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CONVENIENCY IMPROVEMENT FOR GRAPHICAL INTERFACE USING GESTURE DETECTION

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Abstract— **Recent Developments in computer software and related hardware technology have provided a value added services to the user. In everyday life, physical gesture is a powerful means of communication. The Project introduces an application using computer vision Hand Gesture Recognition. A camera records a live video stream, from which a snapshot is taken with the help of interface. The system is trained for each type of count hand gesture (using color pointer) at least once(R, G, B color pointer). After that a test gesture is given to it and the system tries to recognize it. A research was carried out on a number of Algorithms that could best differentiate a hand gesture (using color pointer). It was found that the diagonal sum algorithm gave the highest accuracy rate. In the Pre-processing phase, a self-development algorithm removes the background of each training gesture. After that the image is converted into a binary image and the sums of all diagonal elements of the picture are taken. This sum helps us in differentiating and classifying different colors of color pointer. Previous system has used data glove or markers for input in the system. I have no such Constraints for using the system. The user can give hand gesture in view of the camera naturally. A completely robust hand gesture recognition (using color pointer) system is still under heavy research and development the implemented system as an extendible foundation for future work.**

Index Terms— **Camera Test, hand detection, hand recognition, hand gesture, Blob Detection, Information Retrieval.**

I. INTRODUCTION

The task of hand gesture recognition is one the important and elemental problem in computer vision. With recent advances in information technology and media, automated human interactions systems are build which involve hand processing task like hand detection, hand recognition and hand tracking.
This prompted my interest so I planned to make a software system that could recognize human gestures through computer vision, which is a sub field of artificial intelligence- The purpose of my software through computer vision was to program a computer to "understand" a scene or features in an image.
A first step in any hand processing system is to detect and localize hand in an image. The hand detection task was however challenging because of variability in the pose, orientation, location and scale. Also different lighting conditions add further variability.
Daily Information Retrieval is big challenging issue in today's research world. People getting Daily information from Television, Radio, Newspaper and Internet. Apart from that people getting today's Breaking News, Weather Condition, Sports and Financial Condition, form mostly used in Internet. Internet is main medium to get large amount of information. Some type of daily information is repeatedly retrieved such that reading newspaper, Weather information and shear market and so on. This daily information retrieval has to repeatedly perform some action like mouse and keyboard and consequently, it is waste time and it's become inconvenience system. To learn all the situations and I decided to develop the Project, which can easily access daily information without mouse and keyboard actions and making people convenient system.

Now a day computer becomes a Major part of every person's life. We are using computer to hearing and watching songs/motivational Clip, read some data, accessing important information from the internet. The computer operating and accessing important information has to be done with the mouse and keyboard action. When using keyboard and mouse to retrieve information from internet, at that time required waste time system become much more boring and tire. Now a time many advance system are available to access information from internet like that hand gesture and other gesture system and make a system intelligent without using keyboard and mouse.

II. RELATED WORKS

A. Information Retrieval systems and Process

Information storage and retrieval, it is a systematic process of fetching and classifying data so that they can be located and displayed on request. An information retrieval process starts when a person showing hand moment to the computer system through web camera. Camera capture image for hand using color pointer, for example one figure showing to web camera then image are recognize and gesture are done using different techniques. An information retrieval system finds data that is similar to a user's query. An IR system finds out in collections of unregulated or semi-regulated data (e.g. web pages, documents, images, video, etc.). The need for an Information Retrieval system occurs when a collection reaches a larger size where traditional classifying techniques or searching techniques can no longer exist, so that these techniques are developed.

Steps of Information Retrieval Process

A Universal model of the information retrieval process, where both the images need and the image Recognition have to be translated into the form of substitute to initiate the matching process to be performed.

I Web Camera: - In this we are taking the appropriate image for figure using image pointer. The final image should take 2D and 3D view of real image for the matching point of you.

II Normalization: -In this section we prepare a normalize image using different colour model. Any impurity capture by camera when showing image pointer to web camera, all the impurity are recover and generated by pure image. The normalisation done using image Blur, image threshold and Image Processing RGB To other colour model.

III Matching Process: -This process matches the user finger using image pointer with the XML RSS finds more relevant result with stop words as well as without stop words.

IV Result: - Finally the output comes out to be the more relevant search result with output graph comparing overall search time with stop words and without stop words.

B. Image Processing

Image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems.

I Image gray scaling

Grayscale is a range of shades of gray without apparent color. The darkest possible shade is black, which is the total absence of transmitted or reflected light. The lightest possible shade is white, the total transmission or reflection of light at all visible wavelength s. In analog practice, grayscale imaging is sometimes called "black and white," but technically this is a misnomer. In true black and white, also known as halftone, the only possible shades are pure black and pure white. The illusion of gray shading in a halftone image is obtained by rendering the image as a grid of black dots on a white background (or vice-versa), with the sizes of the individual dots determining the apparent lightness of the gray in their vicinity. The halftone technique is commonly used for printing photographs in newspapers.

II Image Thresholding

Thresholding is the simplest method of image segmentation. From a grayscale image, Thresholding can be used to create binary images**.** The purpose of Thresholding is to extract those pixels from some image which represent an *object* (either text or other line image data such as graphs, maps). Though the information is binary the pixels represent a range of intensities. Thus the objective of binarization is to mark pixels that belong to true foreground regions with a single intensity and background regions with different intensities.

Fig1.Thresholding

III Image Blob Detection

Blob detection is the name for a set of mathematical methods which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally,
Have discontinuities.

C. Different Recognition Approaches

The different recognition approaches studied are as follows:

I Pen-Based Gesture Recognition

Recognition gestures from Two-dimensional input devices such as a pen or mouse has been considered for some time.

The early Sketchpad system in 1963 used light pen gesture, for example. some commercial systems have used pen gestures since the 1970s.there are example of gesture recognition for document editing for air traffic control, and for design tasks such as editing splines.More recently, system such as the OGI Quick set system demonstrated the utility of pen-based gesture recognition in concert with speech recognition to control a virtual environment. Quick set recognizes 68 pen gestures, including map symbols, editing gestures, route indicators, area Indicators and taps.Oviatt has demonstrated significant benefits of using both speech and pen gestures together in Certain task.Zeleznick and Landay and Myers developed interfaces that recognize gestures from pen-based sketching.

II Tracker –based Gestures Recognition

There are many tracking eye gaze, hand gesture, and overall body and its position. In virtual environment interaction each sensor has its own strengths and weaknesses. Gestural interface eye Gaze is useful, so I focus here on gesture based input from tracking the hand and the body.

III Data Gloves

For communication and manipulation people use their hand for wide variety of tasks. Hands including wrist with approximately 29 degrees of freedom are very dexterous and extremely expressive and quite convenient. In variety of application domain, hand could be used for control devices for complex tasks. Sturman analyzed task characteristics and requirement, hand action capabilities, and devices capabilities, and discussed important issues in developing whole-hand input techniques.
Given interaction task, can be evaluated as to which style best suites the task.Mulder presented an overview of hand gestures in human-computer interaction, discussing the classification of hand movemt,standard hand gesture ,and hand gesture interface design.

IV Body Suits

Process of small place of strategically dots placed on human body, people can perceive pattern such as gestures, activities, identities and other aspects of body. One way of approach is recognition of postures and human movements is optically measure of 3D position such as markers attachment to body and then recovers time varying articulate structure of body. This articulated sensing by position and joint angles using electromechanically sensors. Although some of system require small ball or dot placed top user clothing prefer body motion capture by" body suits" generically.

V Head and Face Gestures

When people interact with one another, they use an assortment of cues from the head face to convey information. These gestures may be intentional or unintentional, they may be the primary communication mode or back channels, and they can span the ranges from extremely subtle to highly exaggerate. Some examples of hand and face gestures include: nodding or shaking the head, direction of eye gaze, raising the eyebrows, opening the mouth to speak, winking, flaring the nostrils and looks of surprise, happiness, disgust, anger, sadness etc.People display a wide range of facial expressions.Ekman and Friesen developed a system called FACS for measuring facial expression and coding expression, this description forms the core representation for many facial expression analysis systems.

VI Hand and Arm Gestures

These two parts of body (Hand and Arm) have most attention among those people who study gestures in fact much reference only consider this gesture recognition. the majority of automatic recognition system are for deictic gesture (pointing), emblematic gesture (isolated sign) and sign language(with a limited vocabulary and syntax) some are components of bimodal system ,integrated with speech recognition .some produce precise hand and arm configuration while others only coarse motion.Freeman developed a real-time system to recognize hand poses using image moments and orientations histograms, and applied it to interactive video games. Cutler and Turk described a system for children to play virtual instrument and interact with life like characters by classifying measurements based on optical flow.

VII Body Gestures

This section includes tracking full body motion, recognizing body gestures, and recognizing human activity. Activity may be defined over a much longer period of time that what is normally considering a gesture; for example, the people meeting in an open area, stopping to talk and then continuing on their way may be considered a recognizable activity.Bobick proposed taxonomy of motion understanding in terms of: movement –the atomic elements of motion, activity-a sequence of movements or static configurations and action-high-level description of what is happening in context. Most research to date has focused on the first two levels .Video surveillance and monitoring of human activity has received significant attention in recent years. System that analyzes human motion in virtual environments may be quite useful in medical rehabilitation and athletic training. The Pfinder system developed at the MIT media lab has been used by a number of groups to do body tracking and gestures recognition. It forms a two dimensional representation of the body, using statistical models of color and shape. The body model provides an effective interface application such as video games, navigation.

VIII Vision-based gesture recognition

The most significant disadvantage of the tracker-based system is that they are cumbersome. This detracts from the immerse nature of a virtual environment by requiring the user to put on an unnatural device that cannot easily be ignored, which often requires significant effort to put on and calibrate. Even optical systems with markers applied to the body suffer from these shortcomings, albeit not as severely. What many have wished for is a technology that provides real-time data useful for analyzing and recognizing human motion that is passive and non-obtrusive. Computer vision techniques have the potential to meet these requirements. Vision-based interfaces use one or more cameras to capture images, at a frame rate 30 Hz or more, and interpret those images to produce visual features that can be used to interpret human activity and recognize gestures. This technique was also used by us for recognizing hand gestures in real time. With the help of a web camera, I took pictures of hand on a prescribed background and then applied the classification algorithm for recognition. Currently, most computer vision system use cameras for recognition. Analog feed their signal into a digitizer board, or frame grabber, which may do DMA transfer directly to host memory.

SYSTEM ARCHITECTURE

The desired system is implemented on the basis of the system architecture diagram. Where the individual steps are given those are required in the project. Frame extraction is done; on that real image is capture by web camera. The real image preprocessing filter is performing gesture operation.RBG to HSV color conversion done for supporting for blob detection. Color thesholding done for normalize the real image. Real blob are detected and then recognition process are proceed. Gesture is evaluated for browsing relevant information.

Input: Load image 320 X 240 dimensions.

OUTPUT: To get Daily Information without maximum using Keyboard and mouse action.

Process:

1. Read the image(320 X 240 dimension)
2. Convert given image in Gray-scale (using RGB average formula).
3. Convert given image in threshold image for identified proper Blob.
4. To blurring the threshold image for avoiding noise.
5. To update the current feed.
6. To take 2D view for proper visualization.
7. To take 3D view for proper visualization.
8. To clear Z axis for avoiding noise.
9. Manage feeds means adding new URL.
10. Taking URL using RSS URL which is fastly showing Data.
11. User also updating URL data remove and replace it.
12. Information retrieval to start .to aggregate the URL means set the Priority.
13. When click on Go button then show news on same window.
14. HCI Based information Retrieval Start.
15. When showing figure (image pointer) on web Camera to start proceed.
16. To match the input and show appropriate data on browser.
17. On same window also showing data and new browser opening new tab to show data.
18. Using Read Button gives idea for user to query match or not.
19. Finally Human Computer Interface based Information Retrieval Project should be done and get result.

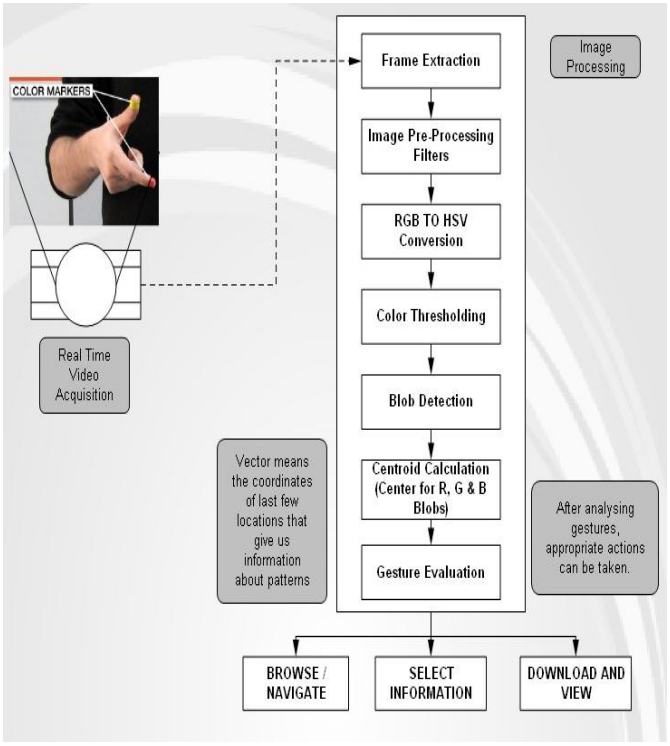

Fig2.working system.

III. PROPOSED ALGORITHMS

The desired system need to implement a suitable process by which the amount of resource required to evaluate documents in a directory can be reduced. That can be formulized using the below given algorithm step.

IV. EXPERIMENTAL RESULTS

This section includes the algorithm processing using the implemented interface and performance evaluation of the system. Initially the system gets the input image and then preprocessing of it. And finally gives the result of hand gesture recognition. After implementing the desired algorithm and concept mentioned in base paper for detection of Hand Gesture (color pointer) and show the Daily Information from the internet without the using repeated keyboard and mouse action.

Table 1Proposed System Algorithm

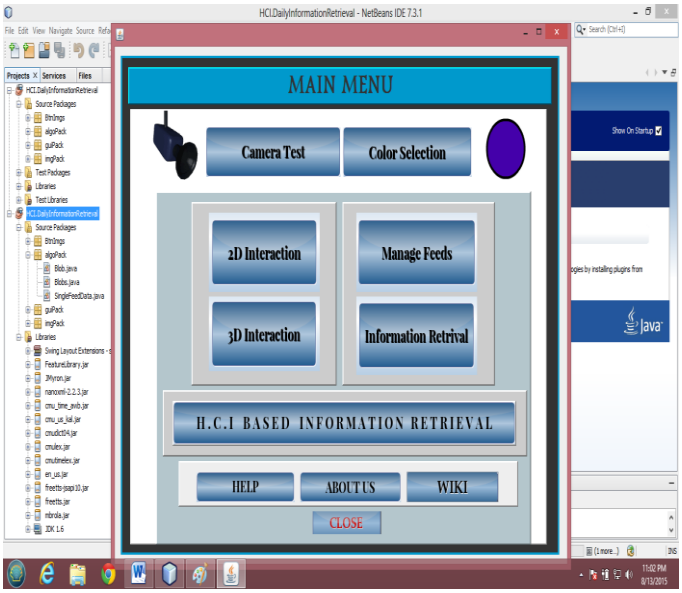

Fig3.GUI for Project

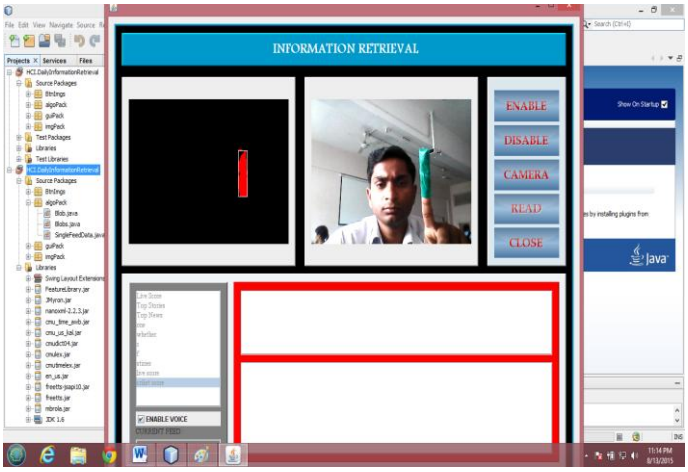

Fig 4 GUI design of application to show of HCI Based Information Retrieval.

After implementing the desired algorithm and concept mentioned in base paper for detection of Hand Gesture (color pointer) and show the Daily Information from the internet without the using repeated keyboard and mouse action.

V. CONCLUSION

The facilities are available for providing input to this application some needs physical touch and some without using physical touch (color pointer, hand gesture etc.).But not more applications are available which access information without using keyboard and mouse action. .By this method user can handle application from without using keyboard and mouse. This application provides a better human computer interface

by which a user can access information using hand gesture (color pointer). The user will provide gesture as an input according to UML RSS. This application is provides a flexibility of defining hand gestures for specific color pointer which become the application is more useful for physically challenged people, so that it's become more feasible. The proposed work is intended to give the verification result obtained by above method to detect finger (using color pointer) and visualize the daily information from internet. In other techniques complex algorithm are used and limited finger are matching. But using this method gives 99.9% efficient result get.

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