Review Paper on Online Signature Verification on Touch Devices

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Abstract: In this paper explains the significance of online systems and presents the survey of various approaches related to online signature confirmation systems. Extend this paper provides the relationships of those approaches along with characteristic used, to help the researchers working in this field. There are a variety of Biometric systems which help in personal identification, amongst those verification system, one system is signature verification system.

Keywords: data training, online signature verification, biometry, template aging, mobile device authentication.
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I.   INTRODUCTION

Handwritten signature is a well known technique for signing documents as well as a technique for personal verification in our daily life, such as commerce and banking transactions, credit acrd payments and , in general, all kind of legal documents[7]. A handwritten signature is a socially and accepted biometric trait for authenticating an individual.

Typically, there are two types of handwritten signature verification system: Off-line or Static system and Online or Dynamic system.

In Static mode, users writes their signature on paper digitize it through on optical scanner or a camera and a biometric system recognize the signature analyzing its shapes. This group is also known as " off-line " .
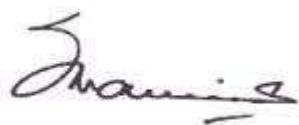

Fig.1. Sample of Off-line Signature.

In Dynamic mode users write their signature in a digitizing tablet, which obtain the signature in real time another possibilities is the achievement by means of stylus operated PDA's. Dynamic recognitions is also known as "Online". Dynamic information usually consists of the following information .Spatial coordinate $x(t)$, Spatial coordinate $y(t)$, Pressure $p(t)$, azimuth $az(t)$, inclination $in(t)$[1].

Fig.2. Online signature graphics tablet.

Handwritten signatures occupy a very special place in this wide set of biometric traits. This mainly due to the fact that handwritten signature have long been established as the most widespread means of personal verification. Moreover, Verification by signature analysis requires no invasive measurements and people are familiar with the use of signatures in their daily life. Signatures are generally recognized as a legal means of verifying an individuals identity by administered and financial institutions automatic signature[8].

II.   RELATED WORK

The study of the online signature verification technique applied to touch devices. This study is done prior to a real implementation in portable devices, to have some insight about the performance of the algorithm in below work:

Donato Impedove and Giuseppe pirlo, the author present the paper Automatic signature verification : The state of the Art. The state of the skill in automatic signature verification present. It deal with the most valuable results obtained so far and highlights the most useful directions of research to date. Thus, the assessment of a biometric trait is strongly dependent on the specific application since it involves not only technical issues but also social and cultural aspects. Therefore, although complex theories have been proposed to model the psychophysical mechanisms underlying handwriting and the ink-depository processes, signature verification still remains an open challenge since a

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signature is judged to be genuine or a forgery only on the basis of a few reference specimens[8].

Enrique Aregones Rua, "online signature verification based on generative models". In this paper contains the online signature verification has the success of generative models for motivated many research works on this topic. These systems can use hidden markov models(HMMs) two different modes: user-specific HMM and user adapted universal background models. This paper analyzes several factors that can modify the behavior of these systems and which have not been deeply studied yet. Moreover, this analysis is also extended to the influence of the HMM complexity in the performance of the different approaches. For this study, a set of experiment is performed on the publicly available MCYT-100 database using only skilled forgeries[5].

Ankita Wadhawan and Dinesh Kumar, "A Survey on Indian and Non-Indian Languages for Online Signature Verification". The signature verification suggest the verification process in which a given identity is examined and is either rejected as forgery or accepted as genuine. Signature verification is an important research topic in the area of biometric authentication. The paper presents the process of online signature verification system and various online signature verification approaches like support vector machines, neural networks, dynamic time warping, hidden markov model etc. proposed for foreign languages and Indian languages that use dynamic properties of signature for verification[3].

Aitor Mendaza-Ormaza, Oscar Miguel- Hurtado, Raul Sanchez- Reillo, Jaime Uriarte- Antonio, " Analysis on the determination of the different signals in an on-line handwritten signature verification system applied to portable devices". In our time, the use of portable devices with touch screens has reached an extended use among the population. Along with this technology, it is possible to incorporate to such devices the possibility of using handwritten signature to authenticate the user.support vector machines have been used as an algorithm to test against the modified databse, and results show good performance of the algorithms, obtaining rates around EER=3%, showing that the algorithms will give good results implemented in real smart phones[7].

Napa Sae-Bae and Nasir Memon, " Online Signature Verification on Mobile Devices". This paper give to online signature verification on touch interface-based mobile devices. A simple and effective technique for signature verification is developed. An online signature is characterized with a discriminative feature vector derived from attributes of several histograms that can be computed in linear time. The findings signature template is compact and requires constant space. The algorithm was initial tested on the well-known MCYT-100 and SUSIG data set. Experimental results on this data setconfirm the effectiveness of the proposed algorithm in mobile setting[1].

III. SIGNATURE VERIFICATION BASIC CONCEPTS

The main phases of the signature verification follow the sequence.

a) Preprocessing
b) Feature Extraction
c) Data Training
d) Signature Verification

A. Preprocessing :

Preprocessing is the set of subsequent oprations applied for the improvement of quality of signature image. This improvement in quality of image increases the accuracy of further steps involved in processing without using relevant information.

B. Feature Extraction :

Feature means similar characteristics and extraction means accurately retrieve those features. A proper feature extraction can increases the recognitions ratio. It plays an important role in development of the robust system as all other phases are based on these features.

C. Data Training :

Data Training is the stage in which the signature database is created by collecting signatures from the individuals. This collection involves both forgeries and original signatures from these signatures, feature vectors are generated which acts as template for verification.

D. Signature Verification :

In the verification stage, the claimed user is asked to produce a single signature which is again represented by the set of features derived by the feature extraction module. The system then derives a signature's quantized feature vector from a given signature using the stored feature quantization step size vector and compares it against the stored user-specific quantized feature vector template. The signature is accepted if the Manhattan distance between these two quantized

vectors is less than a predefined threshold, otherwise it is rejected[3].

IV. CONCLUSION AND FUTURE WORK

This survey paper proposes a study of an on-line signature verification system oriented to a mobile device. Prior to an implementation in a mobile devices, this study pretends to have some insight about the performance of the mobile device system.

It is also a problem in mind to further study the impact that the number of signatures used in training have over the performance of the system. Authors will try to improve the performance using fewer signatures for the registration procedure of the user.

A future research involving different algorithms will like to be done by the authors. In particular, one-class SVM will like to be researched, as it is easier for the enrollment process, from the point of view of the final user, to use only genuine signatures.

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