FACIAL AND HAND GESTURE BASED MEDIA PLAYER

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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.

Keywords--
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 the video
- 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:

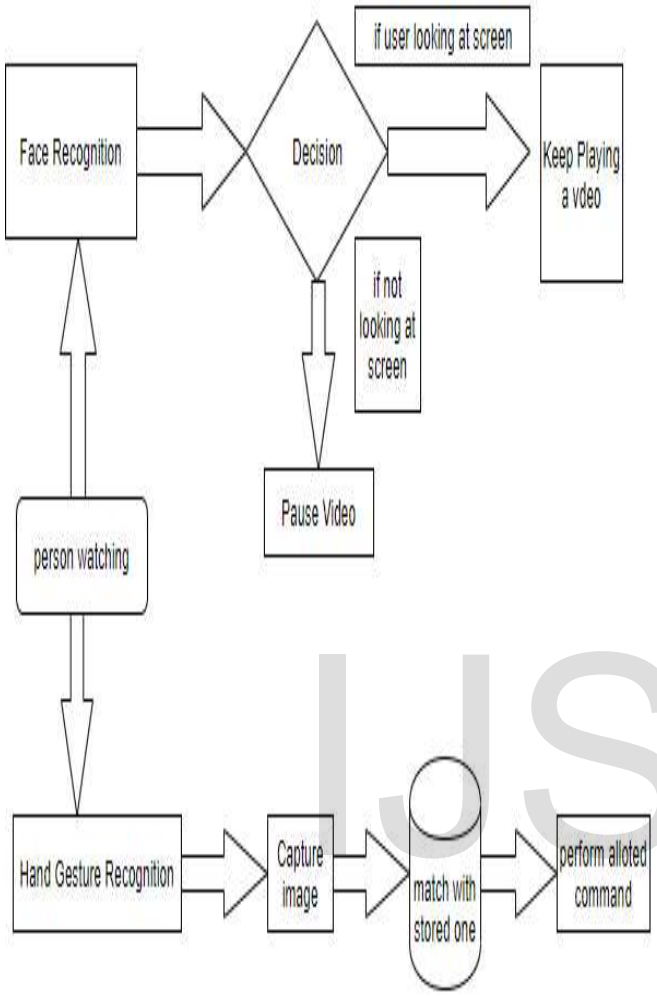
- The GUI of media player should be user friendly and provide efficiency .
- It should give accurate results.
- The media player should pause the video whenever user face is not detected .
- The hand gestures should be captured precisely and actions related to them should be performed accurately.

2 LITERATURE REVIEW

SL No	PAPER TITLE AND AUTHOR	PUBLISHER	METHODOLOGY
1	Enchanced Look Based Media Player With Hand Gesture Recognition Harshada Naroliya,Tanvi Desai,Shreya Acharya,Varsha Sakpal	IRJET	Face And Hand Gesture Recognition
2	Controlling Multimedia Application Using Hand Gesture Recognition Neha S Rokade,Harsha R Jadhav,Sabiha,Uma Annamalai	IRJET	Controlling Multimedia Operations

3 SYSTEM ARCHITECTURE

In this project we are using face recognition and hand gestures for controlling media player. Face recognition is used for pausing and playing. Various hand gestures are used for controlling other functions of media player.



4 IMPLEMENTATION METHOD

4.1 HAAR CASCADE CLASSIFIERS:

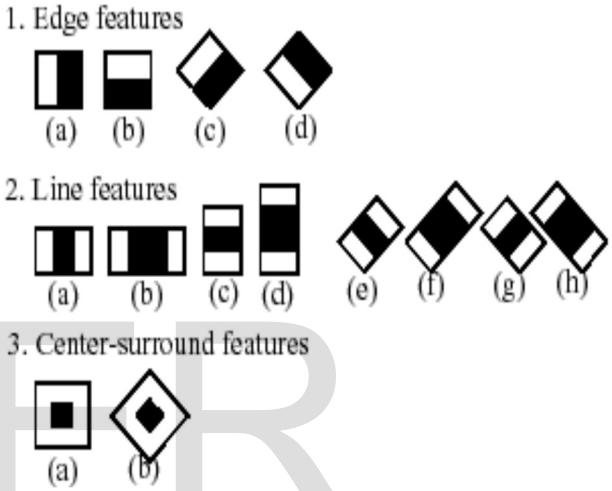
In the Viola–Jones object detection framework, the Haar-like features are therefore organized in something called a classifier cascade to form a strong learner or classifier. The key advantage of a Haar-like feature over most other features is its calculation speed. Haar-like features are digital image features used in object recognition. They owe their name to their intuitive similarity with Haar wavelets and were used in first real-time face detector.

In the detection phase of the Viola–Jones object detection framework, a window of the target size is moved over the input image, and for each subsection of the image the Haar-like feature is calculated. This difference is then compared to a learned threshold that separates non-objects from objects. Because such a Haar-like feature is only a weak learner or classifier (its detection quality is slightly better than random guessing) a large number of Haar-like features are necessary to describe an object with sufficient accuracy. In the Viola–Jones object detection framework, the Haar like features are therefore organized in something called a classifier cascade to form a strong learner or classifier.

The key advantage of a Haar-like feature over most other features is its calculation speed. Due to the use of integral images, a Haar-like feature of any size can be calculated in constant time (approximately 60 microprocessor instructions for a 2-rectangle feature).

Open CV's algorithm is currently using the following Haar-like features which are the input to the basic classifiers:

- Feature = w1 x RecSum(r1) + w2 x RecSum(r2)
- Weights can be positive or negative.
- Weights are directly proportional to the area.
- Calculated at every point and scale.



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

Hmin <=H <=Hmax { Hmin 0 Hmax 20 ……(1)

Smin <=S <=Smax { Smin 45 Smax 255 ….. (2)

5 REQUIREMENT

Coding Using OpenCV and Python

5.1 Dependencies

Let's first install the required dependencies to run this code.

- OpenCV 3.2.0 should be installed.
- Python v3.5 should be installed.
- (Optional) Matplotlib 2.0 should be installed if you want to see results in an organized manner as I've shown in this tutorial. But it's completely optional.

5.2 Importing required libraries from OpenCV

- imutils==0.4.5
- numpy==1.14.0
- opencv-contrib-python==3.4.0.12
- opencv-python==3.4.0.12
- vlc-ctrl==1.0.8

6 ADVANTAGES

Look based media player following advantages:

- Users cannot miss any part of the video.
- The video stops as user changes their view from the video thereby no need of users to keep on dragging back to the point from where they missed.
- You can also forward and backward the video if required.
- It saves time and electricity.
- It gives accurate result

7 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.

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REFERENCES

1. www.superdatascience.com/opencv-face-detection/
2. “Controlling Multimedia Applications Using Hand Gesture Recognition” by Neha S. Rokade, Harsha R. Jadhav, Sabiha A. Pathan , Uma Annamalai.
3. “OpenCV-Python Tutorials Documentation” by Alexander Mordvintsev & Abid K.
4. “Enhanced Look Based Media Player With Hand Gesture Recognition” by Harshada Naroliya, Tanvi Desai, Shreeya Acharya, Varsha Sakpal.
5. Viola and Jones, "Rapid object detection using a boosted cascade of simple features", Computer Vision and Pattern Recognition, 2001
6. A Vision based Hand Gesture Interface for Controlling VLC Media Player,Siddharth Swarup Rautaray,Indian Institute of Information Technology,Allahabad,Anupam Agrawal,Indian Institute of Information Technology,Allahabad