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HANDY MEDIA PLAYER

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ABSTRACT:

We often came across many scenarios where we need to stop the media player automatically when somebody calls us for some work or we suddenly have to move out of the room, but unfortunately, we can't do it without our own interaction with the system. So, is there any solution to this problem? Can there be any way through which we can resolve this? To answer this question, we've hand gestures with us. Hand gestures are a natural form of action that we often use in our daily life for interaction, therefore, to use them as a communication medium with computers generates a new paradigm of interaction with computers. It's used in people's daily life frequently and is an important component of body language in linguistics.

They are more natural in interaction. These hand gestures are used to control various applications like window media players, robot control, gaming, etc.
This paper implements hand gesture recognition techniques and develops a gesture-based low-cost input device for controlling the media player through gestures. The recognition of gestures is done by the Image Processing technique. The theoretical analysis of this approach shows how to do recognition in captured images through a webcam. The captured or training images are further intensified using image processing to identify the convexity defects, through which the system decides what action needs to be performed on the media player. This hand gestures recognition technique will not only replace the use of a mouse to control the VLC Player but also provide different gesture vocabulary which will be useful in controlling the application.

KEYWORDS:

Media Player, Recognition, Hand gestures, Image Processing, Convexitydefects

INTRODUCTION:

Everyone is dependent to perform most of the tasks using computers. The major input devices are the keyboard and mouse. But there is a wide range of scenarios where we need to stop the media player automatically when somebody calls us for some work or we suddenly have to move out of the room, but unfortunately, we can't do it without our own interaction with the system. Direct use of hands as input devices is an attractive method for human-computer interaction. Since hand gestures are a completely natural form of communication, so it does make the user miss the important content that they are currently viewing in their player. While watching a video when someone interrupts you and you have to look somewhere else or go away from the system for some time, you miss some part of the video. Subsequently, you need to drag back a video from where you left it. Well, we got a solution to this problem. A media player that gets paused when the user shows some recognized hand gestures. This can be done using a web camera.

In this paper, we are going to present an application that uses dynamic hand gestures to control the media player. The aim and objectives of this application are to use a natural device-free interface, which recognizes the hand gestures as commands.

We have considered single-handed gestures. In this application the image is captured using a web camera which is then further enhanced and through the process of image processing, it finds the number of convexity defects through which a particular defined function to the media player is performed. The system also provides the feature of controlling other functions of media players such as play, pause, volume up, volume down, next, and many more using hand gestures. It provides users a clear objective model of what task, instructions to perform, and their possible outcomes. Through this users express their significance to the computer user's using their hand to perform button clicks positioning the mouse and key presses.

The goal of our project is to build, an advanced media player based on hand gestures. We've defined some objectives to achieve the goals such as the GUI of the media player should be friendly and provide efficiency and it should give accurate results. This enhanced media player can help in minimizing human efforts, in the future, this technique can be used to control systems using HCI and Machine Learning like PDF Reader, PowerPoint, etc. This media player which is enhanced using image processing can be helpful in many ways such as the user will get a better experience of using the media player, and not miss any part of the video.

RELATED WORK:

Many applications have been developed that are controlled through gestures that including gaming, sign language recognition, control through facial gestures, controlling the mouse, media player, etc.

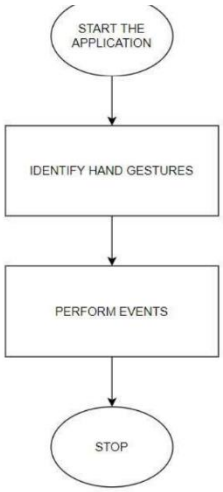
In 2012 RuizeXu, Shengli Zhou, and Wen J. Li developed a system that recognizes seven hand gestures up, down, right, left, cross and circle. Three different modules were built that recognized hand gestures. Signals from MEMS 3-axes accelerometers were given as input. The motion of the hand in three perpendicular directions is detected by 3 accelerometers and transmitted to the system through Bluetooth. A segmentation algorithm was applied and finally, the gestures are recognized by comparing gestures that are already stored in the system. People always use the internet to get daily information about weather, news, etc. For this, they have to repeat the same keyboard and mouse actions. In 2011 Kuan-Ching Li, Hwei-Jen Lin, ShengYuPeng, and KanoksakWattanachote used hand moments to retrieve information from the internet which reduces time and is also convenient to use. Once the user provides the gesture, the appropriate function is selected, then the system will report the action to the user in form of speech. This system also uses face recognition to identify and personalize each user as requirements are different for different users. They used the PCA method to recognize hands and faces. Hand gestures were acquired and stored in the system and the latter compared this with input gestures and perform tasks. This system results better with the small scale of face recognition and hand gesture recognition.

In 2011 Ginu Thomas presented an article on A Review of Various Hand Gesture Recognition Techniques where he compared the results obtained by different techniques. The different methods used are the edges method, pixel-by-pixel comparison, and orientation histogram. An image database was used that contained various static hand gesture images. These images are a subset of American sign languages. Filtering of the image was done to reduce the noise present in it and then segmentation to analyze it. It was then transformed into a feature vector and then compared with a trained set of gestures.

In 2010 Anupam Agrawal and SiddharthSwarupRautaray used hand gestures to control the VLC media player. The K nearest neighbor algorithm was used to recognize the gesture. A VLC media player function that was controlled by hand gesture includes play, pause, Fullscreen, stop, increase volume, and decrease volume. Lucas KanadePyramidical Optical Flow algorithm was used to detect hands

from video. This algorithm detects moving points in the image. After this K_MEAN was used to find the center of the hand. Using this center motion of the hand is recognized. This system used a database that contains different gestures and then input was compared with this stored image and accordingly VLC media player was controlled. In 2007 Yikai Fang, Jian Cheng and Hanging Lu, Hongqiao Wang recognized hand through trigger followed by tracking and segmentation and used this gesture for image browsing.

DATA FLOW DIAGRAM:



OVERVIEW & FUNCTIONALITY:

1) Python: Python is a general-purpose interpreted, interactive, object-oriented,
and high-level programming language. It was created by Guido van Rossum from 1985- to 1990. Like Perl, Python source code is also available under the GNU General Public License (GPL).

2) Image Processing: Images define the world, each image has its own story, it contains a lot of crucial information that can be useful in many ways. This information can be obtained with the help of the technique known as Image Processing.

3)Webcam: Webcam:
When the media player opens, the webcam automatically starts to function and captures live images which then is read by OpenCV frame by frame and fed into the Image processing networks.

4) HSV: The captured image through the webcam is converted into HSV(Hue, saturation, and value are the main color properties that allow us to distinguish between different colors. Using color effectively is one of the most essential elements in photography, as color can draw the viewer's eye to your composition and affect the mood and emotional impact of your photo) using the Image Processing technique.

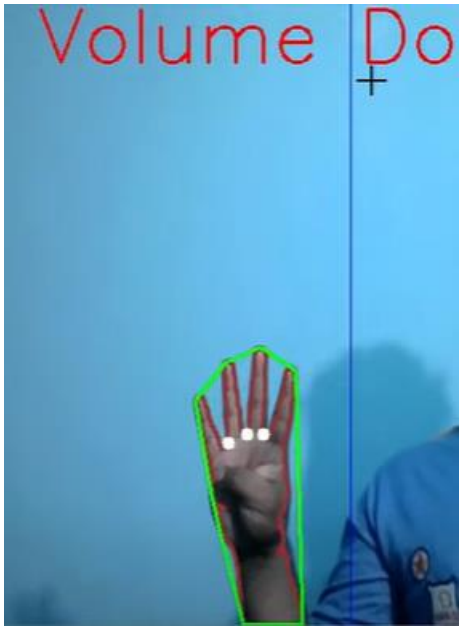
4) Binary Image: The HSV image is further transformed into Binary images(These images are whose pixels have only two possible intensity values. Numerically, the two values are often 0 for black, and either 1 or 255 for white. The main reason binary images are particularly useful in the field of Image Processing is that they allow easy separation of an object from the background).

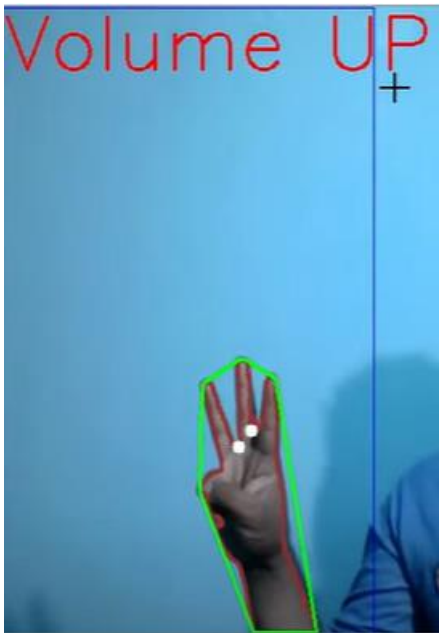
5) Convex Hull: In geometry, the convex hull or convex envelope or convex closure of a shape is the smallest convex set that contains it. The convex hull may be defined either as the intersection of all convex sets containing a given subset of Euclidean space, or equivalently as the set of all convex combinations of points in the subset. For a bounded subset of the plane, the convex hull may be visualized as the shape enclosed by a rubber band
stretched around the subset. Convex hulls of open sets are open, and convex hulls of compact sets are compact. Every compact convex set is the convex hull of its extreme points.

5) Convexity Defects: The last step in the process is to find the number of convexity

defects (Any deviation of the contour from its convex hull is known as the convexity defects).

Various hand gestures and their functions defined with the help of image processing technique are shown in the following figures:





CONCLUSION AND FUTURE SCOPE:

In this project, we aim to help the user get a better experience of using advanced media players. We are doing this by using hand gestures recognition 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 like volume up and volume down, playing next and the previous video.

The application provides the flexibility of defining user interest gestures for specific command which make the application more useful for physically challenged people, as they can define the gesture according to their feasibility. As a future prospect of this research, we are also going to investigate a large number of gestures with different persons, and motion-type hand gestures are developed. We are also going to generalize our system so that it can be useful for other different media players available in the market.

REFERENCES:

1) RuizeXu, Shengli Zhou, Wen J. Li. MEMS Accelerometer Based Nonspecific-User Hand Gesture Recognition. IEEE, 2012. Vol:12, 1166-1173.

2) Sheng-Yu Peng, Wattanachote K., Hwei-Jen Lin and Kuan-Ching Li. A Real-Time Hand Gesture Recognition System for Daily Information Retrieval from the Internet. At the 4th International Conference on Ubi-Media Computing (India), pages 146{151. IEEE, July 2011.

3) Ginu Thomas. Review of Various Hand Gesture Recognition Techniques.

VSRD-IJEECE, Vol. 1 (7), 2011, 374-383.

4) SiddharthSwarupRautaray and Anupam Agrawal. A Vision-based Hand
Gesture Interface for Controlling VLC Media Player. International Journal of
Computer Applications, 2010. Vol: 10, 0975-8887.

5) Yikai Fang, Kongqiao Wang, Jian Cheng, Hanqing Lu. A Real-Time hand
gesture recognition method. At International Conference on Multimedia and
Expo pages 995{998. IEEE, July 2007.