Department of Computer Science & Engineering
Shri Shankaracharya Institute of Professional Management & Technology Raipur (C.G.)

A MAJOR Project Report Phase-I On

SONG RECOMMENDATION USING MOOD DETECTION

Submitted To

Chhattisgarh Swami Vivekanand Technical University
Bhilai, India

For

The Award of Degree

of

Bachelor of Technology

in

Computer Science & Engineering

By

Aditya Londhe
Roll No.-303302220300
En. No.-BJ0001
Semester 7th (CSE)

Shramistha Sinha
Roll No.- 303302219095
En. No.- BH3778
Semester 7th (CSE)

Under the Guidance of

Mr. Anand Tamrakar

Asst. Professor

Department of Computer Science & Engineering

S.S.I.P.M.T, Raipur

Department of Computer Science & Engineering
Shri Shankaracharya Institute of Professional Management & Technology Raipur (C.G.)

SESSION 2022-23

Department of Computer Science & Engineering

Shri Shankaracharya Institute of Professional Management & Technology

Raipur (C.G.)

SONG RECOMMENDATION USING MOOD DETECTION

Department of Computer Science & Engineering
Shri Shankaracharya Institute of Professional Management & Technology
Raipur (C.G.)

DECLARATION BY THE CANDIDATE

we the undersigned solemnly declare that the report of the MAJOR Project Phase1 work entitled Song Recommendation using mood detection is based on my own work carried out during the course ofmy study under the supervision of **Mr. Anand Tamrakar**.

I assert that the statements made, and conclusions drawn are an outcome of the project work. I further declare that to the best of my knowledge and belief that the report does not contain any part of any work which has been submitted for the award of any other degree/diploma/certificate in this University/deemed University of India or any other country.

Name: Aditya Londhe
Roll No.: 303302220300
En. No.: BJ0001
Semester: 7th (CSE)

Name: Shramistha Sinha
Roll No.: 303302219095
En. No.: BH3778
Semester: 7th (CSE)

Department of Computer Science & Engineering
Shri Shankaracharya Institute of Professional Management & Technology
Raipur (C.G.)

CERTIFICATE OF THE SUPERVISOR

This is to certify that the Major project phase 1 report entitled **"song recommendation using mood detection"** is a record of project work carried out under my guidance and supervision for the fulfillment of the award of degree of Bachelor of Technology in the faculty of Computer Science & Engineering of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.) India.

To the best of my knowledge and belief the report

i) Embodies the work of the candidate himself
ii) Has duly been completed
iii) Fulfills the partial requirement of the ordinance relating to the B.Tech. degree of the University.
iv) Is up to the desired standard both in respect of contents and language for being referred to the examiners.

(Signature of the Supervisor)
Mr. Anand Tamrakar
Asst. Professor, Dept of C.S.E
S.S.I.P.M.T, Raipur (C.G.)

Forwarded to
Chhattisgarh Swami Vivekanand Technical University, Bhilai

(Signature of HOD)
Dr. J.P. Patra
Dept. of Computer Science & Engineering
S.S.I.P.M.T, Raipur, C.G

(Signature of the Principal)
Dr. Alok Kumar Jain
S.S.I.P.M.T, Raipur, C.G

CERTIFICATE BY THE EXAMINERS

The project report entitled **"song recommendation using mood detection** "has been examined by the undersigned as a part of the examination of Bachelor of Technology in the faculty of Computer Science & Engineering of Chhattisgarh Swami Vivekanand Technical University, Bhilai.

Internal Examiner	**External Examiner**
Date:	**Date:**

ACKNOWLEDGEMENT

Working on this project has been a great experience for us. There were moments of anxiety when we could not solve a problem for several days. But we have enjoyed every bit of process and are thankful to all people associated with us during this period we convey our sincere thanks to our project guide **Mr. Anand Tamrakar** for providing me all with sorts of facilities. His support and guidance helped us to carry out the project. We owe a great dept. of his gratitude for his constant advice, support, cooperation & encouragement throughout the project we would also like to express our deep gratitude to respected **Dr. J. P. Patra** (Head of Department) for his ever help support. We also pay special thanks for his helpful solution and comments enriched by his experience, which improved our ideas for better element of the project. We would also like to express our deep gratitude to respected **Dr. Alok Kumar Jain** (Principal) and college management for providing an educational ambience. It will be our pleasure to acknowledge, utmost cooperation and valuable suggestions from time to time given by our staff members of our department, to whom we owe our entire computer knowledge and also we would like to thank all those persons who have directly or indirectly helped us by providing books and computer peripherals and other necessary amenities which helped us in the development of this project which would otherwise have not been possible.

Name: Aditya Londhe
Roll No.: 303302220300
En. No.: BJ0001
Semester: 7th (CSE)

Name: Shamistha Sinha
Roll No.: 303302219095
En. No.: BH3778
Semester: 7th (CSE)

ACKNOWLEDGEMENT –AICTE IDEA Lab

We have taken efforts in this project. However, it would not have been possible without the kind support and help of AICTE-IDEA Lab at SSIPMT, Raipur. We would like to extend our sincere thanks to all the gurus, mentors and support staff of Idea lab.

LIST OF FIGURES

ABSTRACT

The work presents described the development of song recommendation using mood detection, which is a computer application meant for all type of users, specifically the music lovers. Due to the troublesome workloads in songs selection, most people will choose to randomly play the songs in the playlist. As a result, some of the songs selected not matching the users' current emotion. Moreover, there is no commonly used music player which able to play the songs based on user's emotion. The proposed model can extract user's facial expression and thus detect user's emotion. The music player in the proposed model will then play the songs according to the category of emotion detected. It is aimed to provide a better enjoyment to music lovers in music listening. The scope of emotions in the proposed model involves normal, sad, surprise and happy. The system involves the major of image processing and facial detection technologies. The input for this proposed model is the .jpeg format still images which available online. The performance of this model is evaluated by loading forty still images (ten for each emotion category) into the proposed model to test on the accuracy in detecting the emotions. Based on the testing result, the proposed model has the Recognition Rate of 85%.

Table of Content

CHAPTER-1

INTRODUCTION

INTRODUCTION

1.1 BACKGROUND OF STUDY

Emotions are the bodily feelings associated with mood, temperament, personality or character. Paul Ekman had developed the classifications of basic emotions which are anger, disgust, fear, happiness, sadness and surprise in 1972.[1]

A facial expression can be expressed through the motions or from one or more motions, movements or even positions of the muscles of the face. These movements transmit of the emotional status of an individual. Facial expression can be adopted as voluntary action as individual can control his facial expression and to show the facial expression according to his will. For an example, a person can make the eyebrow closer and frown to show through the facial expression that he is angry. On the other hand, an individual will try to relax the face's muscle to indicate that he is not influence by the current situation. However, since facial expression is closely associated with the emotion, thus it is mostly an involuntary action. It is nearly impossible for an individual to insulate himself from expressing the emotions. An individual may have a strong desire or will to not to express his current feelings through emotions, but it is hard to do so. An individual may show his expression in first few micro-second before resume to a neutral expression.[1]

Since the work of Darwin in 1872, the behavioral scientists had actively involved in the research and analysis of facial expression detection. In 1978, presented his early attempt on the idea of automatically facial expressions analysis by tracking the motion of twenty identified spots on an image sequence. After Some attempt, there are lots progresses in developing the computer systems in order to help human to recognize and read the individual's facial expression, which is a useful and natural medium in communication. Facial expression analysis includes both detection and interpretation of facial motion and recognition of expression. The three approaches which enabled the automatic facial expression analysis (AFEA) includes

i) face acquisition,
ii) facial data extraction and representation, and
iii) facial expression recognition.

The "Emotion Based Music Player" is a device developed aimed to detect the emotion of an individual and play the lists of music accordingly. First, the individual will reflect his emotion through the facial expression. After that, the device will detect the condition of the facial expression, analyze it and interpret the emotion. After

determined the emotion of the individual, the music player will play the songs which can suit the current emotion of the individual. The device will focus on the analysis of the facial expression only which does not include the head or face movement. [2]

1.2 PROBLEM STATEMENT

The significance of music on an individual's emotions has been generally acknowledged. After the day's toils and hard works, both the primitive and modern man able to relax and ease him in the melody of the music. Studies had proof that the rhythm itself is a great tranquilizer. However, most people facing the difficulty of songs selection, especially songs that match individuals' current emotions. Looking at the long lists of unsorted music, individuals will feel more demotivated to look for the songs they want to listen to. Most user will just randomly pick the songs available in the song folder and play it with music player. Most of the time, the songs played does not match the user's current emotion. For an example, when a person is sad, he would like to listen to some heavy rock music to release his sadness. It is impossible for the individual to search from his long playlist for all the heavy rock music. The individual would rather choose the songs randomly or just "play all" for all the songs he had. Besides, people get bored with this traditional way of searching and selecting songs. The method had been implemented since few years back. [2]

1.3 PROJECT OBJECTIVE

1.3.1 General Objective

The main objective of this project is to develop the "face detection music player" for all kinds of music lovers which aimed to serve as a platform to assist individuals to play and listen to the songs according to his emotions. It is aimed to provide a better enjoyment of entertainment to the music lovers.

1.3.2 Specific Objective

The Specific Objective for this project is specified as below:

i. To propose a facial expression detection model to detect and analyze the emotion of an individual.
ii. To accurately detect the four basic emotions, namely normal, happy, sad and surprise.
iii. To integrate the music player into the proposed model to play the music based on the emotions detected.

CHAPTER-2

LITERATURE REVIEW

2.1 Literature survey

Literature survey is the most important step in software development process. Before developing the tool, it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, then next step is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system, the above consideration is considered for developing the proposed system. [3]

2.2 A Machine Learning Based Music Player by Detecting Emotions

This paper constitutes the implementation of Convolutional neural network for the emotion detection and thereby playing a song accordingly. In order to obtain minimal processing, multilayer perceptron is implemented by CNNs. In comparison to various algorithms for image classification, CNNs observed to have little-processing. This implies that the filters used in CNNs are advantageous when compared to traditional algorithm. The visualization of features directly can be less informative. Hence, we use the training procedure of back-propagation to 23 | Page activates the filters for better visualization. The multiple actions such as capturing, detecting the emotion and classifying the same can all be confined as one step through the use of CNN. [3]

2.3 Emotion-Based Music Player

This paper proposed an emotion-based music player, which can suggest songs based on the user's emotions; sad, happy, neutral and angry. The application receives either the user's heart rate or facial image from a smart band or mobile camera. It then uses the classification method to identify the user's emotion. This paper presents 2 kinds of the classification method; the heart ratebased and the facial image-based methods. Then, the application returns songs which have the same mood as the user's emotion. The user and song emotions [3]

in this paper are divided into four types namely: neutral, happy, sad and angry. The experimental results present that detecting the happy emotion is the most precise with around 98%, while the accuracy of the sad mood detection is the lowest with 40%.

They proposed a system image from database is passed to the facial landmark detection stage to remove noise by applying Gaussian Filter or mask. Here itself they used Viola Jones technique of Haar-like features with Adaboost learning for face detection. The feature detection stage consists of Eyebrow corners detector, Eye detector, Noise detector, Lip corner detector. After these active facial patches are extracted, the classification of features is done by SVM

(Support Vector Machine). While testing it will take the hundreds of images from the database and extract the features and classifies accordingly. They used CK+ (Cohn-Kanade) dataset and JAFEE dataset for training and testing the database. The training database consist of 329 images in total.

Comparison with similar expression can be done in order to detect the facial expression of an individual. In the year of 2005, Mary Duenwald had published an article which summarizes that scientists had did several studies and researches and shown that facial expressions across the globe fall roughly into seven categories:

i. Sadness: The eyelids droop while the inner corners of the brows rise. When in extreme sadness, the brows will all push nearer together. As for the lips, both of its corners pull down and the lower lip may push up in a mope.
ii. Surprise: Both the upper eyelids and brows rise, and the jaw drops open.
iii. Anger: Both the lower and upper eyelids squeeze in as the brows move down and draw together. The jaw pushes forward, the upper and lower lip press on each other when the lower lip pushes upper a bit.
iv. Contempt: The expression appears on one side of a face: One half of the upper lip tightens upward.
v. Disgust: The individual's nose wrinkles and the upper lip rise while the lower lip protrudes.
vi. Fear: The eyes widen and the upper lids rise. The brows draw together while the lips extend horizontally.

vii. vii. Happiness: The corners of the lips lifted and shaped a smile, the eyelids tighten, the cheeks rise up and the outside corners of the brows pull down.

2.4 RELATIONSHIP BETWEEN MUSIC AND EMOTION RESEARCH

Many researchers had did research and studies on if the music can actually influence the emotion of individuals. Throughout the years, the results from the studies proved that different music style can actually influence individuals in different ways. For an example, in the year of 1994, Antoinette L. Bouhuys, Gerda M. Bloem, Ton G.G.Groothuis carried out a study in the relationship between the individuals' facial expression after listening to depression music. The results showed that depressing music bring on a major increase of depressed mood and

significant decline if delighted mood. The study proved that music can actually influence individuals' emotions.

Besides the study mentioned above, Daniel T. Bishop, Costas I. Karageorghis, and Georgios Loizou presented on their research in the used of music in manipulating the young tennis players' emotional state. A total of fourteen young tennis players were involved in this study. The research signifies that participants will often choose to listen to music in order to elicit various emotion states, increased arousal, and visual and auditory imagery. "Increasing the tempo and/or intensity of a musical excerpt may increase the magnitude of an effective response and concomitant action tendencies" (Frijda, 1986) such as increased motor behavior.

In 2001, Matthew Montague Lavy develops four basic assumptions regarding music lovers and their relationship to music. First, music is heard as sound. The constant monitoring of auditory stimuli will not be switched off once an individual listen to music but it will monitor and analyzed the music just like any other stimuli. Secondly, music is heard as human utterance. Everyone has the ability to identify and detect emotion in the contours and timbres of vocal utterances. Third, music is heard in context. Music is described as a wide and complicated network of knowledge, thoughts and environment. All these are the factors which contribute to an emotional experience. Forth, music is heard as narrative. Listening to music includes the integration of sounds, utterances and context

CHAPTER-3

METHODOLOGY

3.1 Proposed System

Convolution neural network algorithm is a multilayer perceptron that is the special design for the identification of two-dimensional image information. It has four layers: an input layer, a convolution layer, a sample layer, and an output layer. In a deep network architecture, the convolution layer and sample layer may have multiple. CNN is not as restricted as the Boltzmann machine, it needs to be before and after the layer of neurons in the adjacent layer for all connections, convolution neural network algorithms, each neuron doesn't need to experience the global image, just feel the local region of the image. In addition, each neuron parameter is set to the same, namely, the sharing of weights, namely each neuron with the same convolution kernels to the deconvolution image. The key era of CNN is the local receptive field, sharing of weights, subsampling by using time or space, with a purpose to extract features and reduce the size of the training parameters. The advantage of CNN algorithm is to avoid the explicit feature extraction, and implicitly to learn from the training data. The same neuron weights on the surface of the feature mapping, thus the network can learn parallel, and reduce the complexity of the network Adopting sub-sampling structure by time robustness, scale, and deformation displacement. Input information and network topology can be a very good match. It has unique advantages in image processing. [4]

3.2 FACE DETECTION

The Viola-Jones Algorithm, developed in 2001 by Paul Viola and Michael Jones, the Viola-Jones algorithm is an object-recognition framework that allows the detection of image features in real-time. Viola-Jones is quite powerful, and its application has proven to be exceptionally notable in real-time face detection. The framework is still a leading player in face detection alongside many of its CNNs counter parts. The Viola-Jones Object Detection

Framework combines the concepts of Haar-like Features, Integral Images, the AdaBoost Algorithm, and the Cascade Classifier to create a system for object detection that is fast and accurate.

Viola-Jones was designed for frontal faces, so it can detect frontal the best rather than faces looking sideways, upwards or downwards. Before detecting a face, the image is converted into grayscale, since it is easier to work with and there's lesser data to process. The Viola-Jones algorithm first detects the face on the grayscale image and then finds the location on the colored image.

grayscale, since it is easier to work with and there's lesser data to process. The Viola-Jones algorithm first detects the face on the grayscale image and then finds the location on the colored image.

Viola-Jones outlines a box (as you can see on the right) and searches for a face within the box. It is essentially searching for these haar-like features, which will be explained later. The box moves a step to the right after going through every tile in the picture. In this case, I've used a large box size and taken large steps for demonstration, but in general, you can change the box size and step size according to your needs. With smaller steps, a number of boxes detect face-like features (Haar-like features) and the data of all of those boxes put together, helps the algorithm determine where the face is.

3.3 FACIAL FEATURE EXTRACTION

3.3.1 Convolution Neural Network

Convolution neural network (CNN) is an efficient recognition algorithm which is widely used in pattern recognition and image processing. It has many features such as simple structure, less training parameters and adaptability.

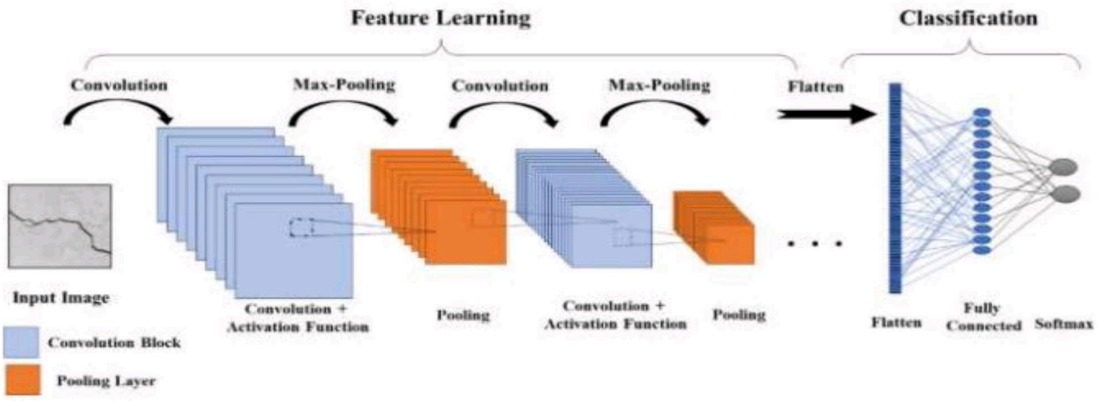

Fig.3.1 CNN Architecture

CNN is a class of deep learning neural networks. CNNs represent a huge breakthrough in image recognition. They're most used to analyze visual imagery and are frequently working behind the scenes in image classification. They can be found at the core of everything from facebook's photo tagging to self-driving cars. They're working hard behind the scenes in everything from healthcare to security. Image classification is the process of taking an input.

or more layers of convolution units. A convolution unit receives its input from multiple units from the previous layer which together create a proximity. Therefore, the input units (that form a small neighborhood) share their weights. The role of the Convents is to reduce the images into a form which is easier to process, without losing features which are critical for getting a good prediction. This is important when we are to design an architecture which is not only good at learning features but also is scalable to massive datasets. A CNN typically has three layers: a convolutional layer, a pooling layer, and a fully connected layer.[4]

3.3.2 Type of SDLC Model Used

Incremental Model is a process of software development where requirements are divided into multiple standalone modules of the software development cycle. In this model, each module goes through the requirements, design, implementation, and testing phases. Every subsequent release of the module adds a function to the previous release. The process continues until the complete system is achieved.[4]

Each iteration passes through the requirements, design, coding, and testing phases. And each subsequent release of the system adds function to the previous release until all designed functionality has been implemented. The system is put into production when the first increment is delivered. The first increment is often a core product where the basic requirements are addressed, and supplementary features are added in the next increments. Once the core product is analyzed by the client, there is plan development for the next System development is broken down into many mini development projects.Partial systems are successively built to produce a final total system.

- Highest priority requirement is tackled first.
- Once the requirement is developed, requirement for that increment is frozen.

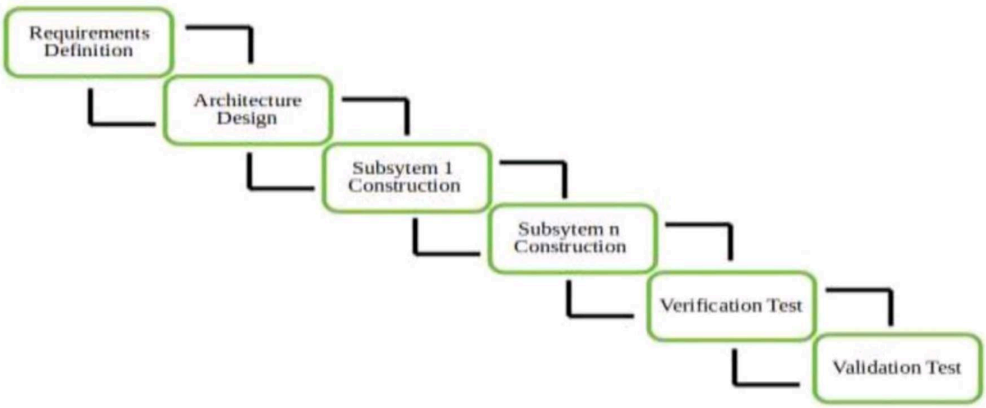

Fig.3.2 Incremental Model

1. Requirement Analysis: -
    - Python stream lit and stream lit web
    - It refers to the people who love to listen song in mood
    - Identifies of mood by peoples
2. System design: - On basis of above collected requirements we designed our interfaces that contains:
    - Data Visualization of Target Variables
    - Data Preprocessing
    - Ten top records of data
3. Implementation: -
    - Link to Music for database
    - Python for backend and frontend
4. Testing: -
    - Face detection mood based on responsiveness.
    - Face expressions accuracy is tested.
    - Face detection fetching is working properly.

3.4 DEVELOPMENT TOOLS

- Software:

I. Sublime and PyCharm:

- Main development software which includes interface design and coding
- Hardware:

I. Personal laptop ASUS TUF:

- AMD RYZEN 7 4800H CPU @2.5GHz
- 16GB RAM

II. Build in webcam/External Webcam:

- To capture the user's facial expression

III. Programming Language:

- Python 3.8.10

IV. Operating System:

- Windows 11 2022h

3.5 FLOW CHART:

A flowchart is a type of diagram that represents a workflow or process. A flowchart can also be defined as a diagrammatic representation of an algorithm, a step-by-step approach to solving a task. The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows.

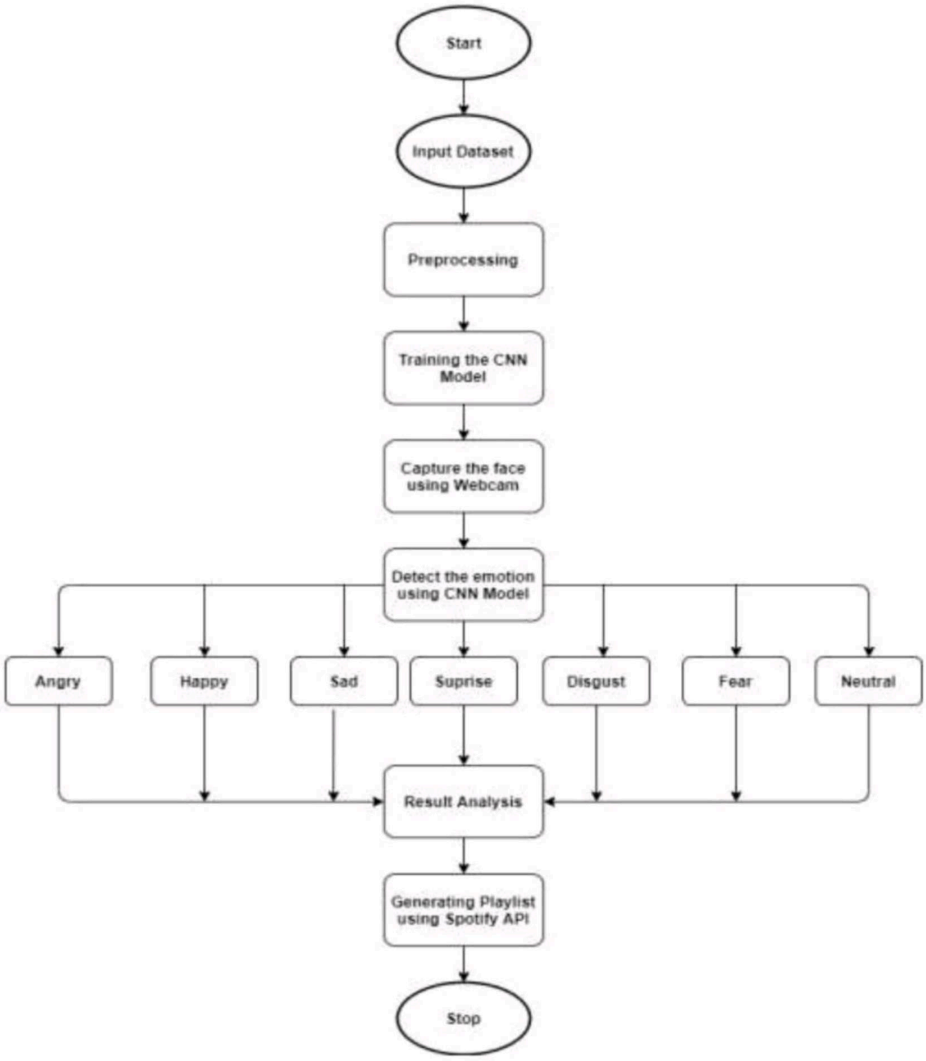

Fig.3.3 Flow chart

3.6 USE CASE DIAGRAM:

In the Unified Modelling Language (UML), a use case diagram can summarize the details of your system's users (also known as actors) and their interactions with the system. To build one, you'll use a set of specialized symbols and connectors. An effective use case diagram can help your team discuss and represent:

• Scenarios in which your system or application interacts with people, organizations, or external system

• Goals that your system or application helps those entities (known as actors) achieve.

• The scope of your system.

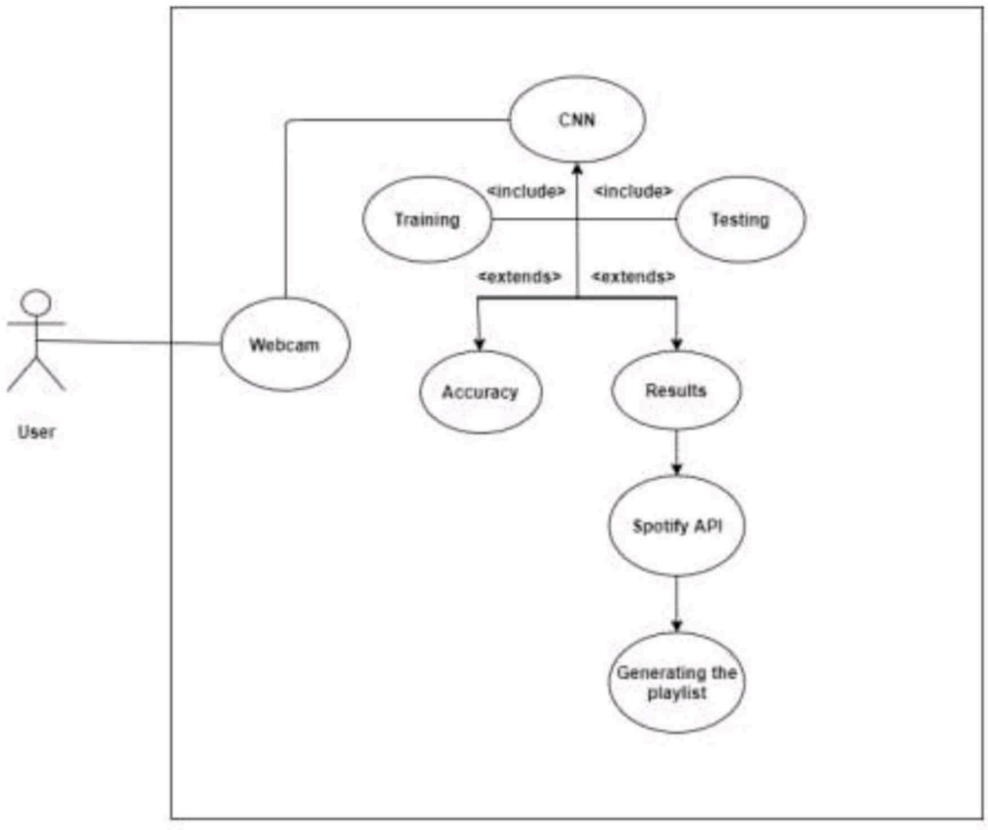

Fig.3.4 Use Case Diagram

3.7 DATA FLOW DIAGRAM(DFD):

DFD is the abbreviation for **Data Flow Diagram**. The flow of data of a system or a process is represented by DFD. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does not have control flow and no loops or decision rules are present.

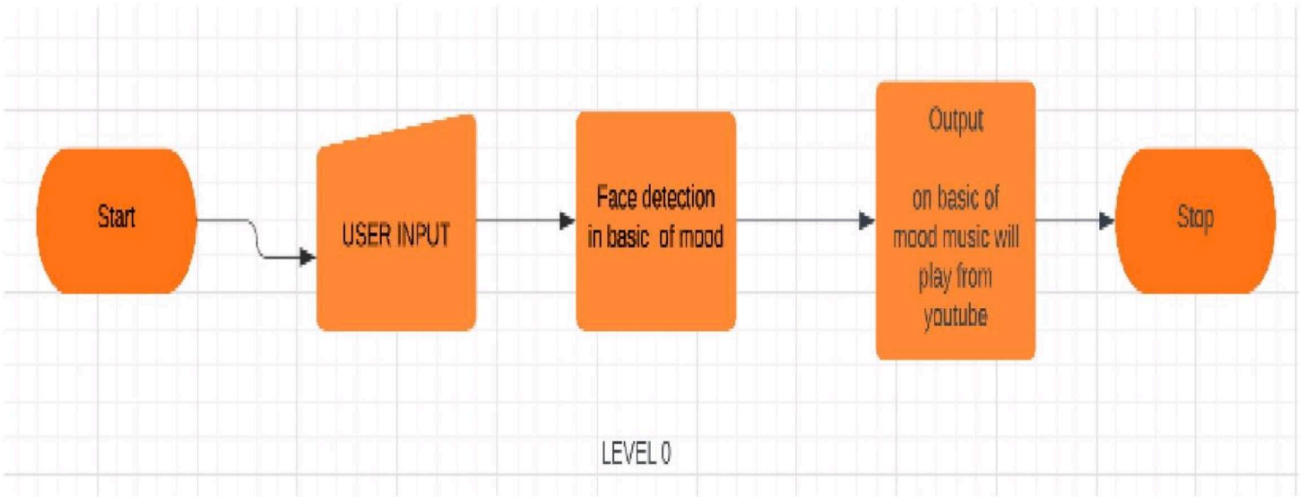

Fig.3.5 Data Flow Diagram

A. Research Approach

We all have been well acquainted with Facebook, right after we upload a picture on it, it uses an auto-attack to tag people which is an interdisciplinary field that deals with how computers can be made to gain high level understanding from digital images or videos. So, the idea is to automate tasks that the human visual systems can do.

Neuropsychiatric symptoms appear to be common in people due to covid-19. The humans are found to have an increased chance of developing a new mental health illness within 90 days when impaired with other illnesses. In such difficult circumstances, it became necessary for us to devise a system that would assist the people in expressing what they truly feel. Since facial expression is the superior non-verbal way of communication that can lay forward the sentiments of an individual, [3]

inspired from this, we developed a platform that recognizes the human facial expression then suggests a YouTube playlist to the person after decoding their mood.

B. OpenCV OpenCV

library is used for computer vision. It supports a wide variety of programming languages such as C++, python, java etc. OpenCV python a python wrapper for the original OpenCV C++ implementation. The images are converted from or to NumPy arrays. This makes it easier to integrate with other libraries. The computer will first convert the image into a matrix; in this case it'll convert it into a NumPy matrix or an array. Loading, resizing and displaying the image are some basic operations that can be easily performed using it. It uses the coordinates of the face for understanding the image. The video is captured in a similar way. This library supports a wide range of complex image processing models and includes a number of image modification methods. [4]

C. Streamlit

Streamlit is a free and open-source framework to rapidly build and share beautiful machine learning and data science web apps. It is a Python-based library specifically designed for machine learning engineers. Data scientists or machine learning engineers are not web developers and they're not interested in spending weeks learning to use these frameworks to build web apps. Instead, they want a tool that is easier to learn and to use, as long as it can display data and collect needed parameters for modeling. Streamlit allows you to create a stunning-looking application with only a few lines of code. [4]

D. streamlit_webrtc

The following tutorial uses knowledge about WebRTC concepts such as "Signaling", "Offer", and "Answer". The below figure provides a simple summary of how to establish a WebRTC connection.

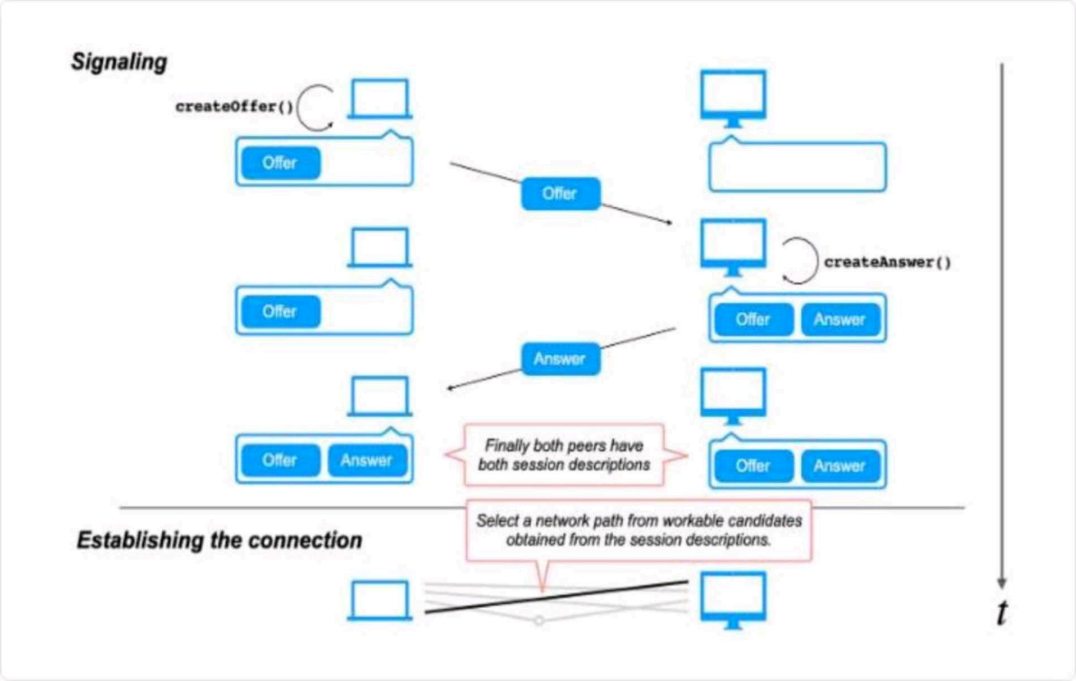

Fig.3.6 streamlit_webrtc

It is now supported by major browsers like Chrome, Firefox, and Safari, and its specs are open and standardized. Browser-based real-time video chat apps like Google Meet are common examples of WebRTC usage. [5]

WebRTC extends Streamlit's powerful capabilities to transmit video, audio, and arbitrary data streams between frontend and backend processes, like browser JavaScript and server-side Python. [6]

- WebRTC has a preparation phase called "Signaling", during which the peers exchange data called "offers" and "answers" in order to gather necessary information to establish the connection.
- Developers choose an arbitrary method for Signaling, such as the HTTP req/res mechanism.

E. Machine Learning

HISTORY

Machine Learning is a sub-set of artificial intelligence where computer algorithms are used to autonomously learn from data and information. In machine learning computers

don't have to be explicitly programmed but can change and improve their algorithms by themselves.

- 1950 — Alan Turing creates the "Turing Test" to determine if a computer has real intelligence. To pass the test, a computer must be able to fool a human into believing it is also human.
- 1952 — Arthur Samuel wrote the first computer learning program. The program was the game of checkers, and the IBM computer improved at the game the more it played, studying which moves made up winning strategies and incorporating those moves into its program.
- 1957 — Frank Rosenblatt designed the first neural network for computers (the perceptron), which simulate the thought processes of the human brain.
- 1967 — The "nearest neighbor" algorithm was written, allowing computers to begin using very basic pattern recognition. This could be used to map a route for traveling salesmen, starting at a random city but ensuring they visit all cities during a short tour.
- 1979 — Students at Stanford University invent the "Stanford Cart" which can navigate obstacles in a room on its own.
- 1981 — Gerald Dejong introduces the concept of Explanation Based Learning (EBL), in which a computer analyses training data and creates a general rule it can follow by discarding unimportant data.
- 1985 — Terry Sejnowski invents NetTalk, which learns to pronounce words the same way a baby does.
- 1990s — Work on machine learning shifts from a knowledge-driven approach to a data-driven approach. Scientists begin creating programs for computers to analyze large amounts of data and draw conclusions — or "learn" — from the results.
- 1997 — IBM's Deep Blue beats the world champion at chess.
- 2006 — Geoffrey Hinton coins the term "deep learning" to explain new algorithms that let computers "see" and distinguish objects and text in images and videos.
- 2010 — The Microsoft Kinect can track 20 human features at a rate of 30 times per second, allowing people to interact with the computer via movements and gestures.

- 2011 — IBM's Watson beats its human competitors at Jeopardy.
- 2011 — Google Brain is developed, and its deep neural network can learn to discover and categorize objects much the way a cat does.
- 2012 – Google's X Lab develops a machine learning algorithm that is able to autonomously browse YouTube videos to identify the videos that contain cats.
- 2014 – Facebook develops DeepFace, a software algorithm that is able to recognize or verify individuals on photos to the same level as humans can.
- 2015 – Amazon launches its own machine learning platform.
- 2015 – Microsoft creates the Distributed Machine Learning Toolkit, which enables the efficient distribution of machine learning problems across multiple computers.
- 2015 – Over 3,000 AI and Robotics researchers, endorsed by Stephen Hawking, Elon Musk and Steve Wozniak (among many others), sign an open letter warning of the danger of autonomous weapons which select and engage targets without human intervention.
- 2016 – Google's artificial intelligence algorithm beats a professional player at the Chinese board game Go, which is considered the world's most complex board game and is many times harder than chess. The AlphaGo algorithm developed by Google DeepMind managed to win five games out of five in the Go competition more efficient Machine Learning is.

1) Supervised Machine Learning

- As its name suggests, Supervised machine learning is based on supervision. It means in the supervised learning technique, we train the machines using the "labelled" dataset, and based on the training, the machine predicts the output. Here, the labelled data specifies that some of the inputs are already mapped to the output. More preciously, we can say; first, we train the machine with the input and corresponding output, and then we ask the machine to predict the output using the test dataset. [7]
- Let's understand supervised learning with an example. Suppose we have an input dataset of cats and dog images. So, first, we will provide the training to the machine to understand the images, such as the shape & size of the tail of cat and dog, Shape of eyes, color, height (dogs are taller, cats are smaller),

etc. After completion of training, we input the picture of a cat and ask the machine to identify the object and predict the output. Now, the machine is well trained, so it will check all the features of the object, such as height, shape, color, eyes, ears, tail, etc., and find that it's a cat. So, it will put it in the Cat category. This is the process of how the machine identifies the objects in Supervised Learning. [7]

- The main goal of the supervised learning technique is to map the input variable(x) with the output variable(y). Some real-world applications of supervised learning are Risk Assessment, Fraud Detection, Spam filtering, etc.

2) Unsupervised Machine Learning

- Unsupervised learning is different from the Supervised learning technique; as its name suggests, there is no need for supervision. It means, in unsupervised machine learning, the machine is trained using the unlabeled dataset, and the machine predicts the output without any supervision. [7]
- In unsupervised learning, the models are trained with the data that is neither classified nor labelled, and the model acts on that data without any supervision.
- **The main aim of the unsupervised learning algorithm is to group or categories the unsorted dataset according to the similarities, patterns, and differences.** Machines are instructed to find the hidden patterns from the input dataset. [7]
- Let's take an example to understand it more preciously; suppose there is a basket of fruit images, and we input it into the machine learning model. The images are totally unknown to the model, and the task of the machine is to find the patterns and categories of the objects.
- So, now the machine will discover its patterns and differences, such as colour difference, shape difference, and predict the output when it is tested with the test dataset.

3) Reinforcement Machine Learning

- Reinforcement learning works on a feedback-based process, in which an AI agent (A software component) automatically explore its surrounding by hitting & trail, taking action, learning from experiences, and improving its performance. Agent gets rewarded for each good action and get punished for each bad action; hence the goal of reinforcement learning agent is to maximize the rewards.
- In reinforcement learning, there is no labelled data like supervised learning, and agents learn from their experiences only.
- The reinforcement learning process is similar to a human being; for example, a child learns various things by experiences in his day-to-day life. An example of reinforcement learning is to play a game, where the Game is the environment, moves of an agent at each step define states, and the goal of the agent is to get a high score. Agent receives feedback in terms of punishment and rewards.
- Due to its way of working, reinforcement learning is employed in different fields such as Game theory, Operation Research, Information theory, multi-agent systems.
- A reinforcement learning problem can be formalized using Markov Decision Process(MDP). In MDP, the agent constantly interacts with the environment and performs actions; at each action, the environment responds and generates a new state.

K-NEAREST NEIGHBOR (KNN)

K-Nearest Neighbour is one of the simplest Machine Learning algorithms based on Supervised Learning technique.

- K-NN algorithm assumes the similarity between the new case/data and available cases and put the new case into the category that is most similar to the available categories.
- K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category by using K- NN algorithm.
- K-NN algorithm can be used for Regression as well as for Classification but mostly it is used for the Classification problems.

- K-NN is a **non-parametric algorithm**, which means it does not make any assumption on underlying data.
- It is also called a **lazy learner algorithm** because it does not learn from the training set immediately instead it stores the dataset and at the time of classification, it performs an action on the dataset.
- KNN algorithm at the training phase just stores the dataset and when it gets new data, then it classifies that data into a category that is much similar to the new data.
- **Example:** Suppose, we have an image of a creature that looks similar to cat and dog, but we want to know either it is a cat or dog. So for this identification, we can use the KNN algorithm, as it works on a similarity measure. Our KNN model will find the similar features of the new data set to the cats and dogs images and based on the most similar features it will put it in either cat or dog category.

Fig.3.7 K-Nearest Neighbour

CHAPTER-4

RESULT

4.1 DATA GATHERING AND ANALYSIS

In this chapter, all the result and discussion will be briefly present and discussed. These results are not the final and complete yet – basically these are the result of the study obtained in order to see whether the system is feasible.

In order to know if the idea of this project is acceptable by the public, questionnaire survey has been done in the early (planning stage) of this project. A total of four questions are asked in the survey in order to understand the passion of different individuals toward music, if they facing the problem of song selection as well as if the respondents like the idea of emotion-based music player.

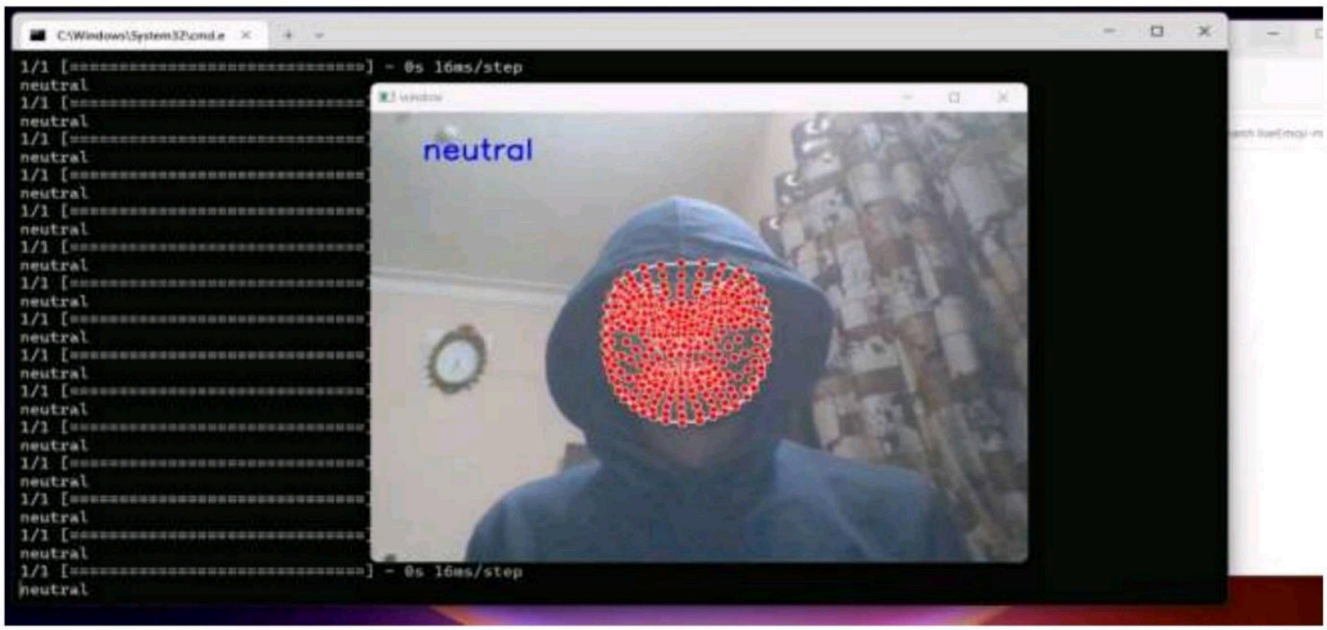

Fig.4.1 collecting data for Emotion

The collecting data, the user's emotion based on the comparison method. Thus, a set of emotion (neutral, sad, surprise and happy, rock) is saved in the database for use to see the similarities in the images when user used the application, that what expression is giving by user than try look with the database to predict the proper output.(Fig.4.1 &Fig.4.2)

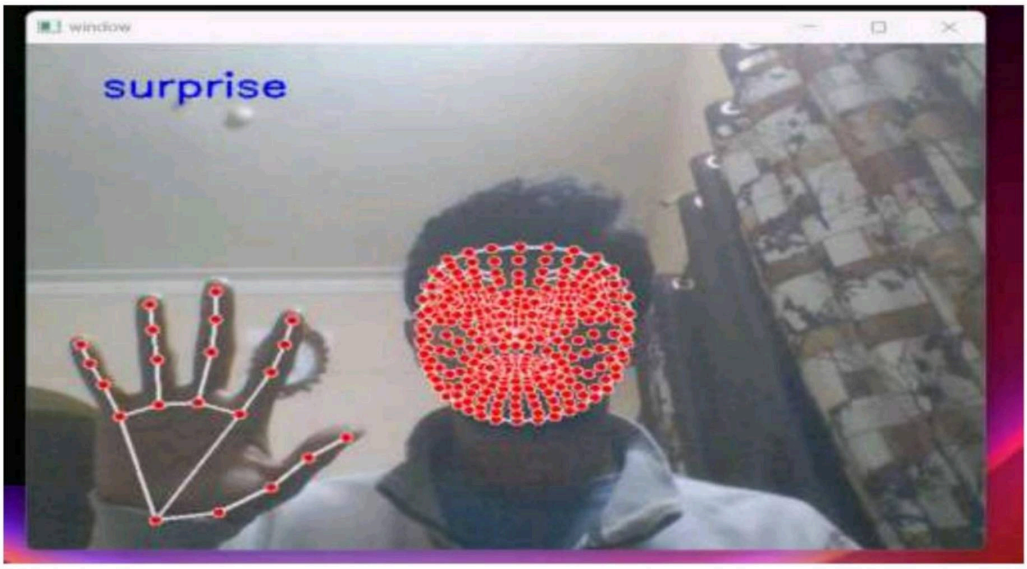

Fig.4.2 collecting data for Emotion

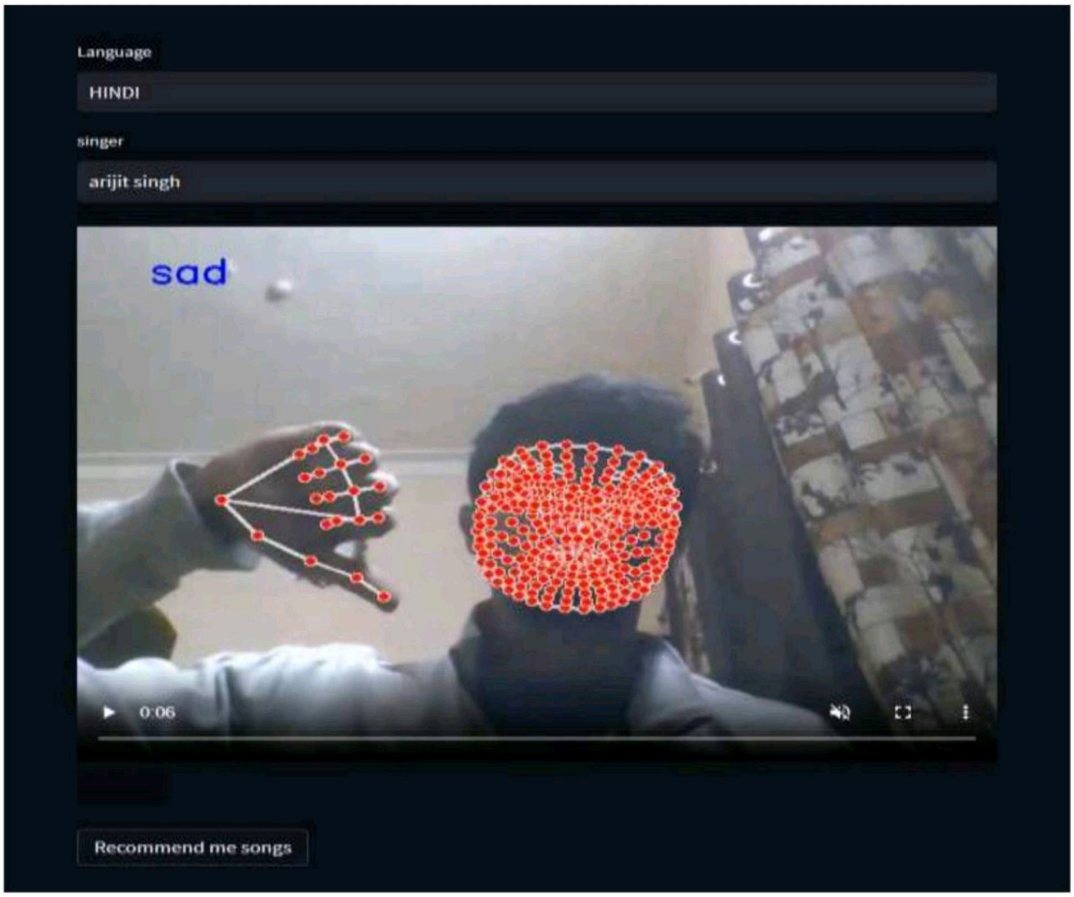

Fig.4.3 The first interface once it launched.

4.2 Explaining

First, the user first put the Language (ENGLISH, HINDI, etc.). Then next the user needs to put his favorite singer name (Arijit Singh, Alan Walker, AVICII, etc.). Then the user will have to device camera which an image which can represent the emotion. (Image selected in figure above is “Sad” (Fig.4.3) emotion and bottom is “rock” (Fig.4.4)).

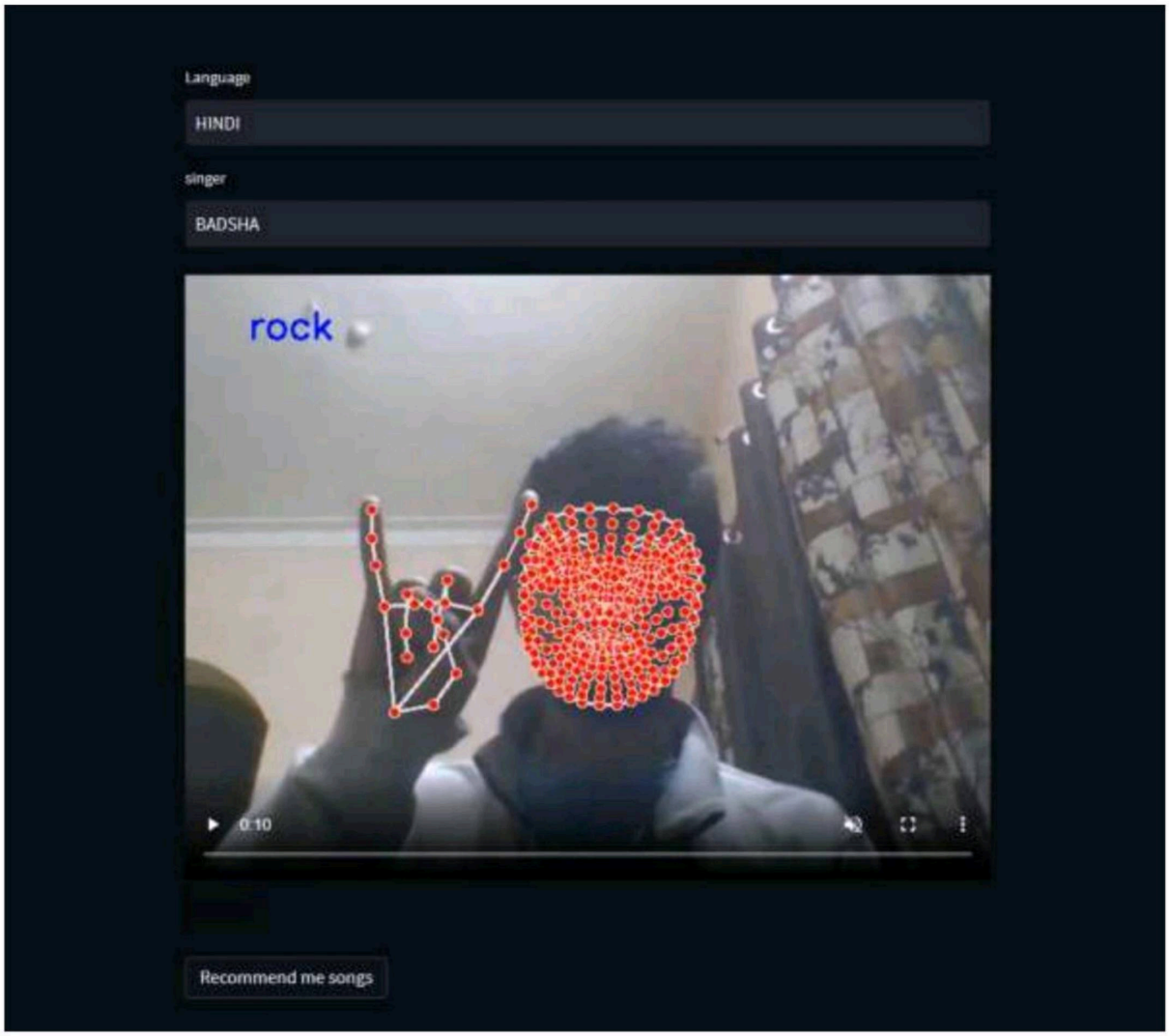

Fig.4.4 The first interface once it launched

```python
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

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

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:
                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:
```

Fig.4.5 sample code of an interface.

```
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)
```

Fig.4.6 Sample code for data collection of Emotions

CHAPTER-5

CONCLUSION

5.1 CONCLUSION

The significant of this project is the emotion detection of the images loaded into the proposed model. The main purpose is on its emotion detection functionality. Through the integration between emotion detection technology and music player, the proposed model is aimed to provide betterment in the individual's entertainment. The proposed is able to detect the four emotions i.e. normal, happy, and sad of the images loaded into it. Once the proposed model compared and detected the emotion of the user, the music player will play the song(s) accordingly.[6]

Thus, with this Song Recommendation Using Mood Detection, users can have an alternative way of selecting songs, which is in a more interactive and simpler way. The music lovers will not have to search through the long list of songs for the songs to be played but to match the emotion in the song's selection.[6]

REFRENCES

[1]https://utpedia.utp.edu.my/id/eprint/6334/1/TanSiewChing12873_finaldissertation.pdf

[2](PDF) Music Emotion Recognition using Python (researchgate.net)

[3]Predicting the Music Mood of a Song with Deep Learning. | by Cristóbal Veas | Towards Data Science

[4]IRJET-V6I340320190826-49615-bg0qqz-libre.pdf (d1wqtxts1xzle7.cloudfront.net)

[5] Music mood and human emotion recognition based on physiological signals: a systematic review | SpringerLink

[6]Emotion_Based_Music_Recommendation_System-libre.pdf (d1wqtxts1xzle7.cloudfront.net)

[7]Python Tutorial: Streamlit | DataCamp

PUBLICATIONS

A Detailed Study on Internet of Things

Aditya Londhe
Btech CSE SSIPMT,
RAIPUR (C.G)
The Shri Shankaracharya
Institute of professional
Management and
Technology
Raipur (C.G), India
aditya.londhe@ssipmt.com

Rudraja Vansutre
Btech CSE SSIPMT,
RAIPUR (C.G)
The Shri Shankaracharya
Institute of professional
Management and
Technology
Raipur (C.G), India
rudraja.vansutre@ssipmt.com

Vibhor Mathur
Btech CSE SSIPMT,
RAIPUR (C.G)
The Shri Shankaracharya
Institute of professional
Management and
Technology
Raipur (C.G), India
vibhor.mathur@ssipmt.com

Anand Tamrakar
Assistant Professor
Department of Computer Science and Engineering
The Shri Shankaracharya Institute of professional Management and Technology
Raipur (C.G), India
a.tamrakar@ssipmt.com

***Abstract*— A tranquil insurgency that impacts a few divisions, running over vehicle, home computerization, vitality, mechanical control, and wellbeing administrations is experiencing with expansion of new organized gadgets driving to improved administrations. Right now, plan to distinguish data security prerequisites that are normal more than a few (vertical) areas, and specifically, ones that sway basic cultural administrations, to be specific, the vitality, water, and wellbeing the executive's frameworks. We present the aftereffects of a meeting-based examination where entertainers in these divisions were gotten some information about their recognitions and mentalities on the security of Web of Things (IoT). We set these observations and mentalities in setting through a writing survey of IoT security and identify with current difficulties right now. This paper exhibits that in spite of a general hopeful view on IoT in basic cultural administrations, there is an absence of accord on dangers identified with IoT security.**

***keywords*: Internet of things , IOT , Security , Purchaser .**

1.INTRODUCTION

The cutting-edge society relies upon basic frameworks and the administrations they give, here alluded to as basic cultural administrations (CSS). They furnish us with power, water, warmth, and approaches to travel, convey, and exchange. Generally, these imperative frameworks have been kept detached to stay away from security dangers and execution aggravations. Nonetheless, a quiet transformation is in progress as increasingly more of them are turning out to be a piece of the Web of Things (IoT), e.g., through brilliant lattices, astute transportation frameworks, body sensor systems and wise natural surroundings. There is a solid method of reasoning for this change. For instance, Web associated implanted frameworks can be overhauled and adjusted to evolving needs on request, helpful data can be right away gathered from remote geographic zones, and deficiency analysis what's more,

Mensturation Blood Color Detection: Color detection using AI

Mr. Anand Tamrakar

Assistant Professor, Department of Computer Science & Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Raipur, Chhattisgarh, India
Email: a.tamrakar@ssipmt.com

Miss Shramistha Sinha

B.Tech (Scholar), Department of Computer Science & Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Raipur, Chhattisgarh, India
Email:shramishtha.sinha@ssipmt.com

Mr. Mukesh Kumar Sahu

B.Tech (Scholar), Department of Computer Science & Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Raipur, Chhattisgarh, India
Email: mukesh.sahu1@ssipmt.com

Abstract- *The color of a time period Blood contains a wealth of essential information about a person's health. The body releases tissues and blood from the uterus through the vaginal canal when a woman is on her period. The color of the blood expelled from the body allows us to determine if it is good or bad and to administer the essential medication before it moves to a new position. for example, vaginal infection and others. A correct discovery is required because these distinct colors are caused by various hormonal shifts and medical disorders.*

We can develop a mobile application using artificial intelligence that will analyze a sample image of blood as input, determine whether the blood is healthy or not, and provide some health advice. Global health and gender equality depend on paying attention to women's and girls' menstruation needs.

Support for this underutilized experience needs to be strengthened. We should dedicate a stage to promoting health and wellbeing, empowering, teaching, and advancing scientifically based health results. We should also work to improve social involvement by shattering taboos and eradicating stereotypes. The goal of this classifier is to create a platform that analyses period blood using AI and color discovery to configure women's health and identify any underlying illnesses or symptoms.

Keywords- *(Hormonal shifts, Artificial Intelligence, Color Analysis, Menstruation)*

I. INTRODUCTION (*HEADING 1*)

the hormonal cycles a woman experiences each month to get ready for a potential pregnancy is called menstruation.

between puberty and menopause, regular menstrual cycles typically sign that your body is functioning normally. ages that are irregular or uncomfortable are not typical.

Many women also experience premenstrual syndrome (PMS) symptoms. You may learn a lot about your health from your menstrual cycle. Period issues like painful or irregular ages could indicate a significant health issue. Different circumstances can cause a womans period to hurt her health. The socio-cultural aspect demonstrates the impact of societal standards governing how to treat menstrual women. one of the topics that are brought up the most is menstrual diseases.

Menstrual disorders are, in fact, one of the most frequently discussed topics. menstrual disease should be further discussed during doctor-patient interactions. the patient must use this platform to find a unique and personalized solution to her menstruation issue.

II. LITERATURE REVIEW

People have revealed, created and disseminated information throughout history using technology and information in a variety of daily forms. The more popular a design is, the more influence information about visual design has on the design's state of development. Color and image are the two main factors that drive visual communication design. These two qualities without a doubt help attract the public's attention. The foundation of this composition is artificial intelligence (AI) technology, which supports the advancement of color analysis and detection operations in design for visual media and communication.

The proposal's objective is to develop visual media and communication in a way that deviates from the traditional methods of color detection and image processing, raising the bar for study and discovery in the field of color analysis. This essay describes the history, essential elements, and determining factors of visual communication design as well as the operation of AI technology. Additionally, a paradigm for creating visual media that is based on AI automation is developed.

III. METHODOLOGY

Artificial intelligence, or AI, is a concept whose horizons are continually increasing. Its components include theories, methods, tools, and systems used for inspiration and research. The applications of AI technology in visual media and communication design include helping designers create more ADA-compliant color palettes and offering users a more faultless experience. AI technology combined with simulation tests can also improve design for visual media and communication. A better perception of images is made possible by the use of artificial intelligence in visual media communication design. The development of a more thorough notion of design for visual media and communication may also benefit greatly from the technology for picture identification and artificial intelligence.

Followership is also more suited to accept knowledge and comprehending its meaning. Information processing and