

A Frequently used Hand Gesture Recognition System for Daily Information Retrieval from Internet

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Abstract— People mostly get daily information from newspaper, Television and Internet such as weather condition, news and financial information. Users have to repeat same mouse and keyboard actions, inducing waste of time and inconvenience. In order to improve all these condition, we present in this paper the design of a system that can easily access daily information without mouse and keyboard actions and system making convenient. The aim of proposed system daily information accessed from internet by using hand gestures. These hand gestures captured by camera. The data recorded from camera send to pc for image processing. Hand gesture is recognized in pc and it is coupled with internet. So user can access information by using hand gestures. Gesture recognition is technology that achieves human machine interactions that do not require contact based input mechanisms like remote, mouse and keyboard.

Index Terms— face recognition, hand detection, hand recognition, hand gesture, PCA..

1 INTRODUCTION

Nowadays, people mostly get daily information from newspaper, Television and Internet such as weather condition, news and financial information. The Internet is mostly used. The future of Internet must be major source to access the vast amount of information. Apart from that, these daily information has to repeat the same mouse and keyboard actions, and consequently, it wastes time and inconvenience. In order to improve all these situations, we present in this paper the design of a system that can easily access daily information without mouse and keyboard actions and making people's life convenient.

Today computer become a integral part of every person's life. We use a computer to hear songs, read something, accessing information from the internet. The computer handling and accessing information has to be done with the mouse and keyboard. Everything has to be told to it by using keyboard and mouse which makes the information access part a tedious one and a lot of time is wasted on just telling it how an information can be retrieved if it is retrieved daily which it tiresome and boring. Today hand gestures or any gesture used in information access can make a system intelligent enough to perform the task given to it by just a gesture and not by using keyboard and mouse.

This kind of human machine interface would allow a human user to control remotely through hand gesture a wide variety of devices. Different applications have been suggested, such as contactless control or house appliances for welfare improvement. A new vision based framework is presented in this method, which allows the users to interact with computers through hand gesture, being the system adaptable to different light conditions and backgrounds. Its efficiency makes it suitable for real time applications. The aim of proposed system daily information accessed from internet by using hand gestures. These hand gestures captured by camera. The data recorded from camera send to pc for image processing. Hand gesture is recognized in pc and it is coupled with internet. So user can access information by using hand

gestures. Gesture recognition is technology that achieves human machine interactions that do not require contact based input mechanisms like remote, Mouse and keyboard.

RELATED WORK

In hand gesture and recognition system there are three phases hand detection, hand recognition and Information retrieval from internet.

A. Hand Detection:

For hand detection image is taken from camera. System takes a video stream as input. This image processed in system. The operators used for image processing must be kept low time consuming in order to obtain the fast processing rate needed to achieve real time speed. There are many approaches for hand detection. The simple way to detect hand is capture image and find for skin color region in the image but skin color region detection is difficult because it can also detect background color and other body parts from image. The camera is used to track the hand movements. So we use the skin color detection Algorithm for skin color detection.

B. Hand Recognition:

In hand gesture recognition two phases are important, firstly features detection which relates with the extraction of Useful features from input video or input image, Secondly, relates with calculation of parameters estimation model from the extracted features. Hand gesture can be localized by detecting the hand gesture from the image and segmenting hand from the background which is the unwanted other objects. Skin color provides an effective and efficient method for hand localization. Segmentation based skin color method applied for hand locating. Recognition process affected with the proper selection of gesture pa-

rameters of features and thus the accuracy of the classification. For example edge detection and counter not suitable for gesture recognition since it might lead to misclassification. Edge detection algorithm is applied on the image captured by camera. These algorithms detect which gesture is selected. Once you select hand gesture system retrieves the information from internet with respect to hand gesture.

C. Information Retrieval:

When request for data, information retrieval process is used to collection of data from internet. Once particular hand gesture is recognizes then query is enters into system. The URL for accessing information is predefined by the user. For different hand gesture different URL's are save in the system. Once URL is selected for first time then nformation is retrieved from internet using hand gesture.

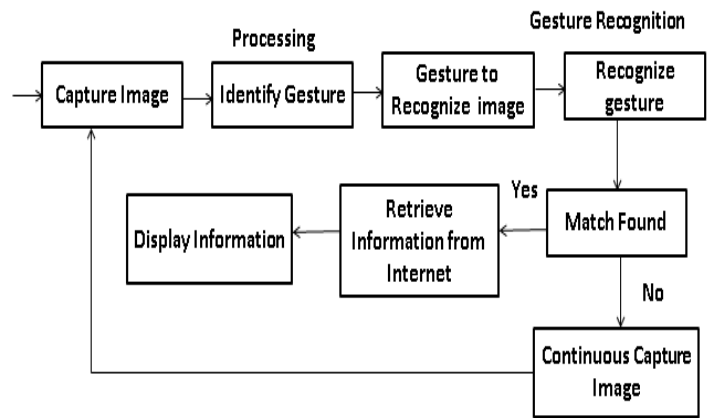


Fig. Working of System

III. SYSTEM ARCHITECTURE

This system is built to provide daily information. A camera is the major hardware component of system. Camera is used to captures the hand movements. These images are sending to Computer for image processing. Image is processed in Computer i.e. hand is detected and gesture is recognized from the image. With respect to hand gesture information is retrieved from the internet. These information displays on the Computer. The proposed system consists of both face and hand detection and recognition, daily information retrieval from Internet, shown on figure system architecture.

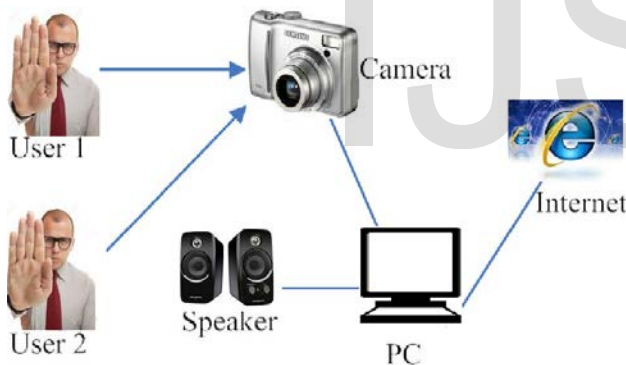


Figure: System architecture

IV. WORKING

The simple way to detect hand is capture image and find for skin color region in the image but skin color region detection is difficult because it can also detect background color and other body parts from image.

A. Face Detection and Recognition:

In face detection, Adaboost and haar-like features are used to detect facial image. First, facial image is segmented and converted from color image to grayscale one. Next, we resize the facial image to a smaller image since using smaller and lower resolution image can achieve better recognition results than large and high resolution image one. But PCA is fast. Unfortunately, PCA is easily affected by light. We use histogram equalization to standardize the brightness of images, which we use to recognize the faces. The flow steps of Face Detection are as follows.

- Step 1 Load grayscale training images,
- Step 2 Process PCA on the training faces,
- Step 3 Project the training images onto the PCA subspace,
- Step 4 save the training data.

The flow steps for Face Recognition are as follows:

- Step 1 Load input image.
- Step 2 Load the saved training data.
- Step 3 Project the input image onto the PCA subspace.
- Step 4 Calculate the distance between input images

And training data.

- Step 5 Output the result.

After a user is successfully identified, this user can login the system and make use of services.

B. HAND DETECTION AND RECOGNITION

The skin detection detects the skin region from input image. If the conditions of tracking trigger are not enough, it will keep detecting skin region. If the conditions of tracking trigger are enough, it will start to track by Camshaft algorithm. The third step is segmentation and normalization. The fourth step is PCA. Finally, we will analyze and recognition. We detect the hand region and position by skin detection. Skin detection is important step and it can affect the final result. The performance of skin detection must is one of the key points. This paper use YCbCr color space to detect skin region. In YCbCr color space, skin region usually focus on a region that likes an ellipse, and we use ellipse template to decide pixel of image whether is a skin or non-skin pixel. According to the different brightness of light, it will

not focus on the same region. These three conditions of tracking are as follows.

1. Detect more than one skin region.
2. Skin region within the tracking window.
3. Skin area is bigger than forty percent of tracking Window and keep more than two second.

C. Hand Gesture Recognition

In hand gesture recognition, we use PCA method to recognize the hand gestures. Before we recognize the hand gestures, we have to train the hand gestures, and then we can use the training data to recognize the hand gesture.

V. EXPERIMENTAL RESULTS

The equipment's include a laptop. Configuration of laptop is Intel dual core processor with 2 GB RAM memory. The Web Cam is used to capture image. The captured image size is 640 x 480 resolutions. Our system interface provides five links that can be choose by hand gesture. The links are i.e. news, election news, gmail, cricket score, and weather Information retrieval. The normalized image is down sampled from the original from the original image by using skin detection. We can find biggest skin region. In our project five defined hand gesture. Our hand gesture is one, two, three, four and five. User can use any hand gesture to choose function. The one, two, three, four, five correspond to news, election news, Gmail, weather, cricket score. On hand gesture picture test accuracy rate is good in static environment. We start to test hand gesture recognition accuracy rate in real time environment. In our experiment hand gesture has 100 frames to recognize. The total time for processing a single frame is between 0.2 to 0.4 seconds. About 50ms to 1 seconds for hand detection and 10ms to 80ms for hand gesture recognition. Total hand recognition accuracy rate is

Show Finger	Zero	One	Two	Three	Four	Total
Accuracy Rate	90.5	86	93.8	81.9	80.4	86.5

V. APPLICATIONS AND FUTURE WORK

Applications of a sophisticated temporal-gesture detection and recognition system are myriad: we enumerate some of the more salient areas of research and development.

A. Home Environment

For daily information retrieval which is efficient way to get information using hand gesture. Different applications suggested such as contactless control or home appliances we are also interested to work in lip reading technology to make life easier.

B. Robotics

Hand gesture recognition system also used in robotics. Using gesture recognition system and sensors movements of robot takes place. Hand gesture also used for to give command to the robot.

C. Remote Control for Games and Hardware Gesture can be used to control interaction within video games to try and make the game players experience more interactive.

D. Sign Language Recognition

Sign language recognition plays an important role in deaf and mute individual's life. So gesture recognition system translates sign language into text. By using gesture recognition system these peoples easily interact with digital work.

E. Medical

Two surgeons manipulate brain images using a hand-gesture recognition system developed by researchers at BGU.

VI. CONCLUSION

In this paper we have implemented how to interact with physical world using hand gestures. The system provides an interface that can easily get daily information by hand gesture recognition. The system is not only can apply in family environment, but also can apply in public. In public, every user can get information from this system by hand gesture, and the cost will cheap than touchpad. We are successfully retrieve daily information from web using hand gesture recognition system. The system is not only can apply in family environment, but also can apply in public. In public, every user can get information form this system by hand gesture, and the cost will cheap than touchpad. The system also suitable for the population that not familiar with computer that only learn how to posture the hand gesture. It will every helpful for the population. Our hand gesture recognition can integrate with other application such as interactive game, smart home, auxiliary equipment and industrial control. In our experiment, the hand gesture recognition accuracy rate is 93.1%, and every frame has between 0.1 and 0.3 second process time, and we have good fluency for controlling the system.

As future work, increasing the hand gesture recognition accuracy rate and improves the total speed of process is primary target, so that we can have less process time and do other algorithm calculation. We will add more hand gestures or add mechanism of operation by two hands. It will make control diversity. We will add user define hand gesture by himself that can set user's intuition hand gesture. We will add more service of information retrieval and it makes more choose and let users feel convenient.

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