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## *Review of a dynamic hand gesture recognition system for controlling VLC media player*

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### **Abstract:**

A low cost system which uses dynamic hand gesture recognition technique to control the VLC media player. This application contains a central computation module which segments the foreground part of the frame using skin detection and approximate median technique. The recognition of gesture is done by creating a Decision Tree that uses various features extracted from the segmented part. This hand gesture recognition technique introduces a new, natural way to interact with computers.

## 1. Introduction:

We come across Gesture Recognition in Human–Computer Interaction. It involves the use of natural hand gestures to control devices. A gesture recognition system comprehends human gestures with mathematical algorithms. With gesture recognition, computers can become familiarized with the way humans communicate using gestures. Thus, machines and humans can interact freely with each other. The primary goal of gesture recognition is to create a system which understands human gestures uses them to control various devices. It is necessary to yield a robust and reliable system. With the development of ubiquitous computing, current user interaction approaches with keyboard, mouse and pen are not sufficient. Due to the limitation of these devices the useable command set is also limited. Direct use of hands as an input device is an attractive method for providing natural Human Computer Interaction which has evolved from text- based interfaces through 2D graphical-based interfaces, multimedia-supported interfaces, to Fully-fledged multi- participant Virtual Environment (VE) systems. Imagine the human-computer interaction of the future: A 3D application where you can move and rotate objects simply by moving and rotating your hand all without touching any input device. In this paper we are going to present an application which uses dynamic hand gestures as input to control the VLC 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 VLC media players are used more frequently and thus applying controls VLC media player for those functions using predefined gestures. The defined gestures according to the VLC player control function.

## 2. Literature survey:

A frequently used method to have a robust system against changes in intensity is to transform RGB color space into a color space where chrominance and luminance components are orthogonal. But the pure color information namely chrominance values of skin color are different in different color spaces and skin locus performances of each space might vary. As mentioned in chapter 2, there is a skin locus for each color model. The skin locus should cover all kinds of skin colors (European, African, Asian etc.). On the other hand it should cover a small region in the color model map to yield smaller amount of false positive results. One must consider all these facts to choose the right skin color model for detection and recognition of hand gestures. There are several color spaces some of which are named as; RGB, HS V, Normalized-RGB, YUV and YCbCr. Most of the studies in image processing area have been

assimilated in the YUV or RGB color spaces because TV, webcam and prerecorded video data are usually available in these color spaces. Although other color spaces aim to percept the colors in a more uniform and accurate way as the human perceptual system, transformation of video signals to such color spaces is a very time consuming method. It is a trade of between computation time and correct detection rate for the system in this study and the performances of these color spaces need to be compared. Robustness is achieved if a color space perfectly separating the chrominance from luminance component. HS V, YCbCr and Normalized-RGB color spaces apart the chrominance and luminance values and make them to be worked on independently. However this separation leads to a success in skin color segmentation just up to a point.

### **3. Problem formulations:**

Thierry Messer, describes static hand gestures which are recognized using well-defined signs based on the posture of the hand. In a process, which is generally known and referred to as static hand gesture recognition, a person instructs the machine using his bare hands, whereas images of the persons hand gestures are captured and analyzed in order to determine the meaning of the hand gesture. This paper also explains that the image of the hand is first captured using a system of two or more cameras. This is followed by preprocessing stage which is used to optimally prepare the image obtained from the previous phase in order to extract the features.

### **4. Proposed methodology:**

The skin color segmentation is very sensitive camera parameters and non-linearity in camera acquisitions (like extreme dark or bright pixels). So, as in many systems, the most critical part of the hand detection is having the right thresholds for the current conditions. The color of human skin can be studied under "global skin-color cloud" in some certain conditions. In global skin color, color of the human skin is described in a more general way by taking the tolerance values large enough. On the other hand skin-color of a specified human under certain illumination should be described by more specific mean values and narrower tolerance values not to convey skin like pixels in consideration. In order to achieve the best segmentation, the optimal parameters should be chosen. To find the optimal values of the parameters, thresholds can be set manually at the beginning of the segmentation but this method would be time consuming and would ruin the user friendly environment of the application. Here a self-

calibration algorithm based on a histogram clustering method is used to determine the necessary parameters. Normalized-RGB is the color space used to extract the skin color in this study. Thus,  $r$  (normalized Red in n RGB color space) and  $g$  (normalized Green in n RGB color space) thresholds must be initialized. System starts with a quick coarse skin color extraction as mentioned. This is done with using fixed thresholds and those thresholds covers a wide range to have all type of skin colors under many of the lightning conditions. Since the range of boundaries are so wide, the resultant image would have many false positive type errors. Achieved pixels are called skin pixel candidates and those pixels would go into a fine skin color extraction process to narrow the thresholds and extract true skin pixels. In fine skin color extraction, skin candidate pixels'  $(g - r)$  and  $(g + r)$  (namely  $g_{neg}$  and  $g_{pos}$ ) histograms are extracted. Those histograms would have typically a few local peaks and each one would correspond to a group of pixels. For instance, one peak corresponds to skin-like pixels (wood or similar) and the other peak would correspond to real skin pixels. Those thresholds construct the new narrowed boundaries for fine skin segmentations new narrowed boundaries are applied to skin candidate pixels and a frontal face image would be searched in all trials.

## 5. Conclusion:

Human Computer Interaction is still in its infancy. Visual interpretation of hand gestures today allows the development of potentially natural interfaces to computer- controlled environments. Though most current systems employ hand gestures for manipulation of objects the complexity of the interpretation of gestures dictates the achievable solution. Hand gestures for HCI are mostly restricted to single handed and produced by single user in the system. This consequently downgrades the effectiveness of the interaction. Computer Vision methods for hand gesture interfaces must surpass current performance in terms of robustness and speed to achieve interactivity and usability. Considering the relative infancy of research related to vision based gesture recognition remarkable progress has been made. To continue this momentum it is clear that further research in the areas of feature extraction, classification methods and gesture representation are required to realize the ultimate goal of humans interfacing with machines on their own natural terms.

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