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GRAPHICAL CAPTCHA BASED BIOMETRIC AUTHENTICATION USING FINGER NAIL PLATE

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ABSTRACT

In today's surroundings the expanded level of powerful and high security control and exchange extortion in the realm of electronic and web business, requests for exceedingly secured ID and individual check frameworks. It motivate to client in selecting better secret word for high security. The proposed framework displays a coordinated assessment of the graphical secret key verification by utilizing powerful prompted click focuses, alongside the bio-metric validation utilizing finger nail plate surface to give high security in different application. It executes the graphical passwords plan to ad lib the trouble level of getting it alongside the bio-metric verification which is exceptionally advantageous and productive technique by obtaining low determination pictures of nail plate surface which is the furthest part of the nail unit. The form and surface qualities of nail plates from three fingers (Index, Middle and Ring) are spoken to by the appearance and shape based element descriptors. To actualize these we utilize the method of score level guidelines for combination and classifier based combination of coordinating scores by utilizing choice tree and bolster vector machine. This framework is give three abnormal state of security by utilizing client name with graphical secret word utilizing enticing prompted click focuses alongside bio-metric confirmation utilizing finger nail plate. The extent of the proposed framework is for abnormal state of security reason where it is essential to keep tight security like measurable labs, military application, managing an account application, regular citizen, and so on. The target of this framework is to present the new framework by consolidating two distinct confirmations and furthermore examines new bio-metric methodology which helps ID and check of a man.

KEYWORDS: Biometric Authentication, Graphical Password, Finger Nail Plate, security, Persuasive Cued Click-Point

I.INTRODUCTION

Automated personal identification and verification through biometric based system is becoming the need of networked society [3].Each biometric authentication has its strengths and weakness. There are various ways available authentication like token based authentication, biometric authentication and knowledge based authentication. But these entire authentications can not provide security alone where high security is required.because in textual password generally users create most memorable password which is easy to guess for attackers . And in biometric authentication there are various limitation in existing biometric devices for example in fingerprints and palm prints people unconsciously leave their fingerprint and palm prints wherever they touch an object. So that integration of two types of authentication system is needed to increase the high security level [1]. Proposed system motivates us to increase the security level by using two different authentication methods in combination like graphical password using PCCP with biometric authentication using finger nail plate. Among a number of biometric identifiers for human authentication task, the hand based identifiers have gained immense popularity due to their highly distinct characteristics [3]-[4]. the outermost part of the finger nail called as “nail-

plate” has emerged as a promising biometric candidate which has the potential to support personal authentication. The dermis and epidermis layer of the nail-bed which is an internal part of the nail organ just beneath the nail-plate forms a ridge and groove like channels that are observed on the nail-plate as longitudinal ridges [6]-[7]. These ridges on the nail-plate surface are highly unique and sufficiently specific to allow human distinction even in the case of identical twins [8]. Thus, the uniqueness of nail plate biometrics is completely dependent on the intrinsic or hidden physiological pattern of the nail organ. The cross sectional view of the finger nail and a magnified view of the inner nail bed structure are portrayed in Fig.1[9].

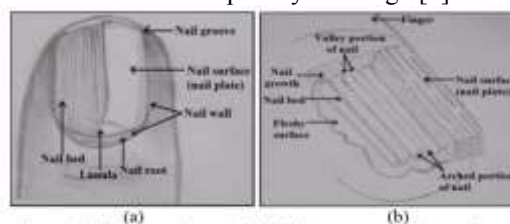


Figure 1. (a) The human finger nail and (b) the cross sectional view of the nail anatomy

This grooved spatial arrangement of the nail-bed has close resemblance with the anatomical structures that produce unique fingerprint patterns [9], which are utilized for the personal authentication.

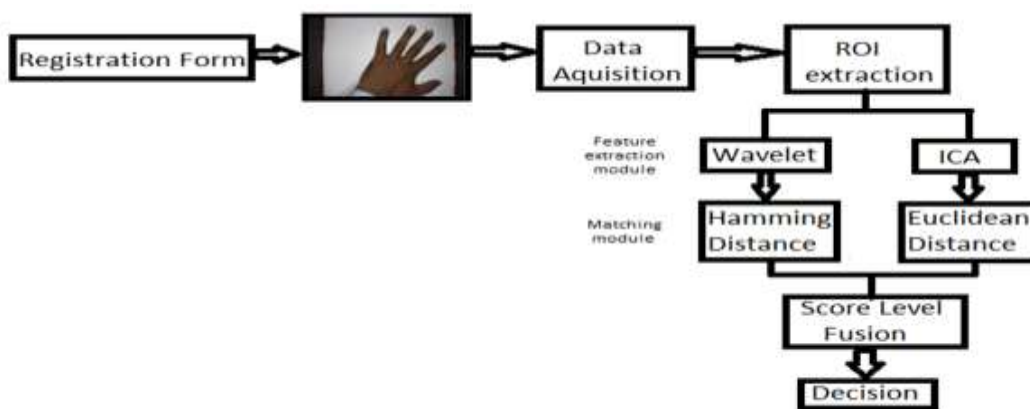


Fig2.Block diagram of biometric nail plate authentication system

II.Motivation:

Graphical password with Biometric authentication using finger nail plates motivates us to work on this because, There are various application where they required the highly secure authentication scheme for that there are various type of authentication which provides the security but out of them like textual password in that there is possibility to forget textual password by user and also can easily guess by attacker and also in biometric authentication there is some limitation in face, palm etc [2]. So this scheme motivates us to increase the security level of fooling the access control system by using three different authentication methods in combination like graphical password, textual

password with biometric authentication using finger nail plate.

The study of nail anatomy reveals that only the nail plate is regenerated as new cells are made, the spacing between the grooves of the nail bed remains constant over the entire life of the individual [11] And the structure or shape of nail plate surface is highly unique of the individual and also in case of different finger nails of the hand and also in twins [1]. Therefore we are using nail plate for biometric authentication.

In this we are going to use PCCP (perceived cued click point). PCCP is an effective method with system influence which reduce the hotspots and pattern formation attack which enables to user in

selecting more random and difficult to guess click point on image [1].

III. LITERATURE SURVEY

In Biometric authentication there are various biometric modalities in the literature such as retina, face, Iris, fingerprint/palm print, etc. but in hand based biometric scheme like in finger print [6] and palm print [5] the palmer part of the hand is more susceptible to spoof attacks and also people unconsciously leave their palm and finger prints on the object whenever they touch. And also in finger knuckle [7] which are more difficult to forge so gaining popularity and in face recognition the face features changes with the age of an individual and also the face characteristics are same in identical twins. And also in Graphical based password authentication Pass Point, Cued Click Points techniques are in literature. In Pass-Point [++3] graphical password consists of a sequence of 5 different click points on given image. To create password user can select any pixel in the image as a click point for their password. The drawback of this method is pattern formation in this password can easily be guessed by attackers because users form certain patterns to remember the secret code so that pattern formation attacks are easily possible and HOTSPOTS. In Cued Click Point [4] in that CCP scheme uses one click-point on five different images in sequence instead of five click points on one image. The next image displayed is based on the location of previously entered click point on the image. Drawback of this method is false accept (system can accept incorrect click point) and false reject (system can reject correct click point). This method reduced the pattern formation attack but HOTSPOT problem is still present.

IV. PROPOSED SYSTEM

The proposed system integrates graphical password with Persuasive cued click point along with Biometric authentication using finger nail plate surface. This system provides highly secure authentication in three levels: i.e. username then graphical password and third level is biometric authentication. In biometric authentication we extract the nail surface features from the middle finger because the middle finger gives the best results.

1) User Registration:

a. Textual Password:

Textual Passwords are like normal password authentication; it will accept username and password in the form of text (alphabets, numbers, special symbols, etc.)

b. Graphical Password using Persuasive Cued Click Points

The PCCP method uses a series of images for click point password creation [1]. Here, the user clicks on one point per image for a sequence of images. The next image is based on the previous click-point. In this proposed work, the user clicks on a sequence of five images. At the time of

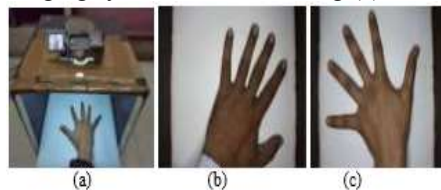
login phase images appear as per the random sequence. In the registration phase, the user selects 5 images from the image pool or local drives. Based on the image selection, the server generates the signature during registration. While users come to the login phase, they select images from the image pool based on the image selected during the registration phase, and then the server generates the new signature based on image selection. This proposed system provides higher security than other techniques.

In this proposed system, the application first generates the graphical password authentication system. In this creation of the application, the runtime images are added and existing database images are also considered for the registration process. It handles the user requests, responds to the user, and connects with the database. After the creation of the application in the database, the user enrolls the images in the image pool with user information. Then the user clicks the images in the database based on this process; the signatures are generated for each user. Then the authentication process is started to login users with images selected by the user in the image pool. In the next step, the newly generated signatures are verified with the registered signatures. If it satisfies, then the user is authenticated; otherwise, the user is eliminated.

2) Nail Plate Authentication:

a) Region Of Interest:[9]

The dorsal part of the user's hands is exposed to a digital camera using an imaging system as shown in Fig. (a).



The unconstrained acquisition setup presents a lot of rotational and translational variations as shown in Fig. (b)-(c). Therefore, the hand dorsal images are first subjected to stringent processing steps which automatically extract the finger nail-plate images as the region of interest (ROI) while minimizing the rotation and translation variations of the hand.

To obtain properly aligned nail-plate ROI, the hand dorsal images are first subjected to pre-processing steps which include:

- (i) hand localization
- (ii) Locating the hand extremities via finger tips and valleys.

- (iii) Global hand registration scheme to accommodate rotation and translation variations, and
- (iv) Finger decomposition

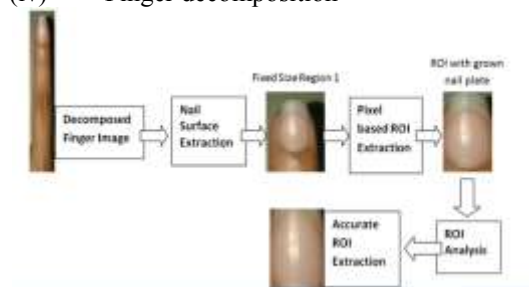


Fig: ROI Extraction

b) Feature Extraction

We compare training and testing image i.e.(Extracted nail images) by using RGB values of respective images. we calculate Euclidian distance to check similarities between images, and it is calculated by using RGB values of respective images then we take static threshold value as 10 then we compare Euclidean distance of images with threshold value if distance is greater than given threshold value then it is considered as imposters i.e. unmatched features.

Number of imposters is counted and number of genuine features i.e. matched features is calculated by,

- Total number of elements in pixels = 6400

-Total number of Genuine = 6400-imposters

If genuine count percent is greater than 50% then the User is Authenticated otherwise Denied

c) Score Level Fusion

The score level fusion techniques applied on genuine and imposter matching scores from three nail plate regions of an individual (ring, middle and index) gives significant performance improvement compared to individual representation. The product rule is found to be the best performing rule with highest verification rates. We have also implemented recognition for all three nail-plates and their fusion using product rule.

CONCLUSION

In this system, users first choose an image and then select single image to click-draw their secrets. At the time of login phase this image will appear. For registration, user selects an image from the image group. Based on the image selection server can generate the signature during registration. While user coming to authentication phase, first step select image from the image pool based on image selected by registration phase and server can generate the signature based on image selection. Second step verify the registration signature with newly generated signature otherwise abort the user.

This proposed work provides higher security than other techniques.

This paper presents a novel and fully automatic nail plate based authentication system. The ridge pattern on the finger nail plate surface has high stability over entire lifetime and is highly unique for every individual [9]. To investigate the capability of the nail plate as a biometric identifier on three nail (ring, middle, and index finger) plate surface images shows the potential and individuality of this new biometric identifier which can be applicable in highly secured areas like military, banks and forensic applications in the near future of biometrics. The score level fusion techniques applied on genuine and imposter matching scores from three nail plate regions of an individual (ring, middle and index) gives significant performance improvement compared to individual representation. The product rule is found to be the best performing rule with highest verification rates. We have also implemented recognition for all three nail-plates and their fusion using product rule.

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