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Identification and analyzing Palm Print in Biometric Authentication System using Neural Network

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Abstract

Security plays an important key role in our day today life most of the important transactions are done through online. Initially the personal identification was done by using user identification number and password. But the hackers easily retrieve the user identification number and passwords. Sometimes the users also forgot their password. To avoid this type of problems biometric authentication method was introduced. It means check the personal identification with the help of human body parts. The important biometric identification methods are fingerprint identification; palm print identification, voice identification, iris identification etc. this biometric identification is more secure than other security mechanisms. Because each individual person have unique threshold value. The same pattern is not repeated again. This paper analyzes the palm print with the help of Artificial Neural Network concept. This concept is mainly used for classify and match the data with stored data.

Keywords:*Palm Print Identification, Neural Network, Preprocessing, Classification, Pixel Matching.*

I INTRODUCTION

From last decades onwards biometric identification has been used in various places for personal identity. Password identification is one of the oldest identification methods. It is not secure. The hackers can easily break the password protection. Biometric authentication and identification is more secure than password protection method because each person has a unique biometric value and individual people can be identified by their own physical features. Biometric authentication technology is used to access control and the authentication or recognizing each individual. The important biometric authentication methods are used in real time applications like voice identification, fingerprints, retina part in the eyes, facial value, palm print images etc. Automatic authorization and identification is play major role in various applications. Authentication is very important in various fields such as banking, ecommerce, ATM, passport verification, checking licenses and debit and credit card. Biometric authentication process can be divided into two stages. In the first stage biometric value can be captured from an individual and stored on the database. In the second stage indentify each individual by using stored data. The major advantages of Biometric authentication are no one stolen or forgot the password value and it is easily measured by using simple devices. It should be provide accurate result compared with existing methods. Uniqueness is the another important benefit of the biometric authentication ie., the same features won't have two peoples.

From the various biometric approach palms print identification is one of the important approaches. This identification has more advantages than other biometric authorization. Finger print fake images are easily created by the hackers. But making a fake palm print is very difficult task. Because the texture value of the palm print image is more complex. This area consists of variety of features like geometry feature, wrinkles, delta points, principal lines and minutiae features the following figure 1 shows the important features of the palm.

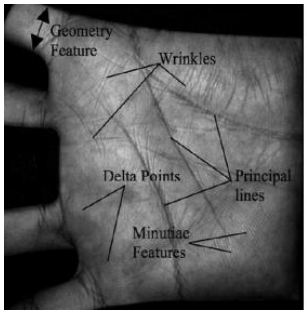

Figure 1 Palm print features

These complex features and patterns are used to identify the individuals easily. Each individual have their own palm print pattern. Even twins palm print may be also unique. One type of the pattern cannot be repeated again. Palm print authentication system uses low or high resolution images. Mostly all the systems are using the low resolution pictures for personal authentication.

An ANN(Artificial Neural Network) is one of the important data processing model. It contains extremely interlinked processing essentials. The reason for using ANN concept is to find the proper meaning from the complicated data and it has a skill to lean to do the various processes on the given data for training time. This ANN concept is mainly used for classification and similarity checking purposes.

The second section of this paper reviews the various palm print identification system. Section three represents the proposed architecture system used for palm print identification. Section four discuss about result part. In section five concludes the proposed system.

II LITERATURE REVIEW

Divya Pirale et al., says that Biometrics is one of the technology used for analyzing biometrics data. The existing method used for personal identification is password. But it does not provide better security. To increase the security level biometric identification methods are introduced. Biometrics authentication is more secure and easy to maintain. The major guideline of the biometric identification is to identify the authorized person and reject the unknown person. The main objective of the biometric identification is to find the features belong to the specific person or not. Here the authors reviews various techniques used in biometric identification with the help artificial neural network [1].

Mamta Dewangan et al., said that palm print identification is used in various places for identification and authorization. It has also used in the civil cases and access control related applications. Initially researchers capture the palm print images, preprocess it, extract the features and matched with existing stored image. Here the authors overcome the various problems face in each stage of palm print identification [2].

Krishneswari et al., said that palm print is the famous physiological biometric identification method because palm print images are stable and unique features. In this area various research activities are ongoing. In this research article the authors discussed about research activities to reduce the problems in various stage of palm print identification. In this study palm print identification process has been divided into four stages. The stages are palm print image capturing stage, Preprocessing stage, Feature extraction stage and Palm print comparison stage [3].

Shameem Fathima et al., explained about palm print biometrics authentication methods. Palm print identification is more secure because it contains unique features. In this method the palm prints are collected in real time and compared with existing stored data. If the features of stored image and captured images are equal it provides positive output. In this research article the authors used left and right palm print pictures of an individual person to analyze the data. The features are extracted with the help of Gabor filter. For classification neural network technique is used because it has an ability to be trained critical input and associations. Connection network weigh is involved in the learning

process. Here back propagation concept is used for classification and comparison. This method generates better accuracy level compared with other neural network methods [4].

Vivek kr. Sharmaet et al., explained about the importance of biometrics authentication methods. It assists to recognize peoples based upon their physiological and behavioral features. Different physical features like retina images, iris pictures, fingerprint images, palm print images; facial images etc. are used for identification purposes. Palm print identification involves the different features of palm images. The important features used in the palm print identification are principal lines on the palm, wrinkles and creases on the area of the palm. This palm print identification is more secure because no two people have same pattern of palm print. The main benefit of the palm print identification is mostly palm print is in stable manger up to the entire life of the people [5].

Michał Choraś et al., says that palm print identification is efficient authentication method. . In this research paper the authors presented, a novel concept to extract features for palm print identification. In this research work features are retrieved from hand geometry images and palm print pattern and fused value. The usage of fusion feature is to provide better level of accuracy. The important contribution of the proposed system is to improve accuracy level with less complexity [6].

P. Vijaya Kumar et al., explained about image classification concept. It is the procedure of analyzing the images with the help of numerical values. Image classification process consists of training and testing phases. The important steps used in this process are preprocessing images, identify ROI area, feature extraction and apply neural network technique. Palm vein identification is very useful technique in biometrics. The final output is used in various applications [7].

Amit Taneja et al., explained about the importance of biometric identification in current scenario. Biometric authentication method is widely used for personal identity. In this paper the authors used palm geometry for identification. Dimension values of palm print are called hand geometry. The main objective of the palm print identification is to check whether the two features belong to the same individual or not. This identification system is mainly used in access control applications, attendance and time management [8].

Pooja et al., says that biometric identification is the fastest developing area because the necessity of high level security. The palm print features are unique, so each palm prints are identified in easier manner. Because of the uniqueness of the palm print it will become more popular. The convenient methods of palm print identification are PCA, SVM and Linear Discriminant Analysis approach. In this paper the authors proposed a new identification system using the combined technique of PCA and LDA. ANN concept is used to train and test the given data set. The experiment result shows the efficiency of the proposed system [9].

Sajedi, et al., discussed about the uniqueness of the palm print features. This is the most important research area in this current situation. In this paper the authors used contourlet transform is used to extract the various features from the palm print images. This proposed method contains three steps, preprocessing stage, extract features and classify using various machine learning concepts [10].

III PROPOSED SYSTEM

Palm print identification is one of the important biometric identification. In olden days the applications are protected with the help of user identification number and password. But it does not provide more secure. The hackers easily extract the password and user identification number without the knowledge of concern users. To avoid such kind of issues biometric identification concept was introduced. This paper proposed a new model used for palm print identification by using neural network approach. This neural network approach is used to classify and compare the images. The following figure 2 shows the block diagram of proposed system.

Figure 2 Block diagram of Proposed System

The first process of the proposed system is capture palm print images in real time. The captured image is preprocessed by using various data mining techniques for removing unwanted data. The next stage is to identify the ROI (Region of Interest) area of exact features. In this stage the unwanted image parts are removed. Then ROI image is compared with stored palm print images. If the captured image is matched with the stored image the person identification is in accepted stage. Otherwise it produces negative result. Neural network concept is used in the comparison stage for proper comparison.

IV RESULTS AND DISCUSSION

Palm print identification is one of the important biometric systems. Normally the palm print values are stable through the entire life of the human being. For that reason most of the applications prefer biometric identification. In this proposed system is divided into various stages. In the first stage the real time data is captured from the people. Then apply various preprocessing concepts to remove unwanted parts of the captured images. The technique pt of a ROI is used in many application domains like medical imaging domain. Here the edge level can be identified for the usage of calculating the size of tumor. The following figure 3 shows the sample interface for capture palm print in real time.

Figure 3 : Sample output

The various attributes of human hand can be used in biometric authentication. The important attributes are shape of the hand, finger length, finger width and hand size. In some situation environment factors also consider. The important environmental factors are dry hand or wet hand. The main benefit of this proposed authentication system is easily embedded with other devices. It takes the input from training samples. These samples fed into the network and the classified samples are the output of the system.

V CONCLUSION

Biometric identification systems are mainly used to identify individuals and control access roles to various applications. Several types of identification methods are used to identify the individuals. Each biometric system has its own advantages and disadvantages. This proposed system is used to identify the peoples with the help of their palm print. It is the common and famous security system. The hackers are not able to hack the peoples palm print, because it is unique in nature. The captured image is compared with the stored database. Here neural network concept is used for better classification and comparison. If the captured images are matched with stored image it provides positive result or it provides negative output.

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