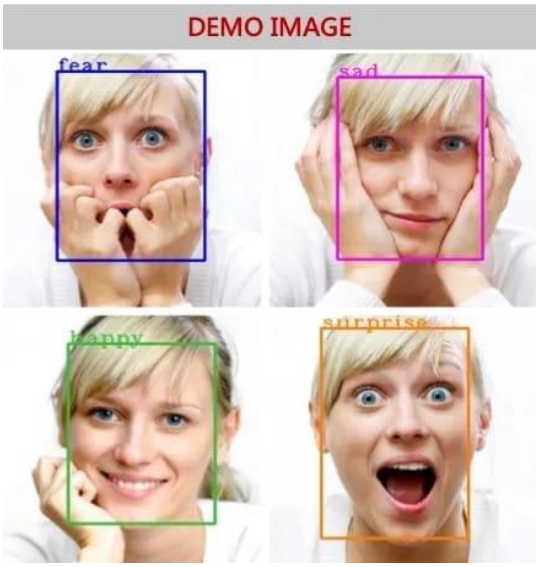
Chapter 3 : DETECTION MODULE

3.1 Face Detection :

Face detection is one of the applications which is considered under computer vision technology. This is the process in which algorithms are developed and trained to properly locate faces or objects in object detection or related system in images. This detection can be real-time from a image. Face detection uses such classifiers, which are algorithms that detect what's either a face or not a face in an image. Classifiers are trained to detect faces using numbers of images to get more accuracy. The main aim of face detection is to spot the face within the frame by reducing external noises and other factors. This uses machine learning techniques to urge a high degree of accuracy from what's called "training data".

3.2 Emotion Detection :

Emotion detection is the process of identifying human Emotion. Use of technology to help people with emotion recognition. Emotion recognition is an important area of research to enable effective human computer interaction. Human emotion can be detected using facial expression, body language. The expression and understanding of emotions is an essential skill for human. Facial expression to propose recommendor system to emotions recongnition that can be detect user emotion and suggest a list of appropriate songs. If the person has a negative emotion, then a certain playlist will shown that includes the most related types of music that will enhance their mood & If the emotion is positive a specific playlist will be presented which contains different types of music that will inflat the positive emotions.



Images Of Emotion

3.3 Music Recommendations:

After facial emotion detection, each song will be played from the playlist based on the user's mood such as sad, angry, chilled-out party, or happy.

Chapter 4 : BENEFITS & LIMITATIONS

4.1 Benefits :

- Easy to Use
- Current Mood Detection
- Improve Accuracy

4.2 Limitations :

- Emotion based music players in use are less accurate & do not cover all emotions.
- Manual selection of songs.
- Some users wanted happy songs in a sad mood to cheer them up. In that situation, the user has to select manually from the playlist.

Chapter 5: FUTURE SCOPE

This system, although completely functioning, does have scope for improvement in the future. There are various aspects of the application that can be modified to produce better results and a smoother overall experience for the user. Some of these that an alternative method, based on additional emotions which are excluded in our system as disgust and fear. This emotion included supporting the playing of music automatically. The future scope within the system would style a mechanism that might be helpful in music therapy treatment and help the music therapist to treat the patients suffering from mental stress, anxiety, acute depression, and trauma.

The current system does not perform well in extremely bad light conditions and poor camera resolution thereby provides an opportunity to add some functionality as a solution in the future.

Chapter 6 : CONCLUSION

In this system, we provide an overview of how music can affect the user's mood and how to choose the right music tracks to improve the user's moods. The implemented system can detect the user's emotions. The emotions that the system can detect were happy, sad, angry, neutral, or surprised. After determining the user's emotion, the proposed system provided the user with a playlist that contains music matches that detected the mood. Processing a huge dataset is memory as well as CPU intensive. This will make development more challenging and attractive. Our music recommendation system based on facial emotion recognition will reduce the efforts of users in creating and managing playlists. There are several methods to use the Music Recommender System, according to a thorough examination of the literature. The methods proposed by preceding researchers and developers were examined. So when we started studying we mainly found 2 approaches and that too independent. The first approach was like just determining the accurate emotion from the facial expression and second one was classifying the songs into the front emotions based on their acoustic features. The goals of our system were fixed based on the results. so we decided to merge these two approaches and provide complete solution for existing problem.

CODE :

```
import media pipe as mp

import numpy as np

import cv2

cap = cv2.VideoCapture(0)

name = input("Enter the name of the data : ")

holistic = mp.solutions.holistic

hands = mp.solutions.hands

holis = holistic.Holistic()

drawing = mp.solutions.drawing_utils

X = []

data_size = 0

while True:

        lst = []

    _, frm = cap.read()

     frm = cv2.flip(frm, 1)

res = holis.process(cv2.cvtColor(frm, cv2.COLOR_BGR2RGB))

if res.face_landmarks:

                for i in res.face_landmarks.landmark:

                        lst.append(i.x - res.face_landmarks.landmark[1].x)

                        lst.append(i.y - res.face_landmarks.landmark[1].y)

if res.left_hand_landmarks:

for i in res.left_hand_landmarks.landmark:
```

```
                    lst.append(i.x –

res.left_hand_landmarks.landmark[8].x)
                    lst.append(i.y -
res.left_hand_landmarks.landmark[8].y)
            else:
                for i in range(42):
                    lst.append(0.0)

            if res.right_hand_landmarks:
                for i in res.right_hand_landmarks.landmark:
                    lst.append(i.x -
res.right_hand_landmarks.landmark[8].x)
                    lst.append(i.y -
res.right_hand_landmarks.landmark[8].y)
            else:
                for i in range(42):
                    lst.append(0.0)
X.append(lst)
            data_size = data_size+1
drawing.draw_landmarks(frm, res.face_landmarks,
holistic.FACEMESH_CONTOURS)
        drawing.draw_landmarks(frm, res.left_hand_landmarks,
```

```
hands.HAND_CONNECTIONS)
        drawing.draw_landmarks(frm, res.right_hand_landmarks,
hands.HAND_CONNECTIONS)

cv2.putText(frm, str(data_size), (50,50), cv2.FONT_HERSHEY_SIMPLEX, 1,
(0,255,0),2)

        cv2.imshow("window", frm)
if cv2.waitKey(1) == 27 or data_size>99:
                cv2.destroyAllWindows()
                cap.release()
                break
np.save(f"{name}.npy", np.array(X))
print(np.array(X).shape)

import os
import numpy as np
import cv2
from keras.utils import to_categorical

from keras.layers import Input, Dense
from keras.models import Model
 is_init = False
```

```
size = -1

label = []

dictionary = {}

c = 0



for i in os.listdir():

    if i.split(".")[-1] == "npy" and not(i.split(".")[0] == "labels"):

        if not(is_init):

            is_init = True

            X = np.load(i)

            size = X.shape[0]

            y = np.array([i.split('.')[0]]*size).reshape(-1,1)

        else:

            X = np.concatenate((X, np.load(i)))

            y = np.concatenate((y, np.array([i.split('.')[0]]*size).reshape(-

1,1)))

label.append(i.split('.')[0])

        dictionary[i.split('.')[0]] = c

        c = c+1

for i in range(y.shape[0]):

    y[i, 0] = dictionary[y[i, 0]]

y = np.array(y, dtype="int32")
```

```
###  hello = 0 nope = 1 ---> [1,0] ... [0,1]

y = to_categorical(y)

X_new = X.copy()

y_new = y.copy()

counter = 0

cnt = np.arange(X.shape[0])



np.random.shuffle(cnt)

for i in cnt:

        X_new[counter] = X[i]

        y_new[counter] = y[i]

        counter = counter + 1

ip = Input(shape=(X.shape[1]))

m = Dense(512, activation="relu")(ip)

m = Dense(256, activation="relu")(m)

op = Dense(y.shape[1], activation="softmax")(m)

model = Model(inputs=ip, outputs=op)

model.compile(optimizer='rmsprop', loss="categorical_crossentropy",

metrics=['acc'])

model.fit(X, y, epochs=50)

model.save("model.h5")

np.save("labels.npy", np.array(label))
```

```
import cv2

import numpy as np

import mediapipe as mp

from keras.models import load_model

model  = load_model("model.h5")

label = np.load("labels.npy")

holistic = mp.solutions.holistic

hands = mp.solutions.hands

holis = holistic.Holistic()


drawing = mp.solutions.drawing_utils

cap = cv2.VideoCapture(0)

while True:

        lst = []

_, frm = cap.read()

frm = cv2.flip(frm, 1)

res = holis.process(cv2.cvtColor(frm, cv2.COLOR_BGR2RGB))

if res.face_landmarks:

                for i in res.face_landmarks.landmark:

                        lst.append(i.x - res.face_landmarks.landmark[1].x)

                        lst.append(i.y - res.face_landmarks.landmark[1].y)

if res.left_hand_landmarks:

                        for i in res.left_hand_landmarks.landmark:
```

```
                    lst.append(i.x -
res.left_hand_landmarks.landmark[8].x)
                    lst.append(i.y -
res.left_hand_landmarks.landmark[8].y)
            else:
                for i in range(42):
                    lst.append(0.0)

if res.right_hand_landmarks:
                for i in res.right_hand_landmarks.landmark:
                    lst.append(i.x –

res.right_hand_landmarks.landmark[8].x)
                    lst.append(i.y -
res.right_hand_landmarks.landmark[8].y)
            else:
                for i in range(42):
                    lst.append(0.0)
lst = np.array(lst).reshape(1,-1)
pred = label[np.argmax(model.predict(lst))]
print(pred)
            cv2.putText(frm, pred, (50,50),cv2.FONT_ITALIC, 1, (255,0,0),2)
drawing.draw_landmarks(frm, res.face_landmarks,
```

```
holistic.FACEMESH_CONTOURS)
        drawing.draw_landmarks(frm, res.left_hand_landmarks,
hands.HAND_CONNECTIONS)
        drawing.draw_landmarks(frm, res.right_hand_landmarks,
hands.HAND_CONNECTIONS)
cv2.imshow("window", frm)
if cv2.waitKey(1) == 27:
                cv2.destroyAllWindows()
                cap.release()
                break


import streamlit as st
from streamlit_webrtc import webrtc_streamer


import av
import cv2
import numpy as np
import mediapipe as mp
from keras.models import load_model
import webbrowser
model  = load_model("model.h5")
label = np.load("labels.npy")
holistic = mp.solutions.holistic
```

```
hands = mp.solutions.hands

holis = holistic.Holistic()

drawing = mp.solutions.drawing_utils

st.header("Emotion Based Music Recommender")

if "run" not in st.session_state:

        st.session_state["run"] = "true"

try:

      emotion = np.load("emotion.npy")[0]

except:

        emotion=""

if not(emotion):

        st.session_state["run"] = "true"

else:

        st.session_state["run"] = "false"

class EmotionProcessor:


def recv(self, frame):

                frm = frame.to_ndarray(format="bgr24")

################################

                frm = cv2.flip(frm, 1)

res = holis.process(cv2.cvtColor(frm, cv2.COLOR_BGR2RGB))

lst = []

if res.face_landmarks:
```

```
                for i in res.face_landmarks.landmark:
                    lst.append(i.x - res.face_landmarks.landmark[1].x)
                    lst.append(i.y - res.face_landmarks.landmark[1].y)
if res.left_hand_landmarks:
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res.left_hand_landmarks.landmark[8].x)
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res.left_hand_landmarks.landmark[8].y)
            else:
                for i in range(42):
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                for i in res.right_hand_landmarks.landmark:
                    lst.append(i.x –
res.right_hand_landmarks.landmark[8].x)
                    lst.append(i.y -
res.right_hand_landmarks.landmark[8].y)
else:
    for i in range(42):
```
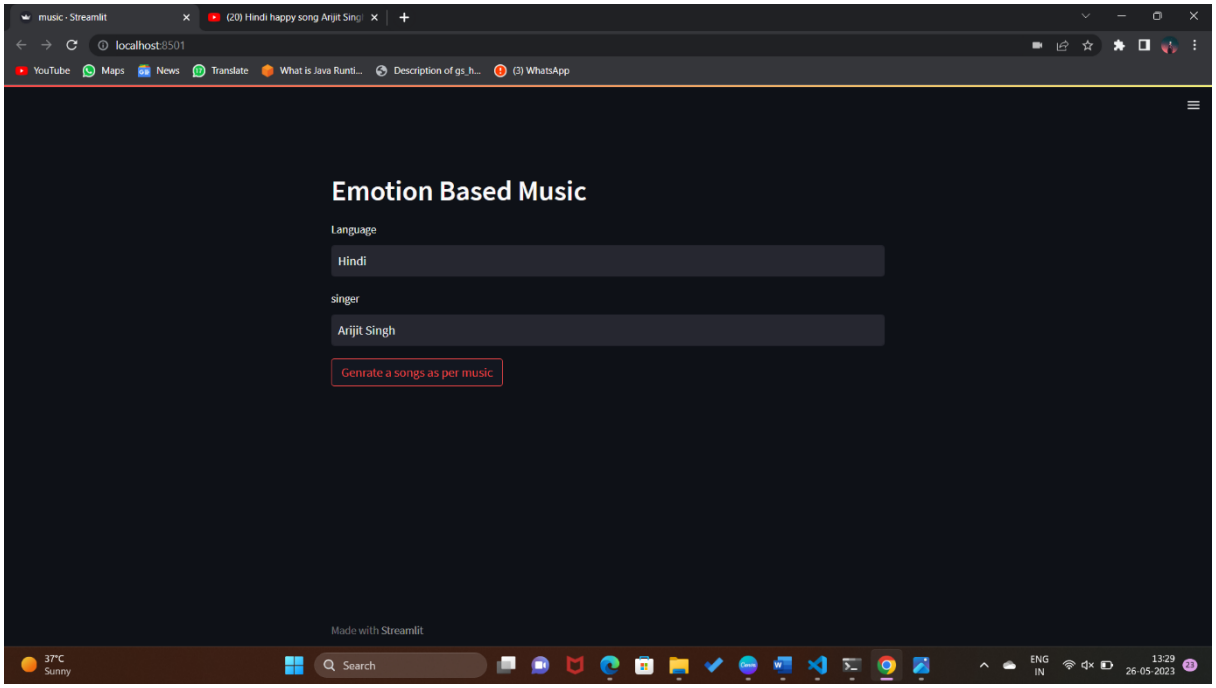
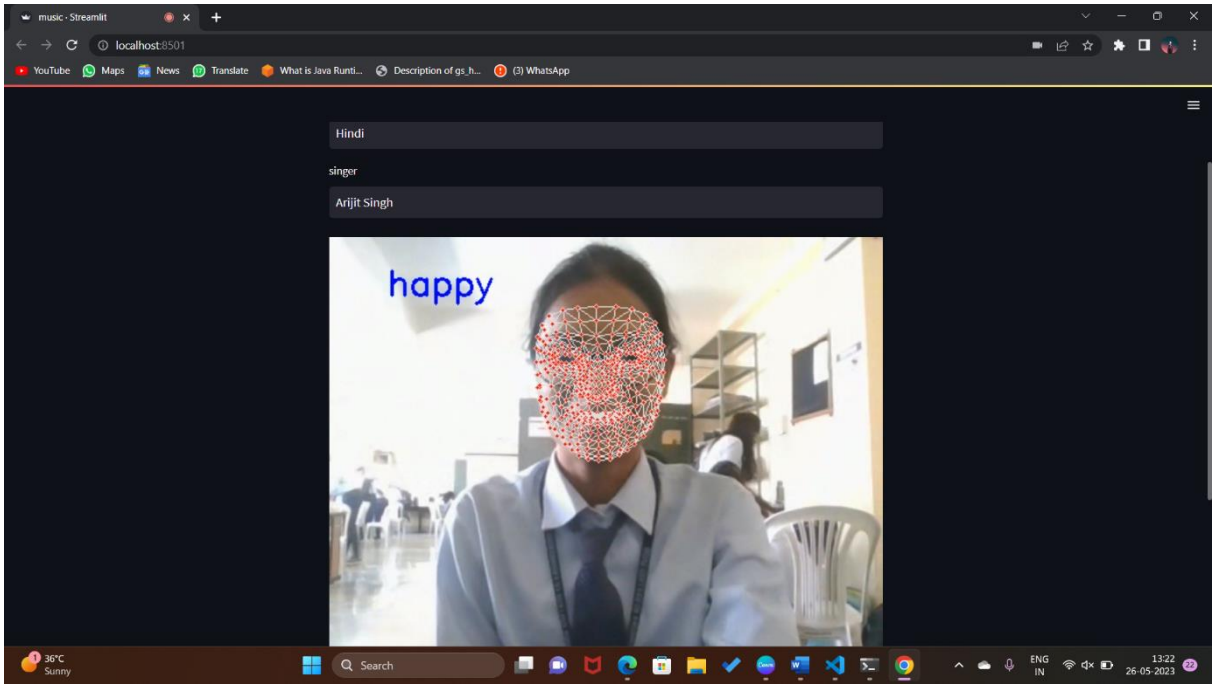
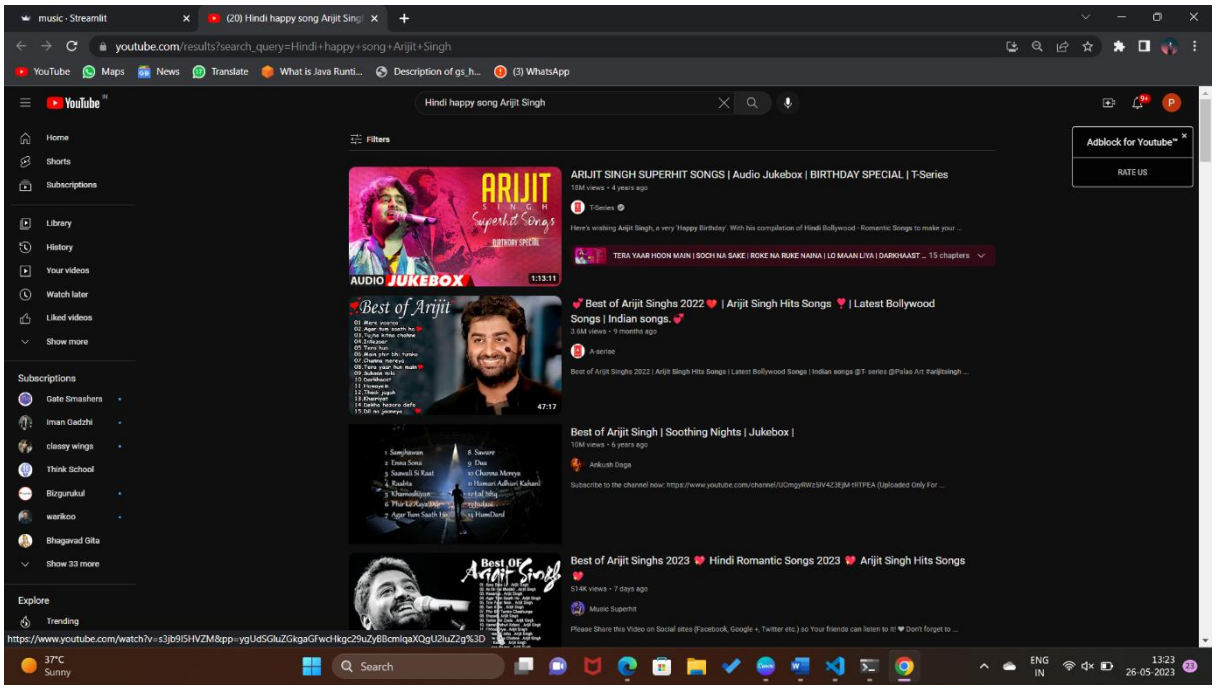

```
        lst.append(0.0)
lst = np.array(lst).reshape(1,-1)
  pred = label[np.argmax(model.predict(lst))]
                print(pred)
                    cv2.putText(frm, pred, (50,50),cv2.FONT_ITALIC, 1,
(255,0,0),2)
np.save("emotion.npy", np.array([pred]))
drawing.draw_landmarks(frm, res.face_landmarks,
holistic.FACEMESH_TESSELATION,
        landmark_drawing_spec=drawing.DrawingSpec(color=(0,0,255),
thickness=-1, circle_radius=1),
        connection_drawing_spec=drawing.DrawingSpec(thickness=1))
                drawing.draw_landmarks(frm, res.left_hand_landmarks,
hands.HAND_CONNECTIONS)
                drawing.draw_landmarks(frm, res.right_hand_landmarks,
hands.HAND_CONNECTIONS)
################################
return av.VideoFrame.from_ndarray(frm, format="bgr24")


lang = st.text_input("Language")
singer = st.text_input("singer")
if lang and singer and st.session_state["run"] != "false":
        webrtc_streamer(key="key", desired_playing_state=True,
```

```
 video_processor_factory=EmotionProcessor)

btn = st.button("Recommend me songs")

if btn:

        if not(emotion):

                st.warning("Please let me capture your emotion first")

                st.session_state["run"] = "true"

        else:

        webbrowser.open(f"https://www.youtube.com/results?search_query={lan

g}+{emotion}+song+{singer}")

                np.save("emotion.npy", np.array([""]))

st.session_state["run"] = "false"
```

OUTPUT :


music - Streamlit
(20) Hindi happy song Arijit Singh
localhost:8501
YouTube
Maps
News
Translate
What is Java Runti...
Description of gs_h...
(3) WhatsApp
Emotion Based Music
Language
Hindi
singer
Arijit Singh
Genrate a songs as per music
Made with Streamlit
37°C
Sunny
Search
ENG
IN
13:29
26-05-2023


music - Streamlit
localhost:8501
YouTube
Maps
News
Translate
What is Java Runti...
Description of gs_h...
(3) WhatsApp
Hindi
singer
Arijit Singh
happy
36°C
Sunny
Search
ENG
IN
13:22
26-05-2023


music - Streamlit
(20) Hindi happy song Arijit Singh
youtube.com/results?search_query=Hindi+happy+song+Arijit+Singh
YouTube
Maps
News
Translate
What is Java Runti...
Description of gs_h...
(3) WhatsApp
Hindi happy song Arijit Singh
Home
Shorts
Subscriptions
Library
History
Your videos
Watch later
Liked videos
Show more
Subscriptions
Gate Smashers
Iman Gadzhi
classy wings
Think School
Bizgurukul
warikoo
Bhagavad Gita
Show 33 more
Explore
Trending
Filters
ARIJIT SINGH SUPERHIT SONGS | Audio Jukebox | BIRTHDAY SPECIAL | T-Series
18M views • 4 years ago
T-Series
Here's wishing Arijit Singh, a very 'Happy Birthday'. With his compilation of Hindi Bollywood - Romantic Songs to make your ...
TERA YAAR HOON MAIN | SOCH NA SAKE | ROKE NA RUKE NAINA | LO MAAN LIYA | DARKHAAST ... 15 chapters
AUDIO JUKEBOX
1:13:11
Best of Arijit
47:17
Best of Arijit Singhs 2022 ❤️ | Arijit Singh Hits Songs ❤️ | Latest Bollywood Songs | Indian songs. 💕
3.6M views • 9 months ago
A-series
Best of Arijit Singhs 2022 | Arijit Singh Hits Songs | Latest Bollywood Songs | Indian songs @T-series @Palas Art #arijitsingh ...
Best of Arijit Singh | Soothing Nights | Jukebox |
10M views • 6 years ago
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514K views • 7 days ago
Music Superhit
Please Share this Video on Social sites (Facebook, Google +, Twitter etc.) so Your Friends can listen to it! ❤ Don't forget to ...
Adblock for Youtube™
RATE US
https://www.youtube.com/watch?v=s3jb9I5HVZM&pp=ygUdSGluZGkgaGFwcHkgc29uZyBBcmlqaXQgU2luZ2g%3D
37°C
Sunny
Search
ENG
IN
13:23
26-05-2023