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Image Processing on Eye Image Using SURF Feature Extraction

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ABSTRACT: Mobile cloud computing (MCC) is an integration of the concept of cloud computing and mobile computing. When user is able to access cloud services through mobile phone on the basis of pay as per the use then we can see there the use of MCC. As users store their data in the cloud security is an important issue. To overcome this issue the biometric identification method is proposed where eye image is used as biometric input. The image goes through some image processing steps required to extract its features. This paper proposed an algorithm required for image processing.

KEYWORDS: biometric authentication, eye image, feature extraction, image processing, mobile cloud computing.

I. INTRODUCTION

Cloud is a distributed computing which processes data distributed by virtualized manner [14]. When cloud consumer demands for the resources and computing infrastructure, cloud provides it to the consumers [11].

To provide optimal services for mobile users it is one of major mobile technology trends in the future [11]. Mobile cloud computing provides the advantages of both mobile computing and cloud computing. for the development of mobile applications the concept of cloud computing provides new opportunity since it allow the mobile devices to maintain a layer for user applications and shift the computation and processing overhead to the virtual environment [12]. Due to the availability of resources and services to access the MCC from anywhere at any time the security issues overcame. There are some common problems issued by MCC like privacy, personal data management, identity authentication, and potential attacks. The security issues are the major problems in the mobile cloud computing environment [2].

To solve such security problems an authentication method is proposed which is called as biometric identification method where biometric deals with the physical characters of the human body like fingerprint, palm print, retina scanning etc. In this research the eye image is used as a biometric input. Because it is difficult for unauthorized user to use someone's eye image for authentication and every individual has their unique eye feature which cannot be hacked.

II. RELATED WORK

For the secured authentication of user in mobile cloud computing author provide biometric authentication technique [3]. As a biometric input fingerprint image is used for which mobile phone camera is used as a biometric sensor to capture fingerprint image. When the captured image matched with the image stored in the database then authentication is provided to user. In [4] cloud storage identity is proposed based on fingerprint identification and mixed encryption to establish a secure communication. From web server user can login to the online cloud storage system. To extract fingerprint template from the database the authentication server provides an ID number to match the input fingerprint with stored one. This method increases the efficiency of cloud storage authentication and secure data transmission A retina pattern recognition and automatic person identification algorithm is proposed in [6]. The proposed method uses 3 steps. First is reference point detection, and then identify blood vessel intersection points and finally matching the intersection points. In preprocessing features of image extracted and then pattern matching is done. In [8] the biometric recognition system is proposed which is based on palm print features of user. The system uses Orthogonal Line Features (OLOF) extraction technique. In preprocessing the features of image are extracted and then matching of

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features with registered image is done. An algorithm for biometric key generation from fingerprint is studied by author in [10]. After studying it has improved it into a new key generation algorithm which is distance based, simpler and reduces the complexity of operations.

III. PROPOSED ALGORITHM

Following steps of image processing are required to extract features of eye image.

Step 1: Eye image acquisition.
Step 2: Green channel extraction of eye image.
Step 3: Detection of edges of eye image.
Step 4: Hough transformation implementation for line detection of eye image.
Step 5: SURF features extraction.
Step 6: Close image.

1. Eye image acquisition:
Eye image acquisition is done by using webcam of the laptop. User can give only eye image as input or if image of face is given by user, the algorithm can find and crop particular eye image from the face for further use.

2. Green channel extraction of eye image:
After getting eye image it is converted from RGB to Gray scale image. It is necessary to convert image because in gray scale image the nerves of eyes can be easily found [6].

3. Detection of edges of eye image:
Edge detection of the eyes is done for getting peak point of the eyes. The canny method is used to detect edges. The Canny method finds edges by looking for local maxima of the gradient of eye.

4. Hough transformation implementation for line detection of eye image:
It is used to detect peak points of the eye. Hough transformation is line extraction technique used for analysis of image.

5. SURF features extraction:
When one image is matched with other its features get matched with each other. These features can be intersection points of nerves of eye, maximum interest points of eyes etc. SURF called as Speeded-Up Robust Features technique is one of the method used for features extraction of the image. It is a faster method and also it is good at handling image with blurring or rotation. The SURF method can describes image efficiently to match with other image by finding the strongest points of interest [18].

IV. RESULTS

Figure 1 shows the frame containing all the options required for image processing. In figure 2 the eye image used is not very clear. Hence the strongest peak points detected are very few. The image used in figure 3 is clearer. Hence the strongest points detected by SURF method are more, which are helpful for efficient and good matching of user with the stored data of eye image in the database. In figure 4 the image used does not contain any eye coordinates. Hence the error message is generated.

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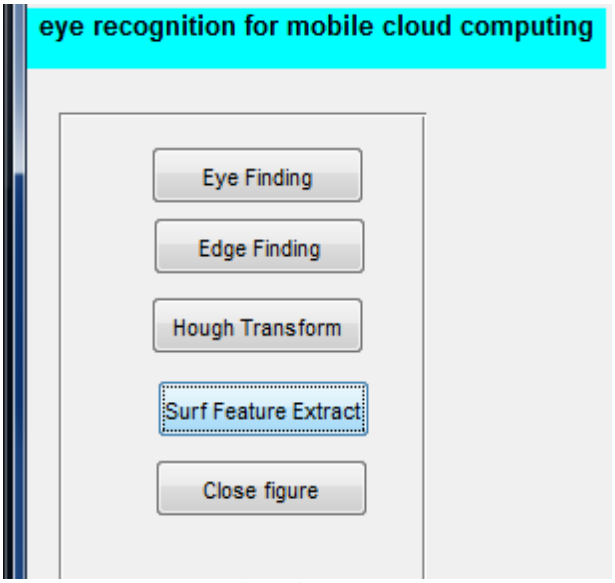

Figure1: Mainframe for image processing

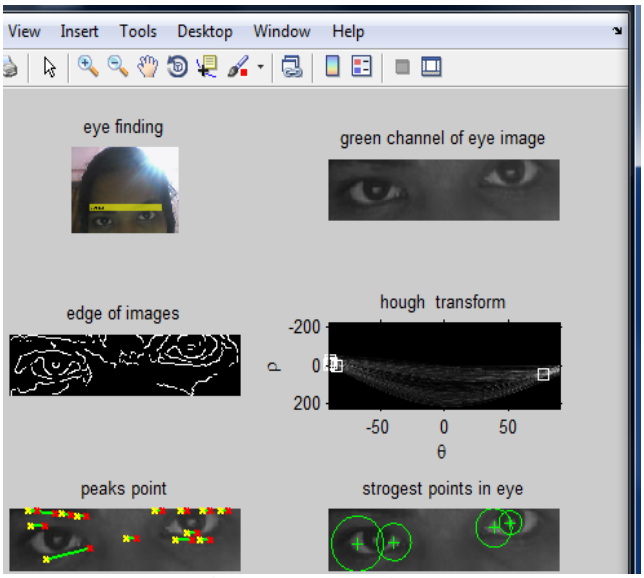

Figure2: Result of image processing of partially clear eye image

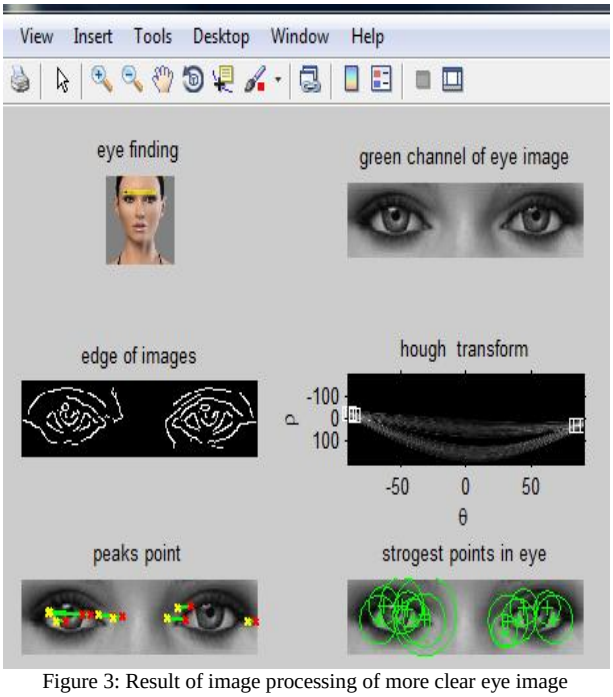

Figure 3: Result of image processing of more clear eye image

Figure 4: Result of image processing of image without eye coordinates

V. CONCLUSION AND FUTURE WORK

After taking results of image processing on eye images with different clarities we can conclude that for better performance of matching algorithm we have to consider eye images with more clarity. If the image is more enough clear the features extraction become easy, which can provide good results. With reference to the above image processing we will use this for matching the eye image of user with the image stored in the database for authentication purpose while accessing the mobile cloud.

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BIOGRAPHY

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