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Static Signature Verification and Recognition Through Artificial Neural Network

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ABSTRACT

For person identification, signature has always been a discriminating feature. Currently, due to advancement there is an increase of authorization via signatures for transaction, especially in the field of finance and business. Therefore, automatic signature verification and recognition should be developed if authenticity is verified and guaranteed successfully on regular terms. Nowadays, huge number of documents, for example: bank cheques, have to be authenticated in limited time but often the signature is unrealistic of the account's holder in terms of manual verification. Authentication and authorization are the secure means that are provided by signatures. Hence, there is the need of identification systems and automatic signature verification. At the present time, people prefer drawing a shape as their signature instead of hand written signatures, as these are different from other textual type, since it does not have text in it. So, an unusual approach should be kept in account to process such signatures. The present research work is on Static signature recognition system signature verification and recognition have been signature recognition system.

Keywords: Authorization, Transaction, Authentication, Automatic, Extraction.

I. INTRODUCTION

The objective of the signature verification and recognition system is to make out characteristics or extract the key feature of a personal style of handwriting. A sign of a person is a special case of handwriting uses special characters. Many signature can be unreadable. A signature can be handled as a pattern and it can be recognized using Artificial Neural Network technique.

A)Feature of signature verification:
There are two types of features:

i. Global Features
ii. Local Features

B) Types of signature verification:

i. Online i.e. Dynamic Signature Verification Technique
ii. Offline i.e. Static Signature Verification Technique

C) Types of Counterfeit of signature:

i. Random Forgery
ii. Simple Forgery
iii. Skilled Forgery

II. LITERATURE REVIEW

Shashi Kumar , R. K Chhotaray, D R K B Raja and Sabyasachi Pattanaik [1] introduced Off-line Signature Verification which was Based on Fusion of Grid and Global Features Using Neural Networks. The Fusion of global and grid features were used to generate dominant feature set and neural networks are used as classifier.

The algorithm and flowchart offers the offline signature verification system to confirm the genuineness of signature in which Artificial Neural Network is used [2].

Abikoye, O. C., M. A. Mabayoje, and R. Ajibade[3] proposed a scheme for signature verification and recognition for Artificial Neural network. They have given more specification which would carry far more in signature verification. They were given one of these modelled of verification and them also, and extracted the procedure of their work. They consider a small database and took few peoples signature and forged signature as well. The main aim of this paper was the utility of signature verification helps in detecting the exact person and more accuracy in verifying signatures for implementation.

Paigwar Shikha and Shukla Shailja[4] highlighted their method for Multilayer perception, modular neural network and the collaboration with feed-forward networks and Self Organizing Map group's neural network comparison for absolute study process. Over here they found that multilayer perception was better for having multilayer networks because it is more reliable to solve complicated problems rather than single layer perceptions. They used small database as a pilot project basis and do not consider the big database and to evaluate robustness and signature verification problems. They reduced the False Rates Rejection, (FRR), False Acceptance Rate (FAR) and Total error rate (TER).

Radmehr, Anisheh, Nikpour and Yaseri [5] developed an offline signature recognition system based on Radon transform, fractal dimension (FD) and SVMs. Experimental result of the proposed method achieved true positive rate (TPR) consisting of 92.5% and false positive rate (FPR) resulted in 10% using polynomial kernel for 5 classes in their proposed method. For comparison, they evaluated the performance using a linear kernel and a radial basis function kernel as well. The scope of our work in contrast covered up to 30 classes with improved accuracies in classification employing multilayer ANN and SVM RBF kernel.

This projected offline signature verification system offers computerized method of verification and recognition by extracting features that characterizes each input signature [6].

III. METHODOLOGY

The approach starts by scanning images into the computer using peripheral devices, then modifying their quality through image enhancement, followed by feature extraction and neural network training, and finally verifies whether a signature is genuine or counterfeit.

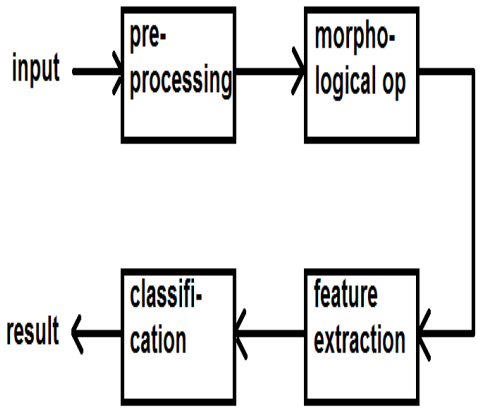

Figure 1. Basic diagram of Static signature verification

A] Pre- processing

Generally in any image processing application preprocessing is required to remove alteration, from the original input image. Any normal scanner with sufficient resolution can be used as an image attainment device for offline operation. Signatures are scanned in gray, using following equation as,

Gray colour = (0.299*Red) + (0.5876*Green) + (0.114*Blue)

The purpose in this stage is to build standard signatures and prepare them for features extraction.

1)Scaling:

Let H be the height of the inputted image & W be the width of the inputted image. We can fit the image uniform at 100*100 pixels by using the following equation as

Xnew = (Xold * 100)/H;

Where Xnew & Xold are calculated & original X coordinate

Ynew = (Ynew * 100)/W;

Where Ynew & Yold are calculated & original Y coordinate.

2)Noise Reduction:

Images are contaminated due to stemming from decoding errors or noisy channels. An image also gets degraded because of the detrimental effects due to illumination and other objects in the environment. Median filter is extensively used for smoothing and restoring images corrupted by noise.

3) Background elimination:

We used thresholding method for distinguishing the signatures from the background. In this, we are focussing in the dark objects on light background and hence threshold value T entitled as a brightest threshold is chosen and applied to the image.

4) Signature Normalization:

Image consists of irregular dimensions which causes fluctuation. Throughout this process the characteristic ratio between the width and height of a signature is kept undamaged.

5) Thinning:

The goal of thinning is to eliminate the thickness differences of pen by making the image one pixel thick. Thinning was introduced to describe the global properties of objects and to reduce the original image into a more compact representation [6].

B) Feature extraction

In Feature extraction, the essential features are extorted from the original input signature. The features to be extorted are based on the application and fluctuate accordingly [6].

1)Global Features:

Global feature offers information regarding shape like signature area, signature height-to-width ratio, slope & slope direction skewness of signature etc.

2)Mask Features:

This provides information about guidelines of the lines of the signature for the reason that the angles of signature have interpersonal variation.

3)Texture Features:

The texture features are the pixel positions with respect to the property of the feature. These can be processed using a matcher which uses co-occurrence matrix of the picture image. It includes End points, Branch points, crossing points. To extract these features, it is necessary to apply the pre-processing techniques like Thresholding and thinning on a gray scale signature image [6].

IV. CONCLUSION

The main features that attributed to ANN is it's ability to learn non-linear problem offline with training selectively which can lead to sufficiently accurate response.

Application of ANN has attained importance due to efficient work in the present day computers. The verification system based on ANN is the ability to learn different kinds of signature datasets by using only geometrical offline features. The classification ratio exceeds 93% though the parameter of threshold deciding the genuineness of an image is 90%. The accuracy in this problem cannot be guaranteed since we are not imitating the signatures to the extent of being considered as being forgeries.

V. REFERENCES

[1]. Shashi Kumar , R. K Chhotaray, D R K B Raja and Sabyasachi Pattanaik, "Off-line Signature Verification Based on Fusion of Grid and Global Features Using Neural Network"s, "International Journal of Engineering Science and Technology",2015.

[2]. Ashwini Pansare, Shalini Bhatia "Off-line Signature Verification Using Neural Network", International Journal of Scientific & Engineering Research, Volume 3, Issue 2, February-2012 1 ISSN 2229-5518.

[3]. Abikoye, O. C., M. A. Mabayoje, and R. Ajibade. "Offline Signature Recognition & Verification using Neural Network." International Journal of Computer Applications, pp.35, (2011).

[4]. Paigwar Shikha, Shukla Shailja, "Neural Network Based Offline Signature Recognition and Verification System", Department of Electrical Engineering, Jabalpur Engineering College Jabalpur, MP, INDIA, Research Journal of Engineering Sciences ISSN 2278 – 9472, Vol. 2(2), 11-15, February (2013).

[5]. M. Radmehr, S. M. Anisheh, M. Nikpour and A. Yaseri, "Designing an Offline Method for Signature Recognition", World Applied Sciences Journal , 20 11.

[6]. S.T. Kolhe, S. E. Pawar, Dept. of Computer Engg, AVCOE, Sangamner, India, " Offline Signature Verification Using Neural Network", International Journal of Modern Engineering Research (IJMER), Vol.2, Issue.3, May-June 2012 pp 1171-1175