

ENHANCED LOOK BASED MEDIA PLAYER WITH HAND GESTURE RECOGNITION

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Abstract - In this project, we are developing an enhanced media player which plays and pauses the video by detecting the users face looking at screen or not and also the field of computer vision based hand gesture interfaces for Human-Computer Interaction (HCI). System will continuously monitor whether the user is looking at the screen or not using a web camera. If it detects then the video will play without any interruption. Along with these, the web camera will also detect the users hand gestures which can be used for performing various events like increasing or decreasing the volume, changing to next video or previous video, etc. If the system could not detect user's face then the video will be stopped immediately. Currently we propose to build prototype for exploring the use of marking menus in gesture-based interaction for controlling the Media player.

Key Words: webcam, face detection, hand gesture, haar cascade, hsv ,media player.

1. INTRODUCTION

While watching a video when someone interrupts you and you have to look somewhere else or go away from the system for some time so you miss some part of the video. Subsequently you need to drag back the video from where you left. Well we got a solution to this problem. A media player that gets paused when user is not looking at it. The media player resumes again as soon as the user looks at it again. This can be done using the web camera. The media player will be played continuously as long as the camera detects the users face. The media player pauses as soon as users face is not completely detected. This system also provides the feature of controlling other functions of media players such as play, pause, volume up, volume down, next using hand gestures.

1.1 Scope and Motivation

This enhanced media player can help in minimizing human efforts. In future, this technique can be used to control systems using HCI like pdf reader, power point etc.

- Get better experience of using media player.
- Not missing any part of video etc.
- We have tried to achieve this goal by automating it to a wide extent.
- We are doing this by using face detection and hand gestures for controlling varied features of the media player.

1.2 AIMS AND GOALS OF PROJECT

The goal of our project is to build an advanced media player based on look and hand gestures. We have defined the following objectives to achieve the goal:

- The GUI of media player should be user friendly and provide efficiency.
- It should give accurate results.
- The media player should pause the video whenever user face is not detected.
- The hand gestures should be captured precisely and actions related to them should be performed accurately.

2. LITERATURE REVIEW

| SR NO. | PAPER | AUTHORS NAME | RESULT | DISADVANTAGES |
|--------|---|------------------------------|--|--|
| 1 | Controlling Multimedia Applications Using Hand Gesture Recognition. | Neha Roka de, et. All. | Easy and simple to manage Real time system such as multi-media apps. | Translation of original image into many forms like HSV Scale image, Filtered image, etc. |
| 2 | A Vision Based Hand Gesture Interface for Controlling VLC Media Player. | Sidharth Rauta ray, et. All. | Can effortlessly control VLC Media player using Hand gestures. | Use of complicated algorithm such k nearest, neighborhood pyramid algorithm, lucas kanade optical flow, etc. |
| 3 | Emotion Detection Using Facial Expression. | Jyoti Rani, et. All. | 1. Automated Facial Expression Recognition System. 2. Face Detection. 3. Emotion Detection | 1. Delay while displaying results. 2. Immutable to different distractions like glasses, facial hairs, styles. |
| 4 | Controlling Windows Media Player Using Hand Recognition System. | N. Krishna, et. All. | ACCURACY RATE: Volume Increase : 80% Volume Decrease : 80% Forward : 90% Backward : 90% | Complicated and very time consuming |

3. CONCEPT AND EVALUTION

3.1 Existing System

In existing systems, face detection and hand gesture recognition has been primarily conducted in a constrained environment as well as the accuracy rate is poor.

3.2 Proposed System

In our project, we implement a recognition system for incoming hand images as well as detecting face in real time.

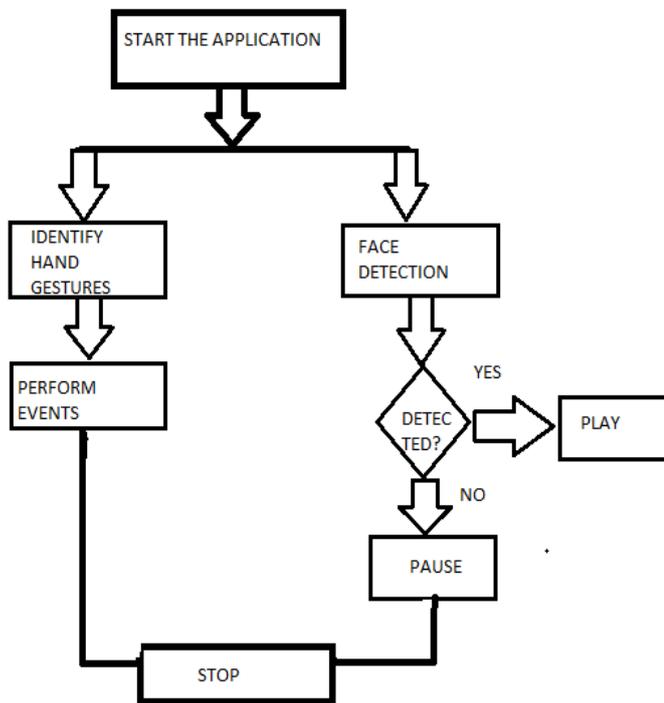


FIG: PROPOSED SYSTEM

4. IMPLEMENTATION

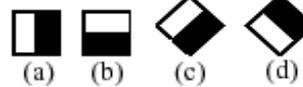
4.1 FACE DETECTION USING HAAR CASCADE CLASSIFIERS

OpenCV's face detector uses a method that Paul Viola and Michael Jones had published in 2001. Usually this approach detects the objects in images which combines four key concepts:

- Simple rectangular features which are called as Haar features.
- An integral Image for quick feature detection.
- The AdaBoost machine-learning method is also used.
- A cascaded classifier to combine many features.

Following are the Open CV's haar like features:-

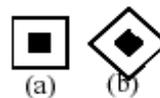
1. Edge features



2. Line features



3. Center-surround features



For visual object detection the rectangle combinations used are not true haar wavelets. Instead of that they contain rectangle combinations best suited for visual recognition tasks. Because of that difference, these features are called Haar features, or Haarlike features, rather than Haar wavelets.

The presence of a Haar feature is determined by subtracting the average dark-region pixel value from the average light-region pixel value. If the difference is above a threshold (set during learning), that feature is said to be present.

4.2 Hand Gesture recognition

HSV (Hue, Saturation, Value) Color scheme :-

Used classical method to detect skin pixels By setting Upper & Lower bound values

$$H_{min} \leq H \leq H_{max} \quad \{ H_{min} 0 \quad H_{max} 20 \dots (1)$$

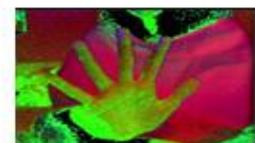
$$S_{min} \leq S \leq S_{max} \quad \{ S_{min} 45 \quad S_{max} 255 \dots (2)$$

STEPS:-

1. INPUT IMAGE



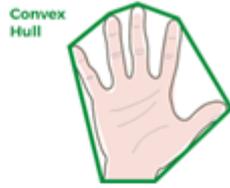
2. HSV



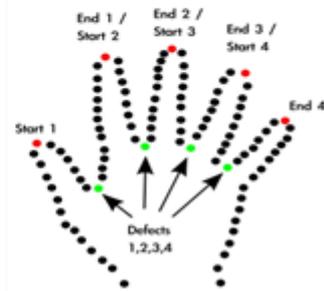
3. BINARY IMAGE



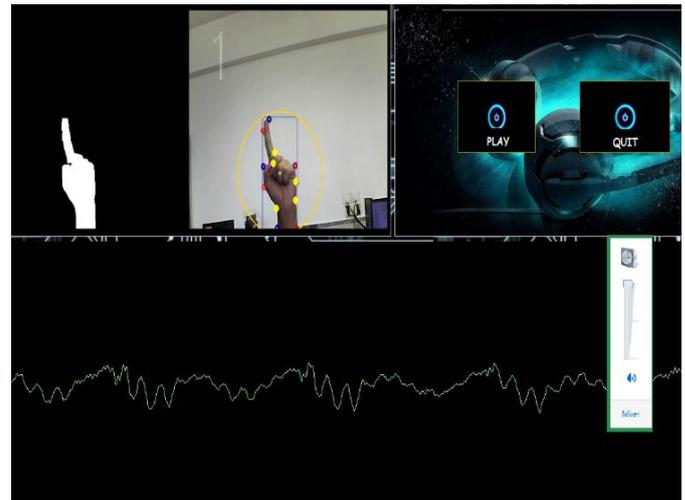
4. CONVEX HULL



5. CONVEXITY DEFECTS

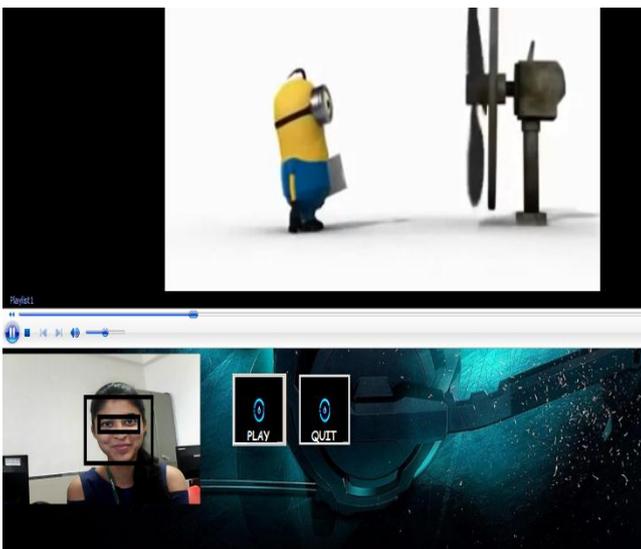


Case 3: Volume up using hand gesture.

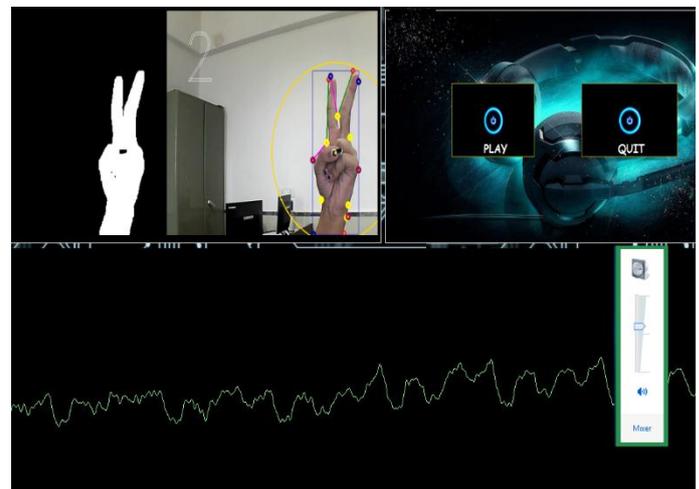


5. RESULT

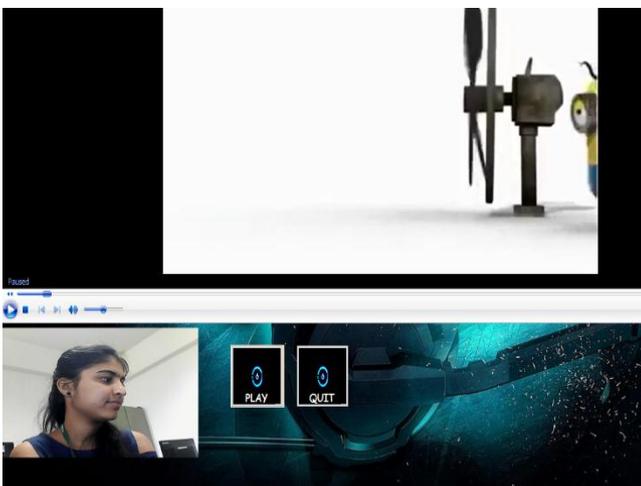
Case 1: As face is detected, video is playing.



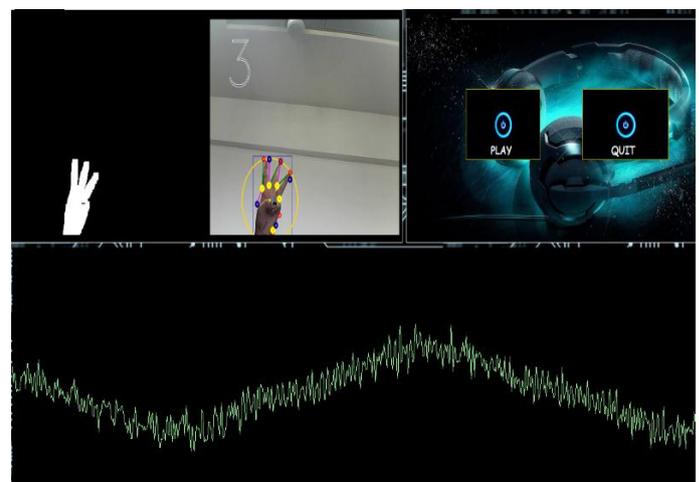
Case 4: Volume down using hand gesture.



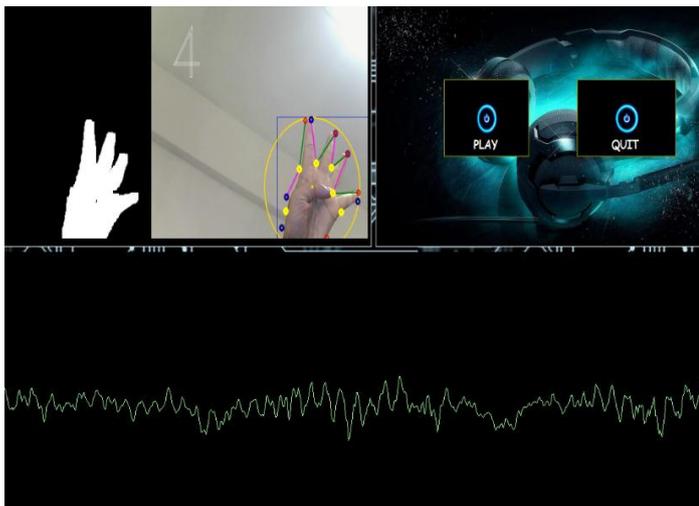
Case 2: As face is not detected, video is paused.



Case 5: Playing previous media using hand gesture.



Case 6: Playing next media using hand gesture.



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6. CONCLUSION

In this project we aim to help the user get better experience of using advance media player. We are doing this by using hand gestures recognition and face detection for controlling features of the media player such as playing the video and pausing when the user is not looking at the screen and controlling functions as volume up and volume down, playing next and previous video.

7. REFERENCES

- [1] Freeman, William T., and Craig D. Weissman. "Hand gesture machine control system." U.S. Patent No. 5,594,469. 14 Jan. 1997.
- [2] Qiao, Yong, Fai Mok, and Gan Zhou. "Methods and apparatus for gesture recognition based on templates." U.S. Patent No. 6,075,895. 13 Jun. 2000.
- [3] Culbert, Michael, et al. "Personal media device controlled via user initiated movements utilizing movement based interfaces." U.S. Patent No. 8,942,764. 27 Jan. 2015.
- [4] N. Krishna Chaitanya et R. Janardan Rao "Controlling OF Windows Media Player Using Hand Recognition System", Journ. The International Journal Of Engineering And Science (IJES), vol. 3, PP 01-04, 2014.

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