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# Invisible Touch Screen Based PIN Authentication to Prevent Shoulder Surfing

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***Abstract:*** ***The most important kind of authentication used is PIN authentication which is simple, effective and usable, but this kind of authentication sometimes becomes prone to an attack known as shoulder surfing. Shoulder surfing refers to a direct observation, such as looking over a person's shoulder to obtain information. The previous work was done with the visibility of the PIN, but here we propose an innovative way to authenticate user by providing PIN to the system which won't be visible to an attacker but will be known to the actual user who is drawing it on a touch screen device.***
***Keywords: Learning mode, Recognition mode, Shoulder surfing, Authentication, Touch Screen***

## I. INTRODUCTION

Validation is any procedure by which a framework checks the personality of a user who wishes to get to it. Since get to control is typically in view of the character of the user who demands access to an asset, Authentication is basic to compelling Security. Authentication may be implemented by using credentials, each of which is composed of a User ID and Password. Alternately, authentication may be implemented with smart cards, an authentication server or even a Public Key Infrastructure. Users are frequently assigned (with or without their knowledge) passwords, which are used to track their authentication. This helps various systems to manage access control without frequently asking for new authentication information.

In this system, the authentication is done by drawing the patterns for characters on the touch screen device. The current system is about character recognition where the patterns are been drawn as a PIN on the touch screen device and the user is authenticated and based on this authentication the user is given access to the system. Basically, the user is authenticated after insertion of patterns on the touch screen device. The recognition of characters can be done in two modes i.e. static mode and dynamic mode. In dynamic mode, user writes his/her content in a digitizing tablet, which acquires the characters in real time. Another possibility is the acquisition by means of stylus-operated PDAs. Dynamic recognition is also known as "on-line". [1], [2] Some of the performance metrics are usually been used at the time of calculation of such systems. These are few performance measures: False Acceptance Rate (FAR), False Rejection Rate (FRR), Receiver Operating Characteristics (ROC), Equal Error Rate (ERR), Failure to Enrol Rate (FER), Failure to Capture Rate (FCR).

The main thing in Invisible PIN authentication is that the pattern which is been drawn on the touch device will not be visible to anyone. As the name suggests here in this system there will be a use of touch screen device for drawing the PIN with the help of stylus. The touch screen will be connected with the hardware unit where the detection of the co-ordinates will be done. This will then transfer to the PC software and will be processed through two modes i.e. Learning mode and Recognition mode as said earlier. The current error rate of the system is too high, so with this another important aim is trying to make the error rate as low as possible.

### *A. What is Shoulder Surfing?*

Shoulder surfing is an immediate perception procedure, investigating somebody's shoulder, to get qualification points of interest . Shoulder surfing is a least demanding approach to get data in places where the vast majority assemble in light of the fact that it's generally simple to remain alongside somebody and see as they round out a shape, in an ATM framework while entering a PIN number at an ATM machine, or utilize a calling card at an open pay telephone. Shoulder surfing should be possible long separation with the guide of binoculars or other vision-upgrading gadgets. To avert bear surfing, specialists prescribe that you shield printed material or your keypad from see by utilizing your body or measuring your hand.

## II. LITERATURE SURVEY

Siddhesh Ashok Vaidya; Varsha Bhosale, [1], "Invisible touch screen based PIN authentication to prevent shoulder surfing". The previous work was done with the visibility of the PIN, but here we propose an innovative way to authenticate user by providing PIN to the system which won't be visible to an attacker but will be known to the actual user who is drawing it on a touch screen device. This will help in reducing the effect of the shoulder surfing attack.

Toan Van Nguyen, Sae-Bae. Napa, Nasir. Memon,[2] "Finger Drawn PIN Authentication on Touch Devices". Stick confirmation is broadly utilized because of its effortlessness and convenience, however it is known to be powerless to bear surfing. In this paper, we propose a novel online finger-drawn PIN confirmation procedure that gives a client a chance to draw a PIN on a touch interface with her finger. . The framework gives some flexibility to bear surfing immediately and many-sided quality by utilizing both the PIN and in addition a behavioural biometric in user confirmation. Our approach embraces the Dynamic Time Warping (DTW) calculation to register disparity scores between PIN tests.

Data Genetics, "PIN Analysis"[5], A data set of 3.4 million pins was used. The initial two digits are on the even end; the second two on the vertical end. That flawlessly slanting yellow line streaking crosswise over it demonstrates the recurrence of 1111, 2222, and so forth. Information Genetics did the math (in light of "discharged/uncovered/found secret word tables and security ruptures") utilized as a part of the realistic.

Shoulder Surfing Attack in Graphical Password Authentication, Arash Lashkari, Dr. Omar [6], Information and computer security is supported largely by passwords which are the principle part of the authentication process. The most well-known PC validation strategy is to utilize alphanumerical username and watchword which has huge downsides. To defeat the vulnerabilities of customary strategies, visual or graphical secret word plans have been produced as conceivable elective answers for content based plan. A potential disadvantage of graphical secret word plans is that they are more helpless against bear surfing than traditional alphanumeric content passwords.

## III. PROPOSED SYSTEM

The proposed system aims at detecting the valid user based on the PIN drawn on the screen from the database.

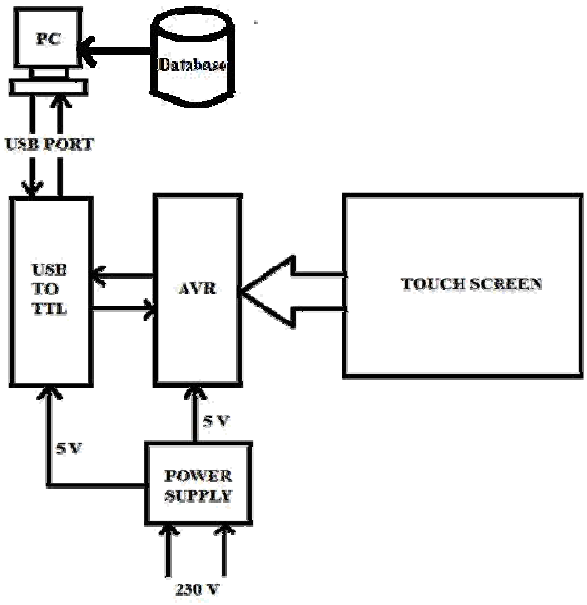


Fig. 1 Block Diagram of the proposed system

This block diagram depicts all the components of the proposed system. It has the following major activities:

*1)* Registration
*2)* Learning mode
*3)* Recognition mode
*4)* Showing status of the pattern
*5)* Showing the pattern drawn
*6)* Showing PIN after the pattern drawn

## IV. ALGORITHM

Slope based curve matching algorithm

*A. Draw pattern on touch screen resistive interface*

Here user will draw pattern on the touch screen device and that pattern will be stored into the database.

*B. Co-ordinate generation on the basis of the pattern drawn*

The co-ordinates of the drawn pattern will be generated.

*C. Storing of co-ordinates in array*

All the co-ordinates of the drawn pattern which are generated will be stored into the array.

*D. Filter unwanted co-ordinates*

The array in which the co-ordinates are stored will be deleted if some of the points are not necessary.

E. Calculate slope from the above process:

From the achieved co-ordinates the slope will be calculated.

*F. Perform normalization*

Here, reduction or expansion of that particular co-ordinates is being performed. Therefore, on this basis the valid user will be displayed.

Formula: $m = (y2 – y1)/ (x2 - x1)$

## V. METHODOLOGY

The proposed system consists of the user registration, verification, drawing of pattern and database.

*A. Phase – I: Learning Mode*

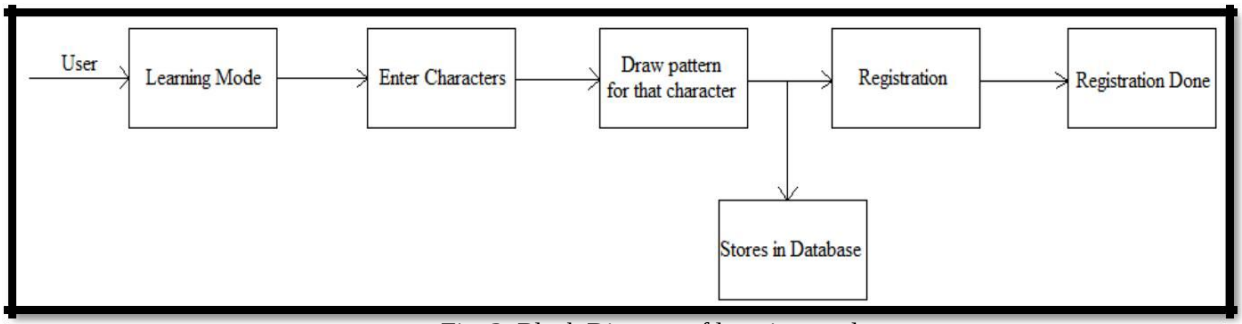


Fig. 2 Block Diagram of learning mode

In general, when user enter into the system, user can not gain access to the system without registration. Our system will work on same principle. First, user will have to first register into the system otherwise system will display the message as “User is not registered”. After the registration, in learning mode user first types the character and make the system learn that character by drawing particular pattern for it and the maximum PIN requirement which is been mentioned in the system is of length four. After completion of drawing PIN, the user can register himself to the system i.e. his credentials will be stored in the database.

*B. Phase – II: Recognition Mode*

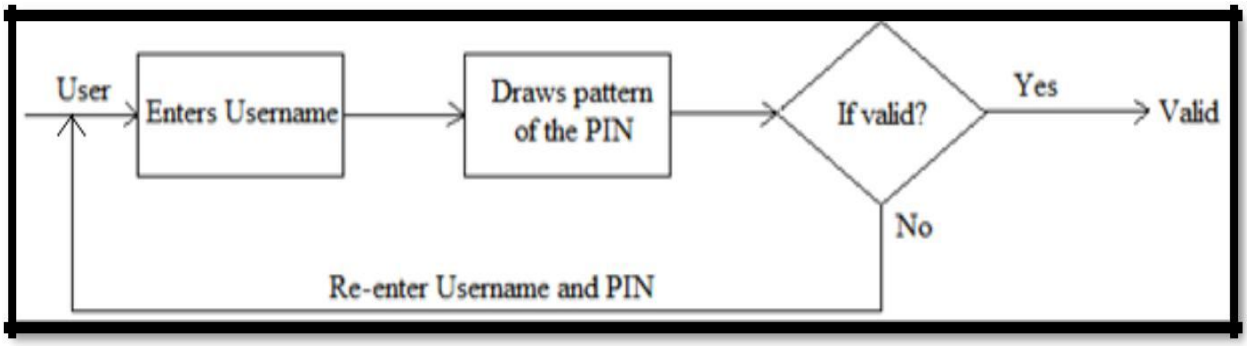


Fig 3 Block Diagram of Recognising mode

In this phase, the user will try to access the system. The is basically the authentication phase. The user will enter his username and for PIN, a pattern will be drawn on which the conclusion will be drawn whether the user is valid or invalid. If user is valid, the message will be shown as "User is Valid" and if the drawn pattern does not matches with the pattern drawn previously at the time registration then the access will be denied and the message will be displayed as "Re-enter username and PIN" .

## VI. CONCLUSION & FUTURE WORK

*A. Conclusion*

PIN authentication is becoming more and more important in the modern world. Thus in this work we have tried to reduce the level of shoulder surfing attacks by implementing the strong system. In this, the user will be authenticated on the basis of the pattern drawn for the character mentioned and if user is valid then will be given access or access will be denied. Therefore, we are also providing a secondary level security so that even knowing the PIN no attacker can get access.

*B. Future Work*

The proposed work can be further applied in ATM, lockers, automatic doors etc. Thus, this can be applied in the field of image processing. The patterns which are been drawn can be saved in the form of images and then the images can be inserted as a PIN to gain access to the system. This system can also be more enhanced by providing gesture to the screen and based on those gestures the user can also be validated.

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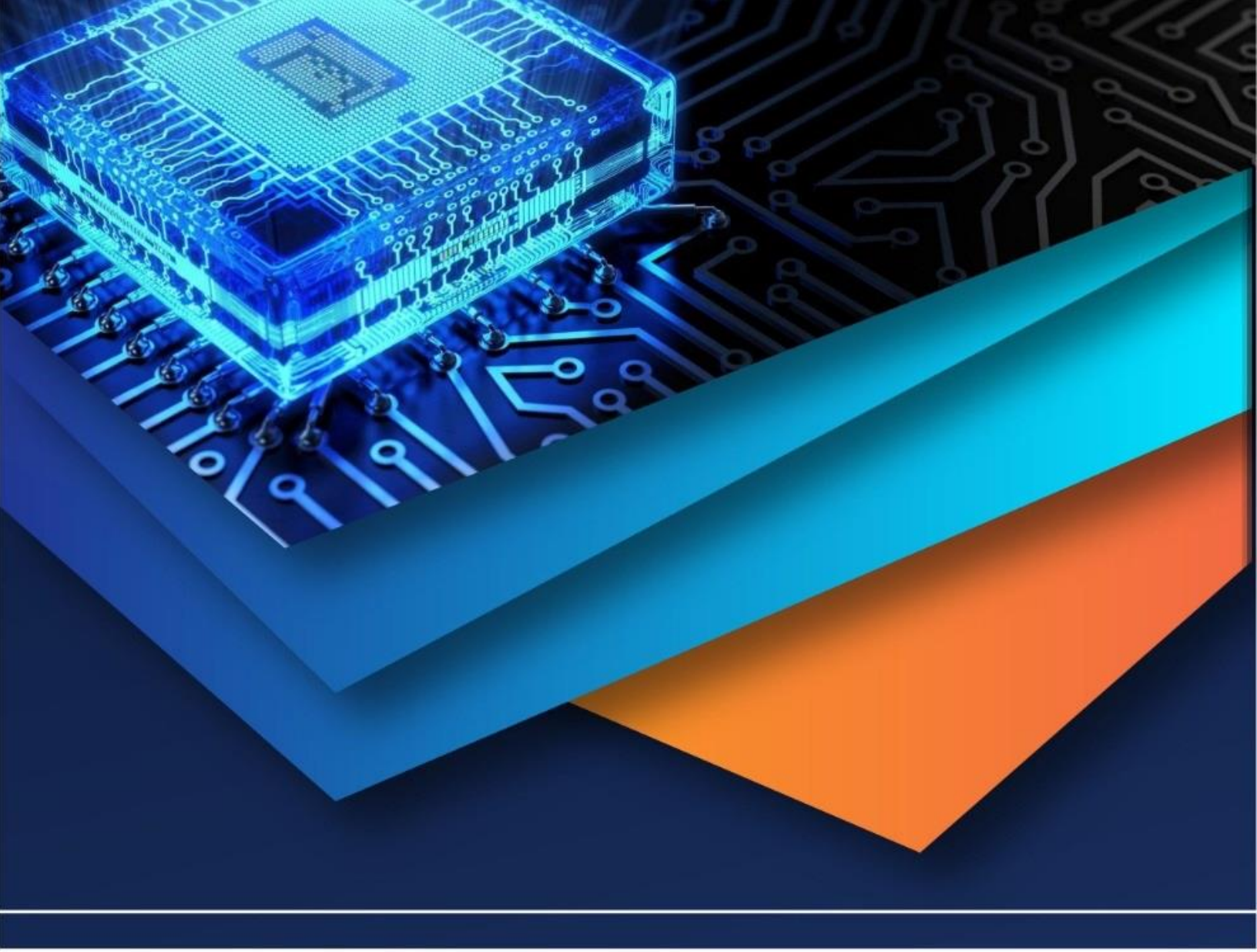

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