Media Player Controlling by Hand Gesture and Color Detection

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Abstract - The aim of project is to develop interface that can connect digital world to physical world. Now people are used keyboard and mouse to get daily data from internet such as daily news, financial news, climateetc.To improve these situation planned system user can interact with system by using hand gesture and color detection. System can give hand gesture and color as input. Once system get particular hand gesture and color as input, the device will report documents from internet as a output from device to handler. It captures video stream as input and system having predefined color and hand gestures. When it recognizes the gesture and color, system stimulates the appropriate action associated with particular gesture.These gestures would be applied such that they are easy to perform, fast, efficient and ensuring an immediate response.

Keywords- RGB to HSV conversion ,Image Processing, HumanComputer Interaction, Noise reduction, Vector calculation, Hand gesture recognition, humancomputer interaction, HSV color space.

I. INTRODUCTION

As the universal computing model that is predicted for the future is brought closer by technological advances, designers of new smart homes, arbitrated spaces and sentient computer systems will have to consider new techniques to interact with users. The main Objective of this application is to implement software application for playing medial with the help of Media Player which can be controlled by using Gesture with the help of Webcam. This project is basically about using Webcam technology using Webcam API for real time interaction .This project broadly includes three main concepts in java namely Threading, Color Detection, basic operations of Media Player.Hand detection image is taken from camera. System captures a video flow as input. Thispictures processed in system. The operators used for image processing must be kept low timedelay in order to obtain the fast processing rate needed to achieve real time speed. In hand gesture and recognition device.there are three phases:-Hand detection -Hand gesture -Information retrieval from internet.A gesture recognoised device could be used in any of the following areas:Man-machine interface: using hand gestures to control the computer mouse and/or keyboardfunctions. Example of this, which has been implemented in this system, Controls various keyboard andmouse roles using gestures alone.3D animation: Fast and simple conversion of hand movements into 3D computer Space forthe purposes of computer animation. Conception: Just as things can be visually examined by rotating them with the hand, soit would be advantageous if effective 3D objects (displayed on the computer screen) could bemanipulated by rotating the hand in space [1].Computer games,Using the finger to interact with computer games would be more Naturalfor many applications. Control of automatic systems(such as robotics): Using the finger to control asystem.It is the one of the human to computer communication. Here the colors are acting as middleware between human and CPU. At initial major color modal is used for a recognisedprocess, it only recognizing primary colors. Color detection is the process of segmenting the colors and recognizing the segmented colors. In the every color images primary colors are segmented and segmented colors are recognized to spot its name as RGB.[2]

This device/system should monitor and process the every frame from the live images. recorder and camera issued as an input devices.

Two important thing:-1)color segmentation --The color objects were designed with a characteristic combination of colors arrangedin a particular configuration. A series of easy and very quick tests performed on an input image will fast detect and localize the color target. The tests activity invariants based on color pitches. That we have resultant empirically under a diversity of indoor and outdoor lighting conditions for our color outline.

2) Color Detection.-Color detection is the process of segmenting the colors and classifying the segmented colors. It is the one of the human to CPU interaction. Here the colors are acting as middleware between human and CPU. Primary color modal is used for a detection process, it only recognizing major colors In the each color images primary colors are segmentedand recognized to identify its name like RGB.[3].

II . HAND GESTURE & COLOR DETECTION

This desktop software operates on windows operating system and minimum Webcam of 1.0MP capabilities, and also another constraint is context (lighting condition) should be brighter .The distance from webcam to color strip upto 4m. Hand gesture recognized In front of camera - suitable for all users, and highly recommended for users with built-in laptop webcams . You just have to show the open palm in front of webcam (like waving your hand) and move the hand to control the pointer. Pointer also, disabled people may use hand movements to control the computer.. The hand movement should be nearer to webcam. The distance between hands and webcam should be less than 1m.In hand gesture technique the various hand gesture is stored as input. According to that hand gesture, the media player is performing the task of playing songs. Previous, next ,stop, play reply. In color detection the color strips are used instead of hand gesture. The color strip is passed infront of webcam .The strip color containing red, Green, blue or color combinations used in order to perform some actions like start, stop, pause, previous and next[11].

Figure .1 hand gestures

of the screen.Response time for a gesture detection - average: 1 seconds, maximum: 2 seconds. an average of 1 gesture detection per second. If the system is degraded when two different color are detected in that specific position of the screen.Now a days security is major and important factor in app. That's why we are taking care of this issue very seriously. Since the system is compatible for only Unix based OS,it will be more secure or the external attacks. And all the data of user will accessible to only him. no one could access the this data without user permission. the backup of all data will be stored on sound cloud.Description and Priority: this feature is considered as one of the chief benefits that Media Player system provides. It is a high priority feature that it is implemented in a way that it can either be automated taken care of play next/previous song. In the automatic mode the system will take care of monitoring the operation of media player. Stimulus/Response Sequence: For Automatic mode, the user should press Next button in the main screen of the application. Then a media Player will look for next song in the selected directory of that device and play song. And another is the user should press Previous button in the main screen of the application. Then a Media Player will look for previous song in the selected directory ofthat device and play song.Stimulus/Response Sequences :To start a gesture control feature[12], the user will press hand icon button. When he press the gesture button than webcam gets started. The operations of media player controlled by using webcam and identifying the color position and that identi_ed color position, media player operation will be performed.

II.   FLOW OF SYSTEM

In the design phase we designed the system architecture diagrams [1] of the system. Here we examined the various phases involved and accordingly considered and studied the algorithms to be used for the same. In this implementation phase, we design the program for recognizing the hand gestures and color detection accordingly mapping the identified gestures to specific system operations.The resolution of the web camera is kept at 320*240 pixels for better quality of video. The image captured by web camera is in RGB color model. The image is then converted to HSV color model[3] for better resolution and HSV model[4] for gesture higher resolution. Here captured images are preprocessed by image processing. Noise reduction and all unwanted background is skipped.RGB to hsv conversion The RGB color model approximates the manner human vision encodes images by using three primary color colors red, green, and blue. In RGB color model red, green, and blue channel combine to create all the available colors in the system. When all three primary color values are the same, the result is neutral, or grayscale.[4]

Secondary colors are combinations of two primary colors: red mixed with green is yellow, green mixed with blue is cyan, and blue mixed with red is magenta.
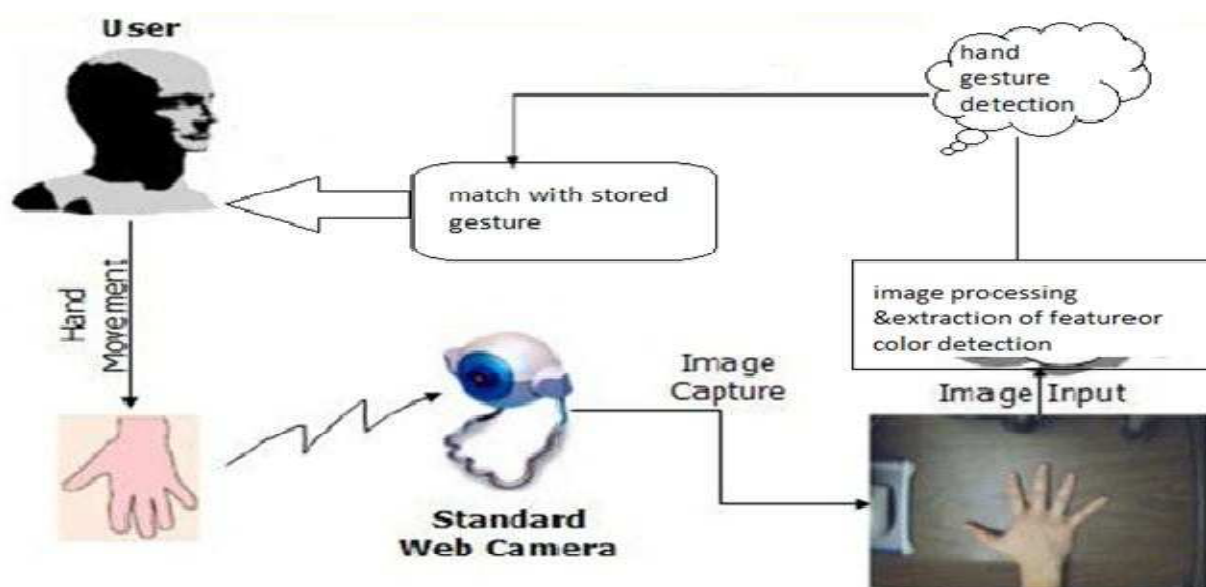
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Figure 2.flow of system.

III.   METHODLOGY

Hand gesture detection module [1] based on four modules based on HSV technique .That Performs like follows-

A)Noise reduction B) RGB to hsv color conversion C).HSV thrsholding (skin color detection) D).edge detection E).feature extraction F). Blob detection. Four modules of this technique-1.Noise reduction 2. RGB to hsv conversion

3. HsvThresholding Noise reduction Blurring is technique in which image is processed and noise is removed to get a pure image. Blurring is very useful for generating Background images and Shadows .Blurring is done using filtering method.[2]

4.1 RGB to HSV conversion

The RGB color model approaches the way human vision encodes images byusing three primary color channels: red, green, and blue. In RGB color model red, green, and blue channels combine to create all the available colors in the system. When all three main color values are the same, the result

is neutral, or grayscale.[4] Subordinate colors are combinations of two primary colors for e.g.: red mixed with green is yellow.

4.2 HSV color model

Hue describes the real color itself, whether it's RGY. Hue is measured as an perspective on a color[5]. Saturation: Saturation defines the intensity of a color, whether it's a bright or a pale red. An image that is completely de-saturated has no color at all and it is a gray scale picture. Saturation is also Measured on a color wheel, but as the distance from the centre of thewheel to the edge. Value: Value represents Brightness of Color.

4.3.HSV thresholding

Thresholding is a method used for segmentation of image. Thresholding can be used to create a black and white image i.e. a binary image from a grayscale image. It is repeatedly used for feature extraction[7] where required features of image are converted to white and rest all to black. HSV Thresholding is a method to transform a current layer into black and white imagewhere white pixels represent the image whose Value is in the threshold range, and black pixels represent the Value out of the threshold[8]

4.4 Algorithm for Labeling and Blob Detection

The gesture in the color segmented image should be recognized as one object before it can be interpreted. This can be done through the process of labeling and blob detection. Labeling is the process of giving each region a unique integer number or label for the purpose of regional identification [3]. In effect, while no two neighboring regions should have the same label, the pixels within one region should have the same label or description so that the region could be interpreted as one object or blob. For the purpose of determining whether pixels might belong to the same region, their adjacent relationships can be examined. The two most common adjacency relationships are:4-adjacency and 8-adjacency [11].The algorithm for labeling and blob detection using an 8-adjacency relationship and a threshold value for a grayscale image is as follows:

1. Select the threshold value for the grayscale image.

2. For each non-zero pixel in the image that is above the threshold value:(a) If the pixel has non-zero labeled pixels in its immediate 8-adjacency neighborhood (namely, the top-right, top, top-left and left pixels), then give it a non-zero label (for example, assign the minimum value of the pixels in this neighborhood to the pixel as its label).(b) If the pixel has no neighboring pixels, then give it a new unused label and include it as part of a new set.

3. After all the pixels have been labeled and placed in sets, merge together the sets with connected pixels into one blob or object. Objects may be given different colors to distinguish them visually. A sample original segmented image of hand with skin color that is converted to a grayscale image, and the finally into two separate images, one showing a single blob using a lower threshold and another showing multiple blob using a higher threshold value. Color detection- The chapter also focuses on required theoretical concepts. The overall worked of system is presented. The input to the continuous video stream acquired by web camera. For further processing of video, the frames need to be separated. The next step works on these extracted frames. To detect the color movement position by using algorithm and perform specific media player operation such as play, pause, next song, previous song, forward song, backward song, control volume.

V. ACKNOWLEDGMENTS

CONCULSION

We have developed a method to recognize the unknown input gestures by using different hand gesture color. Since the variation of the hand gestures is usually large, the transition between states is necessary in each gesture for an effective hand tracking. In the experiments, we assume stationary background so that our system will have smaller search region for tracking. With a larger training set and context modeling, lower error rates are expected and generalization to user independent gesture recognition system should be developable. Once we add a new gesture into the system, we only need to re-train another HSV for the new gesture, since the relationships between new model and the original models are independent. Hand detection provide 80% accurate result.

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