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Emotion based Music Player

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Abstract: Emotion based music retrieval is a music player based on user's emotion. Many music devices and mobile music players are used to listen to music. A practical problem is selection of desired music. Nowadays many devices are integrated with cameras. This paper gives how to take advantage of these one camera systems. In this proposed system emotion is derived automatically from hand gestures where hand gestures are captured by camera. The data recorded from hand gestures are coupled with musical emotion. Users can search through music collection based on emotional character of music which expressed from hand gestures. The main aim of this project is to design emotion based user interface for music retrieval.

Keywords: Music player, finger recognition, camera, background.

I. INTRODUCTION

Emotion based music retrieval is a music player based on user's emotion. Music plays a very important role in enhancing an individual's life as it is an important medium of entertainment for music lovers and listeners and sometimes even imparts a therapeutic approach. 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 (seek & time compression),local playback, streaming playback with multicast streams. Although these features satisfy the user's basic requirements, yet the user has to face the task of manually browsing through the playlist of songs and select songs based on his current mood and behaviour.[2]Many music devices and mobile music players are used to listen to music. A practical problem is selection of desired music.
Nowadays many devices are integrated with cameras. This project gives idea as how to take advantage of these one camera systems. In this proposed system emotion is derived automatically from hand gestures where hand gestures are captured by camera. The data recorded from hand gestures are coupled with musical emotion. Users can search through music collection based on emotional character of music which expressed from hand gestures. This system mainly deals with detecting and identifying the hand, the skin and the gesture to perform some specific tasks in the music player.[1]

II. LITERATURE SURVEY

The potential abilities of humans to be able to provide inputs to any system in various ways has caught the attentions of various learners, scientists, engineers, etc. from all over the world. The problem of the existing methods typically handle only deliberately displayed and exaggerated expressions of prototypical emotions despite the fact that deliberate behaviour differs individual appearance, audio profile, and timing from spontaneously occurring behaviour.[1] By taking efforts to develop algorithms that can process naturally occurring human affective behaviour have recently emerged. A survey was conducted on these recent advances and human emotion perception was discussed from a psychological perspective. We have examined available approaches to solving the problem of machine understanding of human affective behaviour, and discuss important issues like the collection and availability of training and test data The most natural way to express emotions is using facial expressions, hand gestures etc. We humans, often use nonverbal cues such as hand gestures, facial expressions, and tone of the voice to express feelings in interpersonal communications. Facial Expression based Music Player is interactive, sophisticated and innovative mobile (Android) based application to be used as a music player in a different manner. The application works in a different manner from the traditional software as it scans and classifies the audio files present on the device and according to the predefined parameters (Audio Features) present on the application in order to produce a set of mood based playlists. The real time graphical input provided to the application is classified to produce a mood which will then be used to select the required playlist from the earlier set. It would be very helpful if the music player itself selects a song according to the current mood of the user using an application to minimize the efforts of managing playlists.[1] But the problem by using face detection technique is that the system may get confused if the emotion is not properly shown and hence there might be a chance of playing wrong playlists. For example, the system might get confused between sad and happy type of genre if the user doesn't show proper emotion and thus it may not well end well. To overcome this problem we came up with an emotion based music player using hand gestures. Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Gestures can originate

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from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from face and hand gesture recognition. Users can use simple gestures to control or interact with devices without physically touching them. [5]

III. WORKING OF THE PROJECT

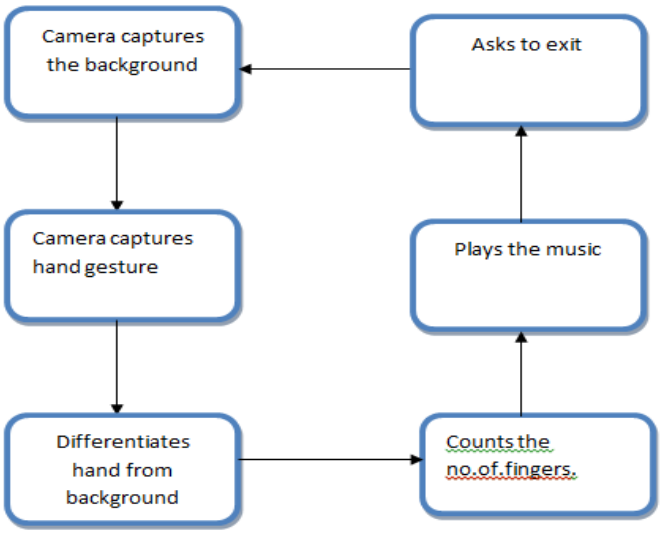

Fig. 1. Working of the project

IV. PROBLEM STATEMENT

Music plays very important role in our daily life.Music and emotions are strongly related .Many music devices and music players enable us to listen to the music during our daily activities.The difficulty arises when we have to create a playlist.The tedious job of generating large playlist based on our current mood can be overcomed here.

V. PROPOSED SYSTEM

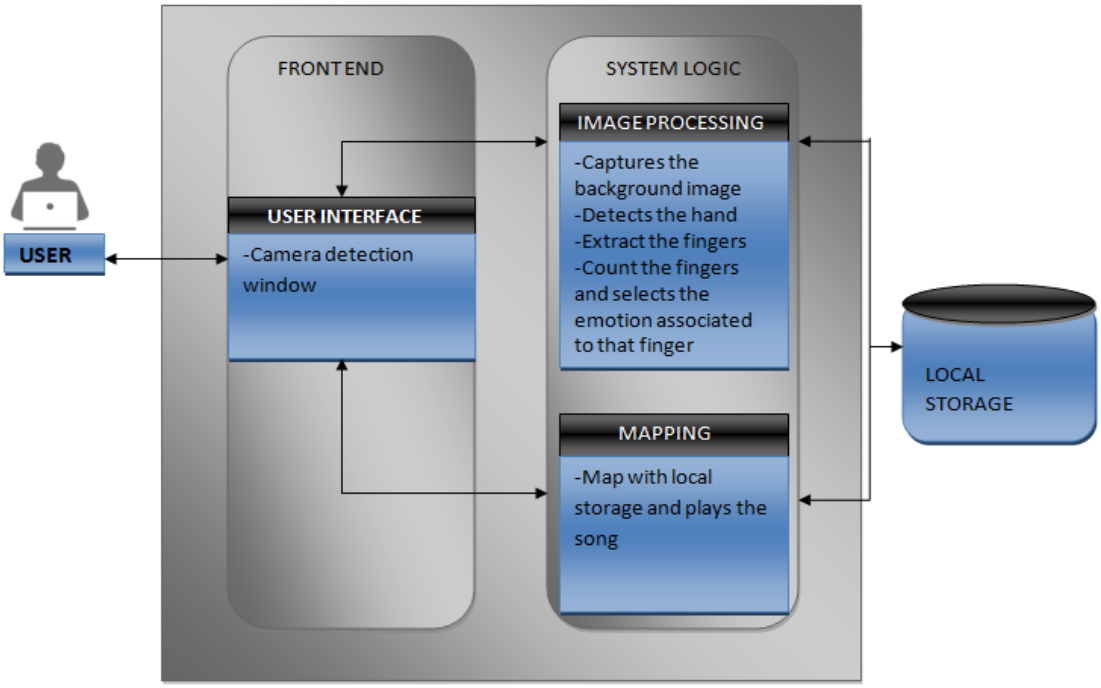

Fig 2.Proposed work

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The proposed system tries to provide an interactive way for the user to carry out the task of creating a playlist, where emotions will be detected by hand gestures and playlist will be automatically generated.

A. Modules
The system after careful analysis has been identified to be presented with the following modules:

- Hand detection
- Gesture Recognition
- Image Processing
- Music Player

a) Hand Detection
The proposed System works by first providing a simple enough interface i.e. hand in front of the camera which prompts the user to scan the background first, detect the emotion and differentiate it.

b) Gesture Recognition
The extracted features values are subjected to classification according to the parameters provided.A gesture input images are taken from camera and images will be processed in MATLAB.In matlab,it compares both the input and database images and it recognizes the assigned emotion to each position.

c) Image Processing
MATLAB is a multi-paradigm numerical computing environment and fourth generation programming language.It allows matrix manipulations, plotting of functions and data, implementation of algorithm, creation of user interface and interfacing with programs return in ten other languages.

d) Music Player
The music player is also being developed in MATLAB 2009a.There are various inbuilt features in matlab to construct the music player such as:

- play()
- pause()
- stop()
- resume()
- random()

VI. PROJECT PLANNING

Phase 1:
We start our development by designing a GUI of the music player in MATLAB. The application is very interactive and easy to operate.

Phase 2:
This phase involves building of the music player which is also done using MATLAB, where songs are generated and segregated as per each emotion.It also involves generation of the detection window.

Phase 3
In this phase the detection window identifies the background and differentiates the position of hand gesture and recognises the gesture accordingly.

Phase 4:
Here package all the resources and the music application is ready to use.

A. Project Formulation

a) Hardware and software specifications

Hardware requirements
Processor: Pentium III Or Above

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System Bus : 32 Bit

Ram : 256MB Or More

Hdd : 40GB

Monitor : Any Coloured Monitor

Camera : Intex 3.0

Mouse : Ps2/ Serial

b) Software Requirements

Operating System: Windows 2000/XP and higher

MATLAB 2009A
MATLAB (matrix laboratory) is a multi-paradigm numerical computing environment and fourth-generation programming language.

A proprietary programming language developed by MATHWOKS, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, andinterfacing with programs written in other languages, including C, C++,Java, Fortran and Python.

VII. DESIGN OF THE SYSTEM

A. System Architecture

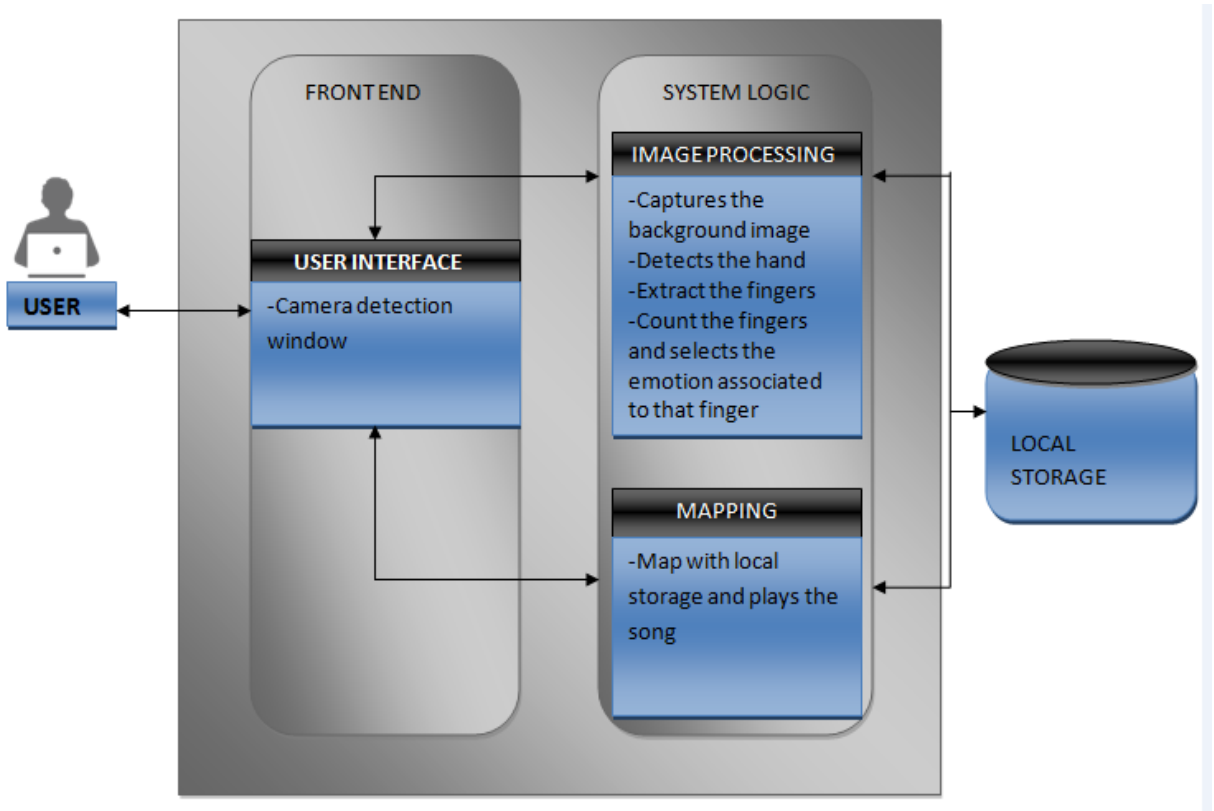

Fig.3.System Architecture

The user's gesture and background is being recognized by the camera and then image processing is done and then the emotions are mapped with the local storage and the song is being played.

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VIII. CLASS DIAGRAM

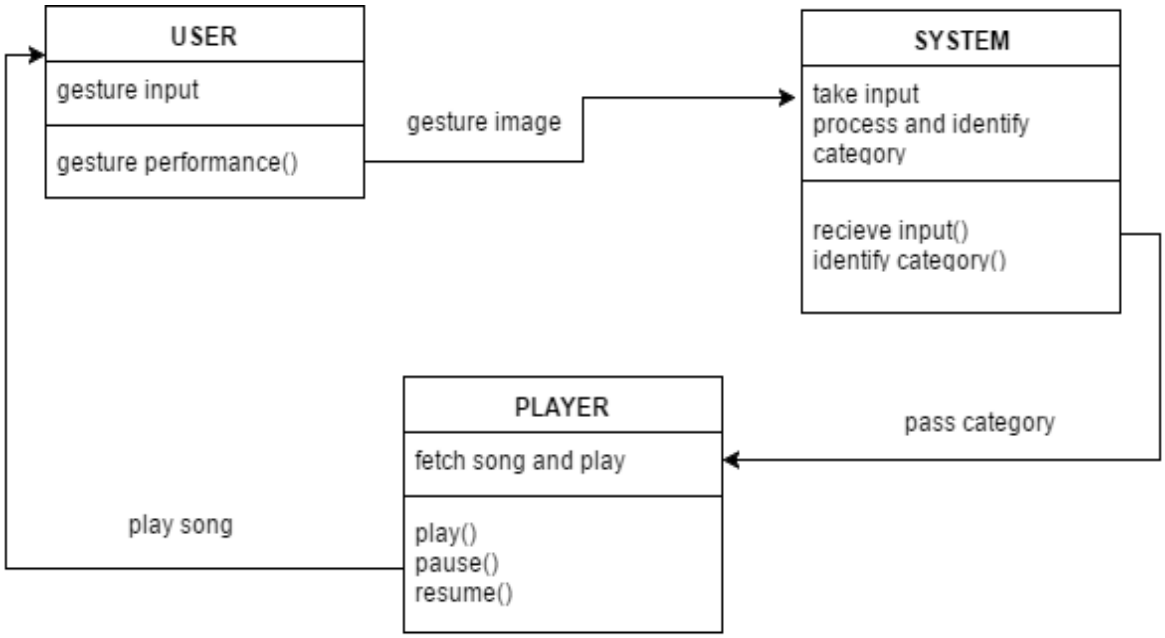

Fig.4.Class Diagram

IX. DATA FLOW DIAGRAM

DFD-Level 0:

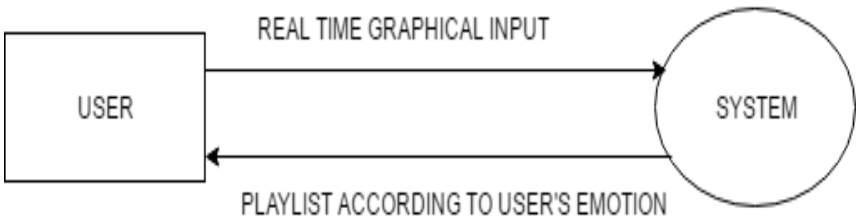

Fig.5. DFD-Level 0

DFD-Level 1:

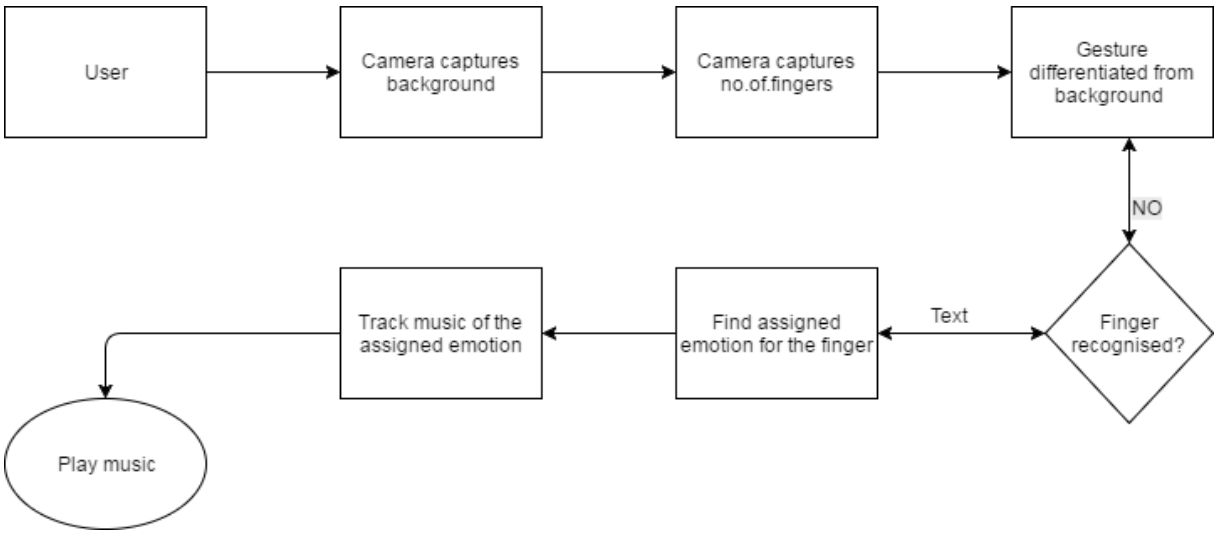

Fig.6. DFD-Level 1

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X. SEQUENCE DIAGRAM

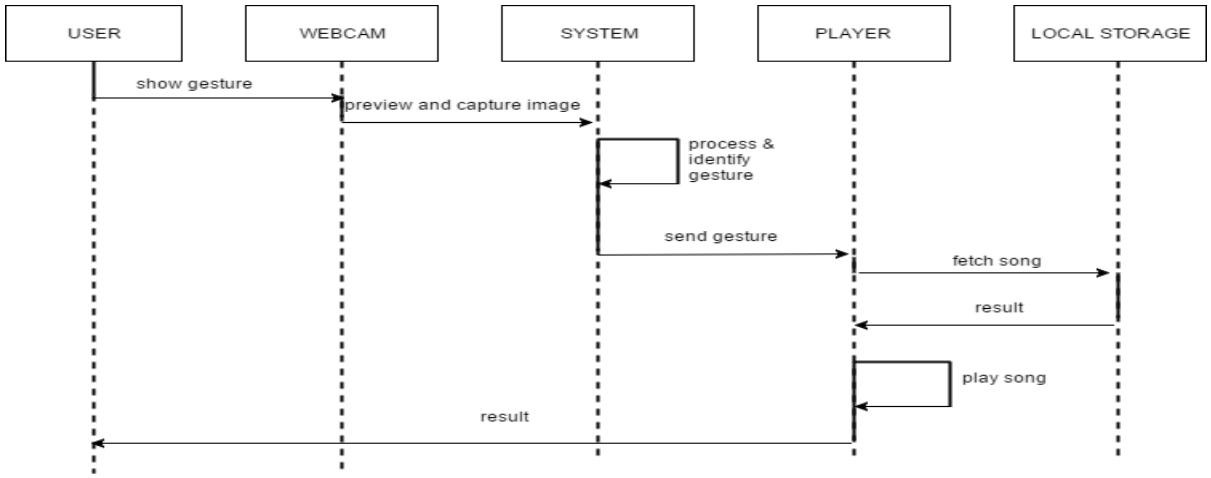

Fig.7.Sequence diagram

XI. ACTIVITY DIAGRAM

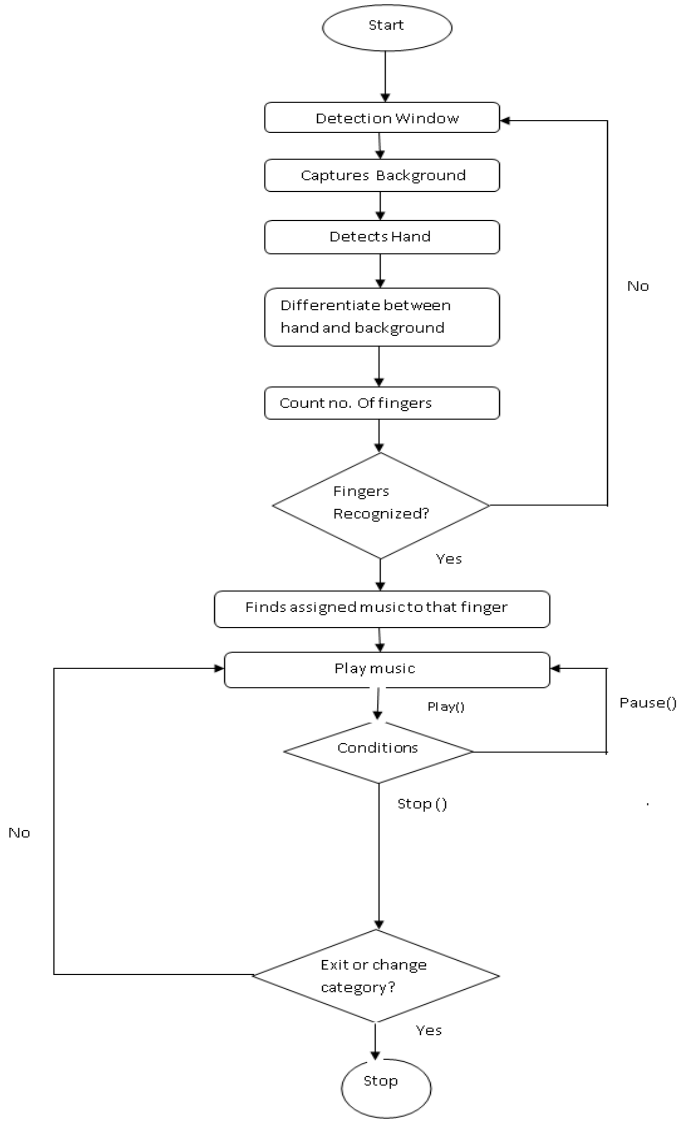

Fig.8. Activity diagram

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XII. SYSTEM IMPLEMENTATION

A. Background Detection

Firstly,the camera captures the background and no other object.

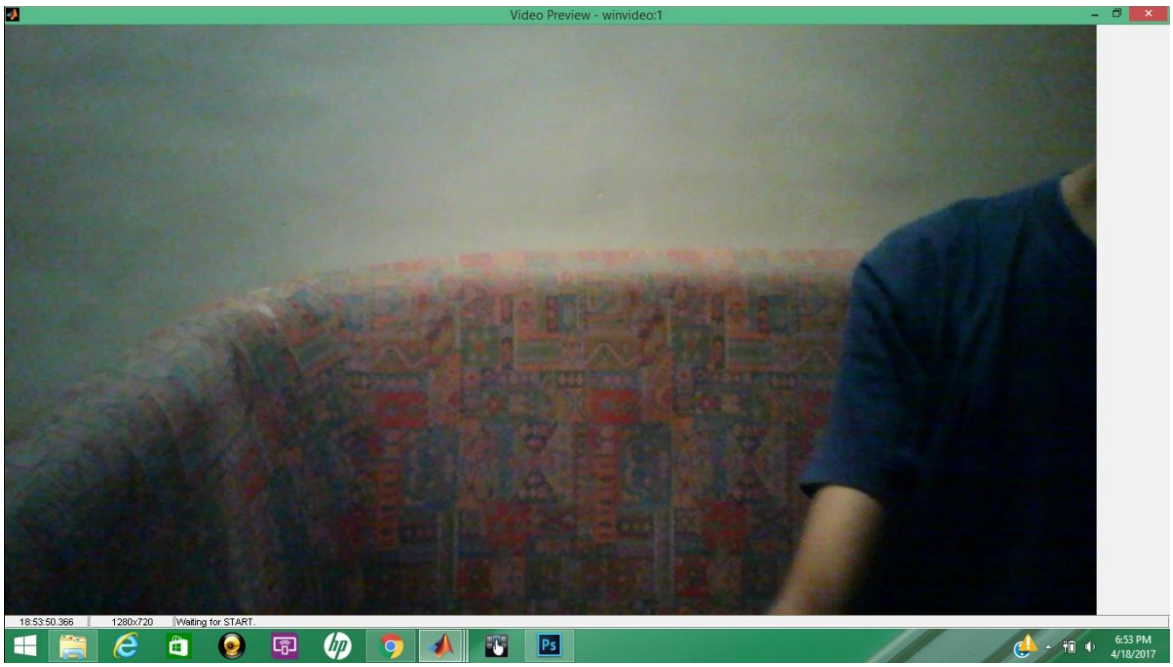

Fig.9.Background detection

B. Gesture Detection

Next,the camera detects the position i.e the count of the fingers.

Fig.10. Finger recognition

C. Image Processing

The camera detects the background and then it recongnises the finger gesture.Then it subtracts the background and the fingers detected i.e it captures only the fingers which can be seen in grayscale.It removes small areas and holes and gives us the eroded,dilated & meridian filtered image and plays the song.

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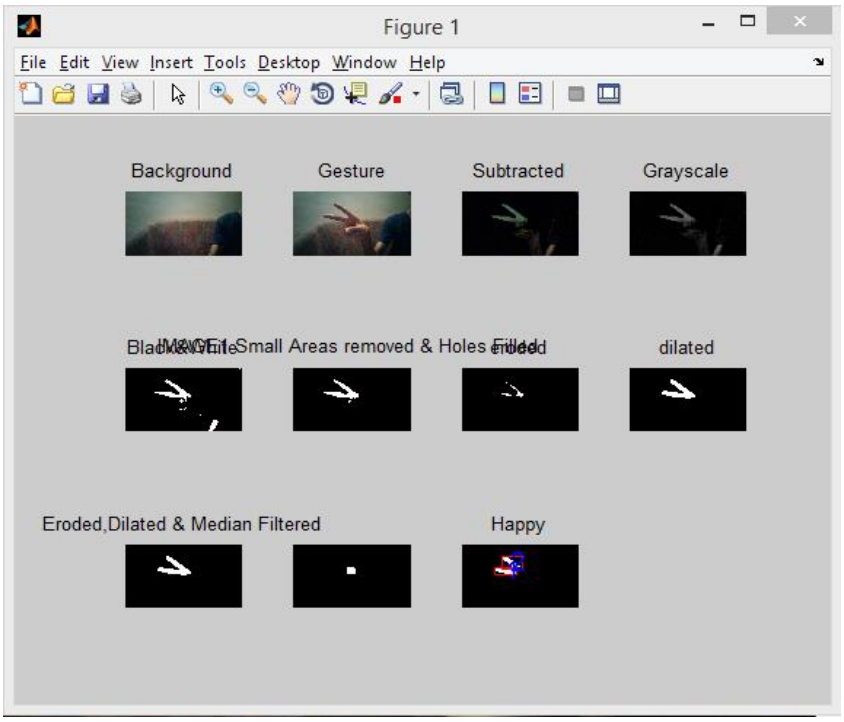

Fig.11. Image Processing

D. Play() Music

After the gesture is properly recognised the music plays.For example,happy emotion is detected and it is played and here a dialog box appears with the name of the song.

Fig.12.Playing music

E. Exit From The Previous Playlist

Suppose we wish to change the genre of the music, then an exit window appears at the end of every song.

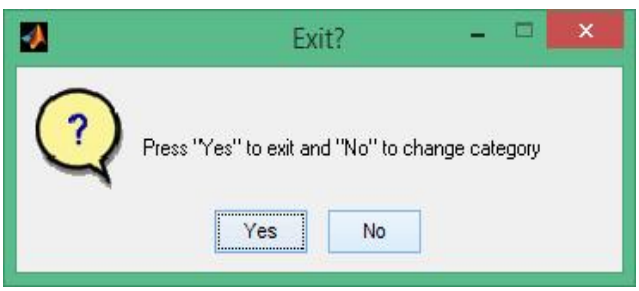

Fig.13. Exit music

XIII. ADVANTAGES AND LIMITATIONS

Advantages:

- Replace remote with hand gestures.
- Allow control without touching the device.

- Low cost, high speed.
- Extremely fast feature computation.
- Low power consumption.
- Automated operation.
- Easy to use.

Limitations:

- Camera captured images depend highly on the amount of luminescence.
- Mixed mood detection is not provided by the application. It is able to judge only one mood at a time.

XIV. CONCLUSION

Gesture recognition technology is fast detection process and allows the real time video applications with low cost sensors such as USB camera. By using finger gesturerecognition user can control music, based on users emotion where emotion can be expressed through finger gestures. Our application replaces remote with hand gesture and it also allows control without touching the device. The system thus aims at providing the Windows operating system users with a cheaper, additional hardware free and accurate emotion based music system. The Emotion Based Music System will be of great advantage to users looking for music based on their mood and emotional behaviour. It will help reduce the searching time for music thereby reducing the unnecessary computational time and thereby increasing the overall accuracy and efficiency of the system. It will be a complete system for music lovers and listeners.

XV. FUTURE SCOPE

The proposed system also tends to avoid in future the unpredictable results produced in extreme bad light conditions and very poor camera resolution. Also many other genre/emotions can be added more.There can be a facility where the playlist will be mapped to online music directories such as Gaana.com,Wynk.com etc. Where the effort of feeding music into the system will be succeeded.

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