

Dynamic Signature Recognition

Tahura Bijapure¹, Suchita Rane², Sumaya Shaikh³, Fatima Anees Ansari⁴

^{1, 2, 3} B. E Students, Computer Engineering Department, M. H. Saboo Siddik College of Engineering,
Mumbai University, India.

⁴Lecturer, Computer Department, M. H. Saboo Siddik College of Engineering,
Mumbai University, India.

Abstract

Abstract— For centuries, Signature have been accepted socially as a mean of identity verification. The core concept of dynamic signature system is behavioural (how it is signed) and not visual (image of the signature). In this paper, Touch screen based user input is learned by the system. The dynamic parameters of signature are recorded using slope based method and are stored in SQL database. Recognition is done by comparing and calculating percentage match. In dynamic signature recognition forgery is detected even if the forger manages to get the authentic signature.

Keywords—Dynamic signature recognition, Biometrics, Touch screen, authentication, verification, AVR, slope based, databases.

1. Introduction

Biometrics deals with “what we are” method for authentication. There are basically two types of biometrics i.e. Physiological & Behavioral. Physiological biometric include Fingerprint, Iris, Hand, Face, DNA recognition. Behavioral biometric include voice, signature recognition. Signature recognition is gaining much attention in today’s time.

Authentication is an important step to verify identity of any person to avoid fraud. Dynamic Signature Recognition offers greater security than any other biometric method. In dynamic signature recognition we concentrate on how signature is signed rather than just verifying how image of signature looks. In dynamic signature recognition forgery is detected even if the forger manages to get the authenticated signature.

In this paper we have used Touch screen for user input and authentication is done by percentage match using parameters of signature. The values of parameters are stored in SQL database. The system tries to reduce FAR (False

Acceptance Rate) and FRR (False Rejection Rate). This system of biometric authentication is fast, cheap and simple.

Application of Dynamic signature recognition system includes remote or wireless payments, legal Transactions, e-government, remote user login, and paperless office where documents are signed electronically.

2. Concept

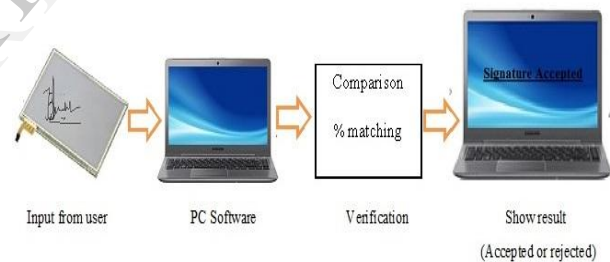


Fig. 1: Signature Recognition Concept.

Signature Recognition is done using combination of Hardware and Software. In this paper Hardware used is a Touch screen with a stylus which accepts user input and transfer it to the pc software. We use Feature Extraction technique. Firstly, few signatures are taken from the person and their values are saved in SQL database. As the stylus of the touch screen moves the signature will get converted into digital x and y co-ordinate. Also the time taken by person to sign is recorded. Then the pc software calculates FAR (False Acceptance Rate) and FRR (False Rejection Rate) using slope based algorithm. For recognition, the input value is compared with the stored values from SQL database. On the basis of the comparison, percentage match will be done. The system authenticates the user only if the percentage match is accepted.

3. Features

This system of Dynamic Signature Recognition uses the Dynamic features to authenticate a person. Signature is done on device known as Touch screen. The following are the prominent features of the discussed system.

3.1. User Friendly

The key feature of Dynamic Signature recognition is that it is simple and user friendly. System can accept the input signature in any language unlike character recognition systems no language barrier.

3.2. Accurate Results

The database of the system will consist of minimum 10 signatures for comparison purpose. Thus more accurate results are derived using dynamic signature recognition. Also FRR and FAR are reduced.

3.3. Touch Screen Based

User input signature is taken using a touch screen, which is easy to use and handle. Signature conversion to digital code will be fast and hence there will be fast response.

3.4 Acceptance or Rejection is Based on Percentage Match

A threshold value will be set for authentication, this value will be compared with user input value and percentage match of both values will be done.

3.5 High Level of Security

In case the system database wherein the signatures are stored gets hacked; the users can change their signatures in the database immediately thus inhibiting any fraudulent activity. This is a key feature of Dynamic signature verification as other biometric authentication methods do not provide this feature and the data once leaked can be misused easily.

3.6 Prominent System

In the proposed system, AVR based system designing is done as this is the latest technology. The technology used here is embedded technology which is the future of the modern electronics.

4. Design and Working Principle

This research paper proposes a system of dynamic signature recognition which has its essence in its feature extraction and recognition phases. The following are the steps proposed:

4.1 Hardware Setup

The touch screen used will be interfaced with the AVR based embedded system. The touch screen will be a resistive one. The hardware system has to be programmed to function, monitor & control the system. The system needs to be programmed such that it has to convert the input signature into its corresponding digital format and send it to the computing device used.

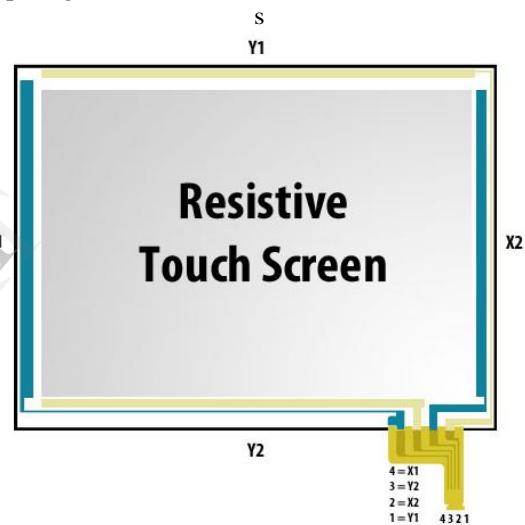


Fig. 2: Touch screen (Resistive)

4.2 Feature Extraction & Learning Phase

The user signs on the touch screen and the input signature data are stored in the SQL database. User is made to sign at least 10 times in order to acquire a range of the data for better authentication purpose. The dynamic parameters of the signature are recorded using a slope based method and those values being stored in the SQL database.

4.3 Authentication Phase

The user when wants to access the system has to sign on the touch screen. This input signature data will be compared with the already learned data of the respective user stored in the database in the previous phase. The user is said to be an authentic one only if the percentage match is permissive.

5. Advantages and Applications

Signature verification can be done by two methods i.e. Static signature recognition and Dynamic signature recognition. In static signature recognition signature is done via offline method, signature is done manually on paper and verified manually. Whereas, in Dynamic signature recognition, signature is done on a touch screen and verification is done via electronic method. Dynamic signature recognition has a major advantage over static signature recognition as it reduces errors and chances of accepting frauds.

Dynamic signature has a vast application in every field. It is used in electronic data security, Health care industry, Banks, ATM card authentication, Government applications, criminal identification, finding the missing children. Overall we can say Dynamic signature verification helps to find real identity of a person.

6. Conclusion

We have proposed a new technique for Dynamic signature recognition using a touch screen to capture the user's signature input. Dynamic signature recognition has gained much popularity in recent years. Many applications can be secured by using this system of biometric authentication in order to prove any individual's authenticity. The main aim of this system is to provide better security to mankind and to identify forgery. We are also working on to extract more features for better accuracy.

7. Future Work

The process of development is endless. The system for Dynamic Signature Recognition is researched and has been studied. The design and concept can be utilized in constructing the system by performing its implementation.

8. References

- [1] Dynamic Signature Verification using Embedded Sensors, 2011 International Conference on Body Sensor Networks, Abhijith Shastry, Ryan Burchfield, S. Venkatesan, Department of Computer Science, The University of Texas at Dallas, Richardson, TX 75080, U.S.A.
- [2] Practical Identity-Based Signature for Wireless Sensor Networks, Wireless Communications Letters, IEEE (Volume: 1, Issue: 6), 20 September 2012.
- [3] Critical analysis of adaptive biometric systems, Biometrics, IET (Volume: 1, Issue: 4), December 2012.
- [4] Strong authentication using dynamic biometric signature, Security Technology (ICCST), 2011 IEEE International Carnahan Conference, 18-21 Oct. 2011
- [5] Usability evaluation of biometrics in mobile environments, Human System Interaction (HSI), 2013 The 6th International Conference, 6-8 June 2013.
- [6] http://www.microbuilder.eu/Tutorials/LPC2148/ADC/ND_TouchScreen.asp