Hand Gesture Recognition for Real Time Human Machine Interaction System
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Abstract — Real Time Human-machine Interaction system using hand gesture Recognition to handle the mouse event, media player, image viewer. Users have to repeat same mouse and keyboard actions, inducing waste of time. Gestures have long been considered as an interaction technique that can potentially deliver more natural. A fast gesture recognition scheme is proposed to be an interface for the human-machine interaction (HMI) of systems. The system presents some low-complexity algorithms and gestures to reduce the gesture recognition complexity and be more suitable for controlling real-time computer systems. In this paper we use the webcam for capturing the image. After capturing the image it converts into the binary image. A gesture is a specific combination of hand position.

Keywords — Gesture Recognition, Human Machine Interaction System, Webcam.

I. INTRODUCTION
The computers understand human language and develop a user friendly human computer interfaces (HCI). Gestures are the non-verbally exchanged information. The computer programmers have been incredibly successful in easing the communication between computers and human. The project aims to determine human gestures by creating an HCI. An overview of gesture recognition system is given to gain knowledge. A gesture is categorized into two distinctive categories: dynamic and static. The system uses Dynamic gesture because these are real time system. There are many challenges associated with the accuracy and usefulness of gesture recognition software. The main challenge is generating some noise in capturing image. The variety of implementations for image-based gesture recognition may also cause issue for the technology to general usage.

II. EXISTING SYSTEM
Previous system captures Black and White images and those gestures are predefined. It scans the whole body as input. It used hand gloves for gesturing. For controlling the games and smart phones it uses static gestures only. In previous system it have a problem that similar gestures might have different orientation histograms and also different gestures have similar orientation of histograms.

III. PROPOSED SYSTEM
The entire system captures the real-time image which is color image as input. The system uses serialized database for storing gestures. Well Accuracy and efficiency. Our project is that we are focusing on interaction between human and computer machine. The proposed scheme can be used to develop a real-time gesture recognition system. The first option is to eliminate most background regions to remain the hand region when the background of implemented environment is less complex. The second option is to detect hand regions by color or brightness. The hand region detection is a very important procedure for identifying the shape and area of each hand. Our system can work well in real time service system.

IV. RELATED WORK
The most gesture recognition methods usually contain three major stages. The first stage is the object detection. Many environment and image problems are needed to solve at this stage to ensure that the hand contours or regions can be extracted precisely to enhance the recognition accuracy. Common image problems contain unstable brightness, noise, poor resolution and contrast. The second stage is object recognition. The detected hand objects are recognized to identify the gestures. At this stage, differentiated features and effective classifiers selection are a major issue in most researches. The third stage is instructs or behaviour of analysis. In this paper, motion-based dynamic gesture recognition system for interaction between human and computer system is proposed.

V. SYSTEM ARCHITECTURE
Fig. 1 shows the architecture of system:
1) Step1- in system architecture first it captures image from webcam call as video capturing.
2) Step2- in second step our captured image is 2D it stored in 2D matrix from.
3) Step3 - After storing image Apply cropping because neglecting background region, and only get image part.

4) Step4 - After that apply scaling for zoom out or zoom in option.

5) Step5 - After template generated like any symbol which is stored into the database like A, S, L call as a template generated.

6) Step6 - After template generation template matching occurred match symbol with database.

7) Step7 - template fetching occurred nothing but calling from database for particular work.

Ones the templates are fetched then system performs different actions like mouse handling, Image viewer, Media player.

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**VI. ALGORITHM**

1. RGB Color Model
   The RGB color model is an additive color model in which red, green, and blue color is added together in various ways to reproduce a broad array of colors.

   In computing, the component values are often stored as integer numbers in the range 0 to 255. These may be represented as either decimal or hexadecimal numbers.

2. RGB to Grayscale Conversion
   Steps / Algorithm
   i. Traverse through entire input image array.
   ii. Read individual pixel color value (24-bit).
   iii. Split the color value into individual R, G and B 8-bit values.
   iv. Calculate the grayscale component (8-bit) for given R, G and B pixels using a conversion formula.
   v. Compose a 24-bit pixel value from 8-bit grayscale value.
   vi. Store the new value at same location in output image.

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**COLOR – GRAYSCALE - BLACK & WHITE**

**Fig. 2 Conversion of Color Image to Grayscale to Black & White**

**VII. EXPERIMENTAL RESULTS**

In this section, some experimental are performed to show the performance of the proposed scheme. Besides, an implemented HMI system also is presented in this section to show an application example of gesture control. In this experiment, the video input device is a common webcam. In the image preprocessing, the proposed scheme uses the noise filter and equalization method to enhance the important information for the hand detection and gesture recognition. The results of the Gaussian filter and the median filter and these noise filters both can reduce most noises and still can remain feature information for hand detection and gesture recognition.
VIII. CONCLUSION
The gesture control technique has become a new developmental trend for many human-based electronics products. The human-machine interface for users to control some service system just by their hands. The proposed scheme can be further applied to be HMI for other applications, such as, intelligent televisions, playing games, robots, bulletin board and so on.

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