# Offline Signature Verification System

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**Abstract -** **Signature has been a distinguishing feature for person identification through ages. Signatures for long have been used for automatic clearing of cheques in the banking industry. Despite an increasing number of electronic alternatives to paper cheques, fraud perpetrated at financial institutions in the United States has become a national epidemic. Since commercial banks pay little attention to verifying signatures on cheques—mainly due to the number of cheques that are processed daily—a system capable of screening casual forgeries will prove beneficial. Most forged cheques contain forgeries of this type. We in our project have tried developing a robust system that automatically authenticates documents based on the owner's handwritten signature. Biometrics can be categorized as behavioural and physiological. Handwritten signature belongs to behavioural biometric. In most of the places the verification is done manually either by a person who is familiar to the signature or by matching it against a few signature templates handwritten signature verification can be classified into offline signature recognition system and online signature recognition system. Between the two, online signature recognition systems are more reliable because of its higher efficiency in terms of accuracy and time than offline. However, offline signature recognition systems cannot be ignored, since its applicability and ease of use are more in comparison to online signature recognition systems in many parts of the world.**

## I.INTRODUCTION

Signature recognition is an important requirement of automatic document verification system. based on powerful global and local wavelet features (Energy features). The proposed system functions in three stages. Pre-processing stage; which consists of four steps: gray scale conversion, binarization, thinning and fitting boundary box in order to make signatures ready for feature extraction, Feature extraction stage. Signature recognition is one of the popular biometric authentication techniques, where the owner of the signature image is identified. Signature recognition can be classified into two main types, depending on the method of data acquisition: on-line and off-line signature recognition. In on-line recognition system, signature is obtained using an electronic tablet and other devices. Here, we can easily extract information about the writing speed, pressure points, strokes, acceleration as well as the static characteristics of signature data, using which

the signature can be recognized On the other hand in off-line signature recognition, signature is available on a document, which is scanned to get the digital image representation. Processing these Off-line signatures is complex and challenging due to the absence of stable dynamic characteristics.[1]

A handwritten signature is the scripted name or legal mark of a person's identity, executed by hand and it is used for the purpose of authentication. People are familiar with the use of signatures in their daily life. Signature is an age-old distinguishing feature for individual's identification. Even today an increasing number of transactions, especially in financial sectors, are being authorized via signatures. Hence, methods for automatic signature verification must be developed if authenticity is to be verified on a day to day basis. There are several approaches of verifying the authenticity of a signature.[2]

The handwritten signature is a very common way of authenticity. Despite its known weaknesses (relatively easy to copy, signatures of one person may vary significantly) and development of cryptographic and biometric techniques, it is still the most commonly used way of authentication when dealing with paper documents and forms. The image of the signature is a special type of object when treated as the subject of the recognition process. One of the problems which is likely to arise is that the signatures of a particular person are not exactly the same. Of course, during the application of the recognition system we may require that the signatures should be made carefully but there are always some differences we must deal with.[3] Many technical methods have been proposed for security purpose. Some of the security algorithm are:

*Euclidean Distance Algorithm:*

In image analysis, the distance transform measures the distance of each object point from the nearest boundary and is an important tool in computer vision, image processing and pattern recognition. The euclidean distance is the straight-

line distance between two pixels and is evaluated using the Euclidean norm. The Euclidean distance or Euclidean metric is the "ordinary" distance between two points that one would measure with a ruler, and is given by the Pythagorean formula. By using this formula as distance, Euclidean space (or any inner product space) becomes a metric space.

## II. PROPOSED WORK

The objective of signature verification systems is to differentiate between original and forged signature, which is related to intra-personal and inter-personal variability. Intra-personal variation is variation among the signatures of the same person and inter-personal is the variation between the originals and the forgeries. There will always be slight variations in a human's handwritten signature, the consistency generated by natural motion and practice over time generates a recognizable pattern that makes the handwritten signature suitable for biometric identification.

## III. THEORY

If we enter the username and password for login to signature verification, the system will check whether it is valid username and password or not. If it is valid username and password then the system will proceed to further steps. If it is not valid re-enter the username and password correctly.

After login, the different modules such as:-

- ✓ Main module
- ✓ Add module
- ✓ Update module
- ✓ Verify module

If new users are entered, their details get added to the system. we can update the signature for the user. Then verify the signature based on the Euclidean distance technique. Every module performs different functions and stores the information in databases.

## IV. EXPERIMENTS AND RESULT

### A. EXPERIMENTAL SETUP

The usage of signature verification will reduce the disruption to received practices with respect to transactions where Personal verification has to be authenticated. The hardware and software requirements of the system is:-

- ✓ CPU- Intel Dual Core 2.4GHz or later
- ✓ RAM- 2GB

- ✓ Hard Disk- 160GB
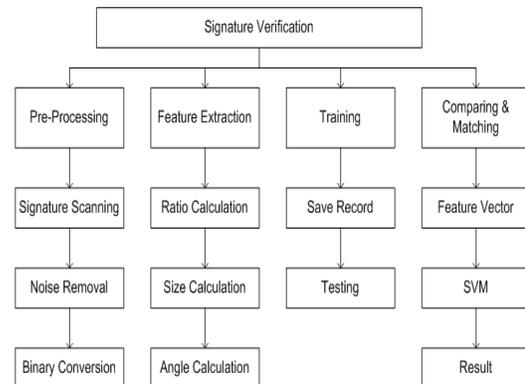- ✓ Language: Java
- ✓ Database server-XAMPP



**Figure 1 Architecture Diagram**

The above figure shows the process cycle in Hand Written Signature Verification system. Preprocessing of a signature image actually related to the removal of noises because noises may include during the scanning process of signature. Features have to be extract from both sample and test image such as signature height, signature occupancy ratio, distance ratio, signature length etc. Training of the samples is done after extracting the features. In order to compare two signatures with respect to their shape, they must be re-sampled to eliminate the dependencies on speed. After this Euclidian distance or any other technique is applied as the metric to compare two feature vectors.
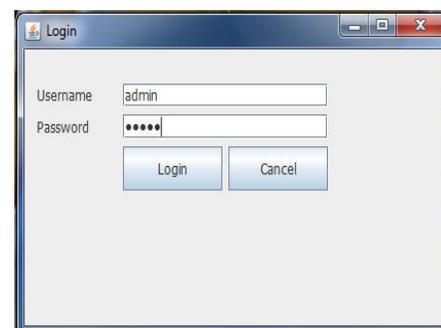
### B. EXPERIMENTAL RESULTS



**Figure 2. login page**

**Figure 3 verify page**

If new users are entered, their details get added to the system. we can update the signature for the user. Then verify the signature based on the Euclidean distance technique. Every module performs different functions and stores the information in databases.

## V. DISCUSSION AND CONCLUSION

Signature verification becomes an attractive topic for computer vision community. Many researchers do a research in signature verification system to classify signature as valid or forgery. There are two phases for the project. First part is to detect the features from signature images and second part is a classification and verification of signature. There are many methods for signature feature detection and signature verification. The results obtained in signature recognition and verification is very high and more research on off-line signature verification is required. The method proposed in this paper has the following important advantages: small database storage, any texture classification and analysis technique can be applied in our method. We have proposed different phases through which we are able to identify the forgery in handwritten signature.

## VI. FUTURE SCOPE

This project has focused on the offline signatures and the techniques that are used for the verification and validation of signature for the classification of them into the genuine or forgery. The verification of signature is carried out on the basis of the features of signature that are extracted using different static image processing techniques. As this paper contains the review of literature in continuation to this the next objective will be to propose some new model that will reduce the FAR and FRR.

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