

Controlling of windows media player using hand recognition system

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ABSTRACT

The computer is becoming more important in our daily life with the development of ubiquitous computing. Computer applications require interaction between human and computer. This interaction needs to be unrestricted and it had made challengeable to traditional input devices such as keyboard, mouse, pen etc. Hand gesture is used in people's daily life frequently. Hand gesture is an important component of body languages in linguistics. They are more natural in interaction, compared with those devices mentioned above. Human computer interaction becomes easy with use of hand as a device. Use of hand gestures to operate machine would make interaction interesting. Gesture recognition has gained a lot of importance. Hand gestures are used to control various applications like windows media player, robot control, gaming etc. Use of gesture makes interaction easy, convenient and does not require any extra device. Vision and audio recognition can be used together. But audio commands may not work in noisy environment. In this paper the idea to use hand gestures to control windows media player.

Keywords: Hand Gestures, Skin Color Detection, Human Computer Interaction, Windows Media Player.

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I. INTRODUCTION

Everyone is dependent to perform most of their tasks using computers. The major input devices are keyboard and mouse. But there are a wide range of health problems that affects many people, caused by the constant and continuous work with the computer. Direct use of hands as an input device is an attractive method for Human Computer Interaction Since hand gestures are completely natural form for communication so it does not adversely affect the health of the operator as in case of excessive use of keyboard and mouse. The User interface has a good understanding of human hand gestures. By using the gesture, Feelings and thoughts can also be expressed. Users generally use hand gestures to express their feelings and notifications of their thoughts. Hand gesture and hand posture are related to the human hands in hand gesture recognition. In this paper we are going to present an application which uses dynamic hand gestures as input to control the windows media player. We have considered single handed gestures and their directional motion defines a gesture for the application. In this application image acquisition is done using a Webcam. Some functions in windows media players are used more frequently and thus applying controls windows media player for those functions using predefined gestures. Fig. 1 shows the defined gestures according to the windows player control function.

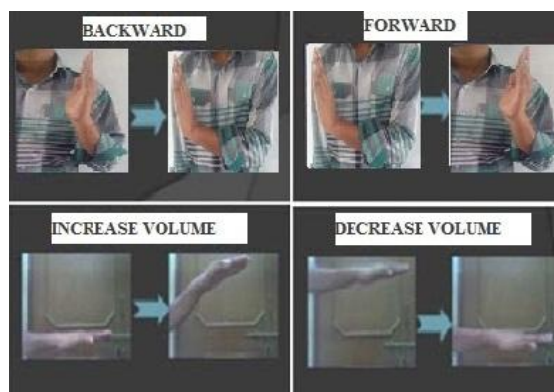


Fig 1:different gestures used for different commands

II. RELATED WORK

Many applications have been developed that are controlled through gestures that include gaming, sign language recognition, control through facial gestures, controlling mouse, VLC media player etc. In 2012 [1] RuizeXu, Shengli Zhou and Wen J. Li developed a system that recognizes seven hand gestures like up, down, right, left, cross and circle. Three different modules were built that recognized hand gesture. Signals from MEMS 3-axes accelerometers were given as input. The motion of the hand in three perpendicular direction is detected by 3 accelerometers and transmitted to the system through Bluetooth. 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 same keyboard and mouse actions. In 2011 [2] Kuan-Ching Li, Hwei-Jen Lin, Sheng-Yu Peng, Kanoksak Wattanachote used hand moments to retrieve information from the internet which reduces time and also convenient to use. Once the user provides the gesture, 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 hand and face. Hand gestures were acquired and stored in the system and the later 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 [3] 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 edges method, pixel by pixel comparison and orientation histogram. Image database was used that contained various static hand gestures images. These images are subset of American sign languages. Filtering of the image was done to reduce noise present in it and then segmentation to analyze it. It was then transformed into feature vector and then compared with a trained set of gestures.

In 2010 [4] Anupam Agrawal and Siddharth Swarup Rautaray 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, Full screen, stop, increase volume, decrease volume. Lucas Kanade Pyramidal Optical Flow algorithm was used to detect hand from video. This algorithm detects moving points in the image. After this K_MEAN was used to find a center of the hand. Using this centre motion of the hand is recognized. This system used database that contains different gestures and then input was compared with this stored image and accordingly VLC media player was controlled.

In 2007 [5] Yikai Fang, Jian Cheng and Hanqing Lu, Kongqiao Wang recognized hand through trigger followed by tracking and segmentation and used this gesture for image browsing. Segmentation is done during detection and tracking using motion and color cues. Palm and finger like structures are then determined using Scale Scape features. Using this palm finger configuration, hand gesture is determined.

In 2007 [6] Yikai Fang, Jian Cheng, Hanqing Lu, Kongqiao Wang speed up hand gesture recognition. They used integral image approximation for Gaussian derivation in image convolution. Fast multi-scale feature detectors were constructed to speed up computation.

In 2002 [7] Lars Bretzner, Ivan Laptev, Tony Lindeberg presented algorithms for hand tracking and hand posture recognition. In this on each image multi-scale color feature detection is performed. Using particle filtering, with an extension of layered sampling referred to as hierarchical layered sampling Hands are detected and tracked.

In 1994 [8] William T. Freeman, Craig D. Weissman used hand gestures and controlled the television. Here a user makes a gesture facing the camera. On the display the hand icon appears that follows the user. User can move his hands on various graphical control using this hand icon and control the television. Gestures for a television control like television off, television on, channel control, channel change were used.

III. PROPOSED METHOD

In this system we have used different image processing techniques, feature extraction and classification tool for recognizing the gesture in real time and appropriate command to the windows media player.

- ✓ Data acquisition: Done by in built webcam on the laptop.
- ✓ Segmentation: there are two types of techniques used. Skin detection model for detection of hand region.
 - Skin detection model for detection of hand region.
 - Approximate median technique for subtraction of background.
- ✓ Recognition phase: decision tree was used as a classification tool.
- ✓ Windows interaction: give the appropriate command to the windows player according to the recognised gesture.



Fig 2: image produced by skin detection model.



Fig 3: image produced by approximate median technique.



Fig 4: this image produced after AND operation

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%% Check only if Entry Set
if (strcmp('Y',EntryChar) %&& (abs(StopTime(6)-StrTime(6))<5)%decision tree%
if (cmin>C2) %&& (rmin<A) %&& (rmax>A) %&& (strcmp(DecChar,'R'))%R-L transition%
                                %backward%
elseif (cmax<C1) %&& (rmin<A) %&& (rmax>A) %&& (strcmp(DecChar,'L'))%L-R transition%
                                %forward%
elseif (rmin>R2) %&& (cmin<B) %&& (cmax>B) %&& (strcmp(DecChar,'U'))%U-Dtransition%
                                %volume down%

```

Fig 5: Decision tree algorithm

IV. RESULT

Table I shows the recognition percentage of the different gestures. The variation in results comes because of the different noisy backgrounds and different light illumination.

Table 1: Recognition rate of different gestures

GESTURE	RECOGNITION RATE
Volume up	80%
Volume down	80%
Forward	90%
Backward	90%

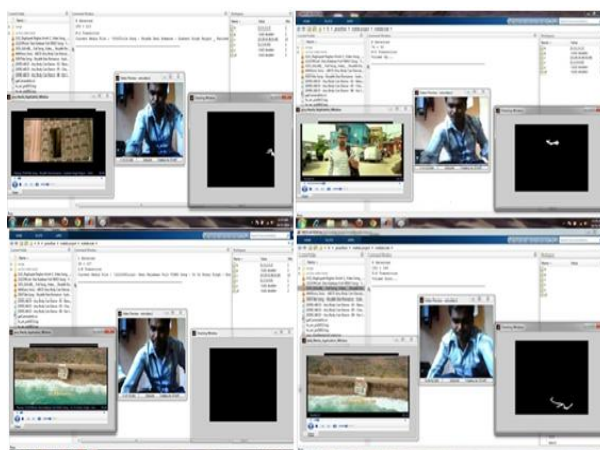


Fig 6: Real time gestures for controlling windows media player

V. CONCLUSIONS AND FUTURE SCOPE

In current world many facilities are available for providing input to any application some needs physical touch and some without using physical touch (speech, hand gesture etc.). But not many applications are available which are controlled using current and smart facility of providing input which is by hand gesture. By this method user can handle application from distance without using keyboard and mouse. This application provides a novel human computer interface by which a user can control media player (windows) using hand gesture. The application defines some gesture for controlling the functions of windows player. The user will provide gesture as an input according to interested function. The application provides a 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 with the 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 market.

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