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A Survey On Keystroke Authentication By Using Local Search Algorithm

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Abstract

In now a days Password authentication plays a vital role typing biometrics as a transparent layer of user authentication for security. Keystroke authentication provides security to the applications like electronic mail, banking and any other web services etc., There are several types of techniques to protect our passwords but it can be easily hacked by the hackers through so many algorithms. By using keystroke authentication we can provide security to the applications. Our research focuses on by using individual's typing pattern we can measure the time period between keystrokes. By using the weights of a fully trained Multi Layer Perceptron (MLP) the typing pattern of a particular individual can be represented in the recent .In this paper i want to propose alternate algorithm similar to k-mean algorithm. Each user's typing pattern can be viewed as a cluster of measurements that can be differentiated from clusters of other users.

Keywords—Authentication, eystrokeauthentication, local search algorithm, multilayer perceptron network.

I. INTRODUCTION

In these days the security of computer access is rely important because a lot of electronic transactions are executed every day via internet in shopping, banking etc., By using Biometric system we can identifies a user or verifies the identity based upon the measurement of his/her unique physiological traits such as face[1],palm[2],iris,or behavioural characterstics like voice[3] ,handwriting[4],signature[5],keystrokedynamics ,physiological biometics is biological/chemical traits that are innate and behavioural biometrics are mannerisms or traits that are learned or acquired.

Biometrics based on typing patterns are different in that. It is very cheap to implement, more distributed and more unobtrusive than conventional biometric procedures. Because It simply require a collecting data on a persons typing patterns keyboard and to collect data by using software. This is relatively cheaper than other conventional methods like iris technology and finger print technology. Most current computer access systems use a username and password to authenticate users trying to log-in. secrecy of the username and password is most important in this method of authentication. Authentication means the process of identifying an individual, usually based on a username and password. In security systems, authentication is different from authorization, based on the identity giving system objects to individuals[6].Authentication merely ensures that the individual is who he or she claims to be, but says nothing about the access rights of the individual.

Keystroke analysis is a behavioural biometric deals with by typing rhythms of the individuals typed for the user. To improve the security of a Standalone application a new methodology has been proposed by which the keystroke Analysis can be combined with the existing authentication Mechanisms through keyboards.

Keystroke dynamics, or typing dynamics,gives the complete timing information that describes exactly at what time each key was pressed and at what time when the key was released as a person is typing at a computer keyboard.

II. LITERATURE SURVEY

In the past the user name and password is typed by the user. This information is taken by the computer and the information can be compared in the database. If the information present in the database and the information provided by the user are found to be the same, then the user is to be accessed. If the information provided by the user does not match with what is present in the database, then the error message is displayed to the user.

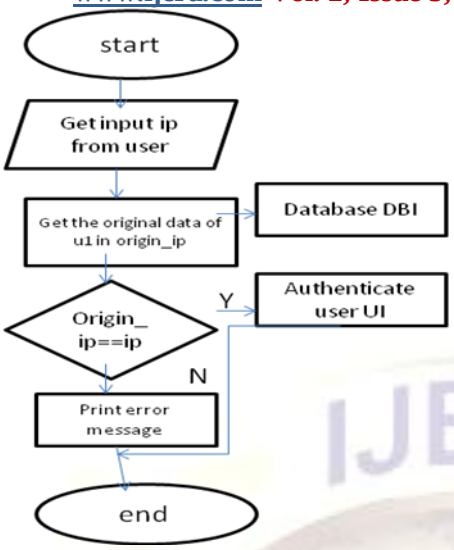

FIG 1.Existing user authentication system[7]

III. LITERATURE SURVEY

1.THE MULTILAYER PERCEPTRON NEURAL NETWORK MODEL

The below fig shows the multiperceptron neural network consists of three layers

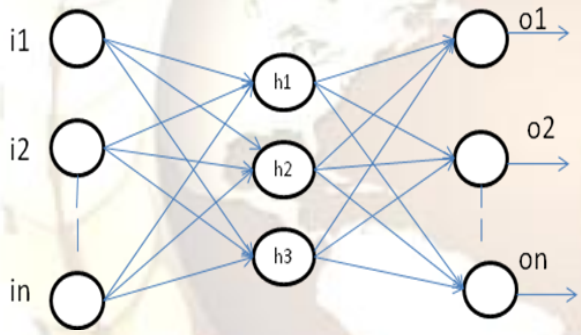

FIG 2.MULTIPERCEPTRON NEURAL NETWORK[8]

This network has three layers they are input layer (on the left) with three neurons, one hidden layer (in the middle) with three neurons and an output layer (on the right) with three neurons[9].

A neuron is present with a predictor variable in the input layer. In the case of categorical variables, To represent the *N* categories of the variable, *N*-1 neurons are used.

Input Layer —In the input layer A vector of predictor variable values ($x_1 ... x_p$) is presented. The range of each variable is -1 to 1. It distributes the values to each of the neurons in the hidden layer. In addition to the predictor variables, there is a constant input of 1.0, called the *bias* that is fed to each of the hidden layers; the bias is multiplied by a weight and added to the sum going into the neuron.

Hidden Layer —Iin the hidden layer a neuron has to be arrived from input layer, the value that are arrived from each input neuron is multiplied by a weight (w_{ji}), and the resulting weighted values are added together producing a combined value u_j. The weighted sum (u_j) is given to a transfer function, σ, which outputs a value h_j. The outputs from the hidden layer are given to the output layer.

Output Layer — In the output layer the neuron has been arrived from hidden layer, the value that we are getting from e hidden layer neuron is multiplied by a weight (w_{kj}), and the resulting weighted values are added together producing a combined value v_j. The weighted sum (v_j) is given into a transfer function, σ, which outputs a value y_k. The *y* values are the outputs of the network.

2. BACK PROPOGATION ALGORITHM

To train a neural network we need to perform some task, for that we must adjust the weights of each unit in such a way that the error between the desired output and the actual output is reduced [10]. In order to reduce the error the process requires the neural network to compute the error derivative of the weights (EW**)**. , the process must calculate how the error changes as each weight is increased or decreased slightly to calculate the error derivative of weights(EW) back propogation algorithm is the efficient one.

if all the units in the network are linear back-propagation algorithm is easy to understand. The algorithm computes each **EW** by first computing the **EA**, the rate at which the error changes as the activity level of a unit is changed. For output units, the **EA** is simply the difference between the actual and the desired output. To compute the **EA** for a hidden unit in the layer just before the output layer, first we identify all the weights between that hidden unit and the output units to which it is connected. We can multiply those weights with the **EA**s of those output units and add the products. For the chosen hidden unit this sum equals the **EA** . we can compute in like fashion the **EA**s for other layers, After calculating all the **EA**s in the hidden layer just before the output layer moving from layer to layer in a direction opposite to the way activities propagate through the network. This is what gives back propagation its name. Once the **EA** has been computed for a unit, it is straight forward to compute the **EW** for each incoming connection of the unit. The **EW** is the product of the EA and the activity through the incoming connection.

3. MODIFIED K-MEANS ALGORITHM:

The clustering problem can be stated as follows. Given p patterns in an n dimensional metric space, determine a partition of patterns into K groups, or clusters. For the purposes of this experiment the number of clusters is set to two. The modified K-means cluster algorithm is as follows[11-14] .

1.By selecting two points as the centroids of the respective or same cluster select an initial partition with 2 clusters .

2.Based on the allocation function generate a new partition by assigning each pattern to a cluster a point is allocated to a cluster if it is closer to the centroid of the cluster and The distance is measured using the particular metric being considered.

3. Based on the representation scheme we can compute the new cluster identities (centroids). This is known as weighted average of the reciprocal distances.

4. Repeat steps 2 and 3 until we get a near optimum value of the cluster criterion is found. To allow different metric space It is the square error criterion to be modified.

5. Repeat steps 2 to 4 until cluster membership stabilizes.

6. Perform steps 1 to 5 for 100 repetitions and record the resulting clusters. The cluster configuration with the most occurrences is considered to be the correct partition of the data set.

For classifying the typing patterns Eight metrics were to be investigated in order to explore the effect of different metric spaces. Some of the metrics was of the correlation type, e.g. Correlation Coefficient and Kendall's Correlation Coefficient. Others are more intuitive measures of distance, e.g. Euclidean and City Block. There were also non-linear metrics, e.g. Minkowsky, Camberra, Chebyshev andQuadratic. The most successful metric was found to be the Camberra Metric.

IV PROPOSED SYSTEM

LOCAL SEARCH ALGORITHM:

For solving computational problems Local Search is one of the optimization method. LS moves from candidate solution to a neighbouring solution interatively, we have applied this fundamental methodology on the multi-layer ENN. We define a vector V whose elements include all adaptable parameters (weights between all layers and thresholds of each neuron) as

$$V = (w11 , w12 ,...wij ...,\theta 1 ,\theta 2 ,...,\theta i ,...)$$

By using local search algorithm the error function can be minimised. It performs the local search iteratively and minimizes the error measure function along with the set of decent directions directly. The current iteration is not a stationary point Sufficient search directions are included to guarantee, By this we can find the nearest minima efficiently. Furthermore, the learning is performed by simply changing the weight and threshold vectors by a small positive or negative constant, and accepting the change if it produces a smaller error measure.

This is simple to specify and implement in hardware applications for the following reasons: As a direct search method, no back propagation pass is needed and only a forward path is required. no bidirectional circuits and hardware for the back propagation are needed, in terms of analog implementations. To generate the derivative no complex analog multipliers and other analog computations are needed.

V. RESULTS & DISCUSSION

These are results by using multilayer perceptron network and k-means algorithm similarly we get approximate result by using local search algorithm. Similarly we get the best results by using alternate training networks.

However results of individual person was accumulated and the average rate of correct classification for both methods and representation were to be calculated.It seems to be huge difference in the rate of different users.

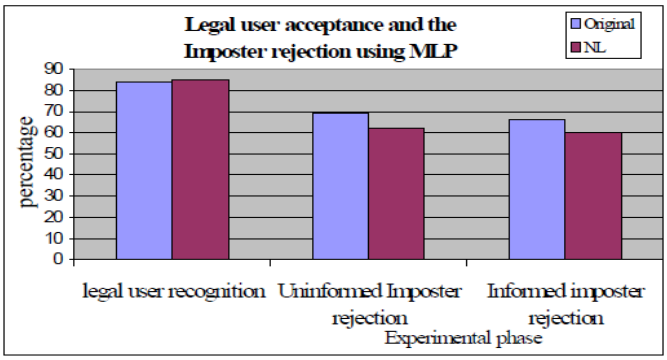

FIG 3.Authentic user recognition and Impostor rejection using MLP[15]

For example,among all users, some of the users managed to achieve 100% acceptance but some of the users accomprised less than 50% acceptance. This implies that observation would be the impose rejection rates as well. Moreover average acceptance rate for the legal user was found to be 84% and85%.

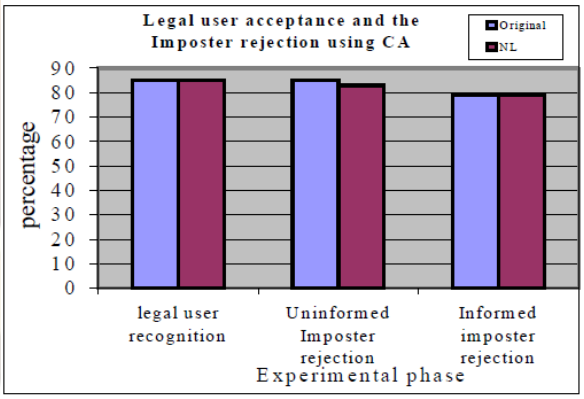

FIG 4. Authentic user recognition and Impostor rejection using clustering Algorithms[15]

By observing the graph, it can be seen that the impostors were able to better act on the legal users after having observed legal users keying in their respective passwords. For cluster analysis, we found that there was a slight decrease in the rejection rate of the impostor when the subject observed the authorised user's typing pattern.

As far as concerned the ongoing research biometric typing could not replace the accuracy of user identification using passwords. It is due to the fact that variation in one's typing patterns based on the factors such as users mental situation example tiredness or physical injury. This shows that the analysis of the data and last interval definitely have standard deviation than compared to other measurements.

The research also shows that the observation that users tended to wait for a variable time interval before pressing the return key.

VII CONCLUSION & FUTURE SCOPE

The proposed paper shows that keystroke is a special kind of biometric which can be used as special features for an additional and transparent layer for user authentication. It also investigates the use of local search algorithm for a detection method for keystroke patterns.

We can enhance the local search algorithm by adding special features to overcome the difficulties that the local search algorithm is suffering. By using alternate algorithms .and training networks we can get the best security keystroke mechanism.

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