

# Dynamic Signature Authentication Using Pixel Coding

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## **Abstract:**

*Dynamic Signature Authentication is playing major role in the current trend of technology where the signature images are mandatory. The forging of signature images is the major concern, in this paper we have present Dynamic Signature Authentication technique that deals with knowledge base creation where sample signatures and twenty-five pixel codes for characters and numbers are stored. This technique verifies whether the given signature image matches with the stored signature image or not using our proposed algorithm.*

## **Keywords**

*Digital Signature Authentication, Pixel Coding, Character Recognition, Signature Verification*

## **1. Introduction**

Authentication is the primary thing when it comes to any confidential data; authentication and confidentiality plays a significant role and importance in data security. Think about the scenario when one need to sign particular document which are confidential and it should be done without any forgery, then one phenomenon comes in spotlight, that is Digital signature pattern recognition and verification. The human signature can be captured by digital signature pen or similar devices; the signature is recognized as well as verified by our proposed algorithm. Process of recognition and verification contain several steps such as: Character Recognition, Number recognition and signature verification. The first step is to Automatic character recognition is a well-accepted area of research under pattern

recognition. In handwritten character recognition, characters are written by different individuals that vary drastically from person to person due to variation in the writing style, its size and orientation of characters. This makes the system difficult to recognize the characters. Artificial Neural Network (ANN) helps to solve the problem of identifying handwritten characters in an automated manner. ANN is an adaptive computational model which is activated by set of pixels of a specific character as features, processing of the similar and divergence information available in the features used to recognize the character. The second step is to acquire signature from particular user, means user have to sign his/her signature on signature pad or similar devices. In the step of pre processing signature, signatures are pre processed which contains several processes like: gray scale the image, thinning, and cropping. Gray scaling is nothing but a process of converting RGB image into gray scale image in which various shades of gray are appeared and signature is converted into gray scale. Another step is image thinning in which the overlapped points are removed so signature cursively is reduced and it becomes much easier to recognize the signature. While cropping the signature, boundary is fixed around the signature so that the extra space is automatically reduced to get the accurate signature area. In the step of feature extraction various factors of signature like pen tip pressure, velocity, speed factor etc. are measured.

## 2. Existing Methodology

Before the age of the computer, there were many mathematical problems that humans could not easily solve, or more precisely humans were too slow in solving. Computers enabled these often simple but slow and tedious tasks to be performed quickly and accurately. The first problems solved with computers were calculating equations to resolve important physical problems, and later displaying a nice GUI, making word processors and so on. However, there are many common tasks which are trivial for humans to perform yet which are extremely difficult to formulate in a way that a computer may easily solve. These include: (i)Signature processing such as pattern recognition, Character recognition, Number recognition, Signature image processing etc., (ii)Compression, (iii)Data reconstruction (e.g. classification where part of the data is missing), (iv)Data mining, (v)Data simplification

Failures in Existing System:

- Authentication is a popular area of research in current trend. Forgery of one's signature didn't mean a threat of one's identity. The basic idea is to investigate a signature verification technique which is not costly to develop, is reliable even if the individual is under different emotions, user friendly in terms of configuration.
- In Pattern Recognition verification application, the patterns are processed to extract features that are used for verification. There are two stages called enrolment and verification. Two types of pattern verification are offline and online also called static and dynamic signature based on data available in the input.

## 3. Proposed Methodology

The proposed system guides users to find hand written characters and numbers. It also allows users to compare the user given signature with stored signature. 25 pixels of each character or number is entered in the system where the value is either 0 or 1(digital data). In perception, the input is compared with stored values by using the activation function output is displayed. In Business Process Network, the input is used to train the network. The calculated output is compared with stored output and result is displayed. The sample signatures are scanned and stored as JPG file. The signature given by the user is then scanned and stored as JPEG file. The signatures are compared and results are displayed. The processing of Dynamic Signature Verification is as shown in the figure 1.

### 3.1 Architecture Diagram

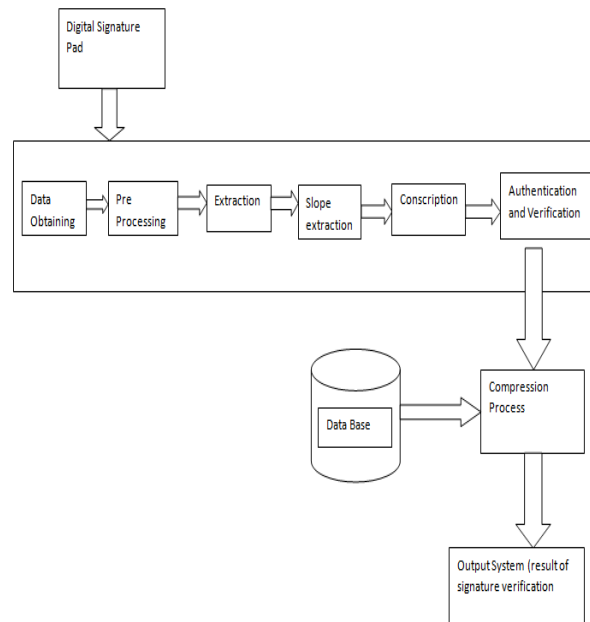


Fig1: Demonstration of Digital Signature Authentication using Pixel Coding

In the above figure we can view the step by step processing of given signature image with the stored signature image.

In this paper we proposed a new algorithm for evaluation which uses digital pen input signature authentication. The algorithm considers writer's signature in the form of slopes, the working process is similar to the slope value of input signature is already in the stored database and the slope value of signature taken from the user by using digital pen needs to match. If the slope value matches up to some approximation (i.e. approximate value decided by user, like 80%, 70%), then the signature will be genuine otherwise forged. In the verification authentication phase, this technique evaluates the difference between the slope value of signature which is already stored in database and the current slope value of the pen input. Care needs to be taken in computing the different function because the length of the input signature different from that of the digital signature even if the signature is genuine. If the computed value didn't exceed boundary value, the input signature is predicted to be genuine; otherwise it is predicted to be forged. The Authentication System uses various parameters to verify and match both the signatures. The algorithm is given as follows:

**Algorithm:**

Input: - User gives the input signature image.

Output: - Input image matching with the stored image in data base.

Step 1:- Get signature image from the digital signature pad.

Step 2:- Preprocessing the input signature image.

Step 3:- The image is obtained based on measure of pen tip pressure and velocity.

Step 4:- Input signature is verified and authenticated pixel based approach.

**Processing of the Algorithm:**

To process the algorithm we need to give the input. The user gives the input signature image using the digital signature pad. Independent strokes are recognized by discovering the points in signature image 1) decrease in pen tip pressure, 2) decrease in pen velocity, and 3) rapid change in pen angle. A remarkable stroke is discriminated by the maximum correlation with respect to the reference signatures. While given each pair of signatures (given signature and stored or reference signature), the local correlation comparisons are computed between portions of pen tip pressure and pen tip velocity signals using segment alignment by elastic matching. The result shows that stroke based features contain robust dynamic information, and offer greater accuracy for dynamic signature verification, in comparison to results without using stroke features. The database is a collection of stored images, actually it stores all user signatures for the purpose of verification and authentication. Now the given signature image is verified with the stored image in the database. If it is matching with the stored image in database then the user is authenticated and allowed access with the necessary resources.

**4. Conclusion**

Before using the method, the accuracy and some parameters like pen pressure, speed, time of signature was not up to the mark but after using our proposed methodology which gives more accuracy, pressure all are improved and gives approximate or satisfied result.

**5. Future Work**

Presently we are concentrating on the signature images i.e verification of signature images using pixel coding. In future we can concentrate on various

kinds of images coming up with more new techniques.

## 6. References

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