

DETECTION OF NEAR DUPLICATE IMAGE USING VARIABLE LENGTH SIGNATURE

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Abstract - Signature does not depend on physical features like that of iris detection, gait, fingerprint, facial features ; instead it's a completely behavioral attribute of an individual .The field of signature verification is broadly classified into two parts i.e. online and offline. Online signature verification deals with signatures obtained from digital tablets or any such device where in addition to spatial features of the signature; time, pressure etc. information is also available. Offline signature verification deals with only verifying the signature through its scanned copy of signature sample, hence it lacks dynamic information which makes offline verification difficult which is still used in our daily lives as in banks, offices etc. The sole purpose of this research paper is to develop an efficient signature authentication system which is still an important part of biometric identification methods.

Key Words: Biometric, Iris, Pre-processing, Feature Extraction, FAR, FRR, EER.

1. INTRODUCTION

From a lay man's point of view, we can easily recognize a person through his way of speaking, voice, facial characteristics but thing is limited to only a number of persons in our vicinity. The problem with recognition comes when the person to be identified doesn't lie in your vicinity. This is where comes the requirement of an efficient system which can easily and effectively verify a person's identify. The security requirements of today's world has provoked a need for an efficient system for verifying a person's identity. Biometrics has recently gained too much popularity in identification of individuals, as it effectively deals with it by utilizing distinctive features of individuals. The former is based on the measurement of biological traits of users, like, for instance, fingerprint, face, h and geometry, retina, and iris. The latter consider behavioral traits of users, such as voice or handwritten signature.

1.1 Signature Verification

Signature verification is a common behavioral biometric used in identification of human beings for purposes of verifying their identity. Signatures are useful for identifying a specific person because each person's signature is highly one - of -a -kind, if the dynamic properties of the signature are thought about in addition to the static features of the signature. It's true that expert forgers can truly replicate the signature, but it's highly unlikely to forge dynamic features of a signature which is used in online signature verification.

1.2 Types of Signature verification

Signature verification is part into two as per the accessible information in the data.

Offline (Static): The signature is obtained from a confirmation framework is the snap of a mark and is valuable in programmed check of marks found on bank checks and archives.

Online (Dynamic): Signatures that are caught by information procurement gadgets like weight -touchy tablets that concentrate element characteristics of a signature notwithstanding its shape (static), and might be utilized as a part of constant requisitions like Visa transactions, security of little individual gadgets, approval for getting to of workstation clients which have delicate information or projects, and validation of people for access to labs, working environment and so forth.

2. General System Overview

A dynamic signature verification method gets its input from knowledge acquisition tool like a digital tablet or other, dynamic input tool. The signature is then represented as time - varying signals. The verification method focuses on how the signature is being written than how the signature was written. This provides a better means to grasp the individuality of the writer but fails to recognize the writing itself.

But in case of offline signature we get the image of signature from a scanner or camera or any such image capturing device which basically gives us only static features of a signature.

2.1 Signature verification procedure

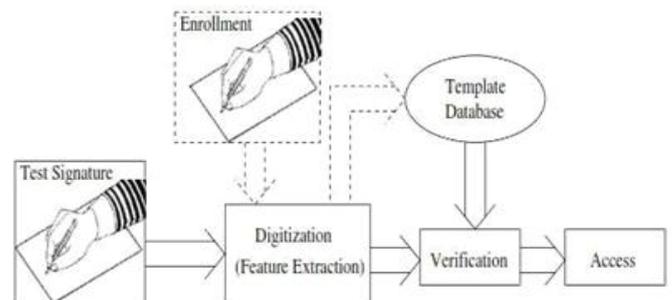


Fig.2.1 Block Diagram of Signature verification system

As shown in block diagram:

Input: For an off-line signature verification system, input is static. This input is normally captured through a tablet or like camera based tracking of pen tip while an individual performs a signature. This input is digitized and fed for processing. First of all pre-processing is done on the input received and then some features are extracted from the captured online data on the basis of which the signature is validated.

Output: The output obtained from an online signature verification system is a decision if the person providing the signature is authorized or not.

3. Preprocessing

In order for confirmation of a signature correctly, preprocessing of acquired signature is always necessary. The acquired signature in offline signature may contain extra dots which arise as a result of dust in lens of capturing device, all these are unwanted. This extra dots can be efficiently removed by usage of median filters on the captured signature image. Preprocessing includes some more operations like resizing, binarization and thinning & rotation normalization. The foremost step in preprocessing is to resize the signature to a standard size so that all the signatures have same normalized size, so that it makes our task easy afterwards to compare reference and test samples.

Thinned Image



Fig.3.1 Thinned signature samples

Rotated Image



Fig.3.2 Rotated signature samples

4. Feature Extraction

Characteristic extraction stage is maybe the most pivotal phase of a mark check framework. Characteristics could be considered worldwide or nearby, where worldwide characteristics speak to properties of a signature all in all and neighborhood ones relate to properties particular to a testing point.

The worldwide characteristics samples are signature limit box, length of trajectory or normal marking speed, and speed or speed between two sequential focuses in a mark are nearby characteristics.

4.1 Feature Types for Signature Authentication

It is especially essential to actualize personality confirmation methodology which gives high degree in execution and still worthy by a greater part of clients. A mark could be verified utilizing either static (off-line) or dynamic (on-line) check.

- Static (off-line): The signature is composed either on a bit of paper and afterward checked or straight forwardly on the machine utilizing gadgets, for example, the advanced cushion. The state of the signature is then contrasted and the enlisted (reference) signature. The trouble with this method is that a great counterfeiter will have the capacity to duplicate the state of the mark.
- Dynamic (on-line): The client's signature is gained progressively in real time. By utilizing this element information, further characteristic, for example, quickening, speed, and prompt trajectory plot and removals might be concentrated.

5. Result

Comparison with Existing Methods:

We have contrasted the proposed strategy and the current three systems via . Offline Signature Verification and Identification utilizing Distance Statistics which utilized the same standard Database B, Novel Features for Offline Signature Verification, and Offline Signature confirmation utilizing Local Radon Transform & SVM. It might be watched that the proposed calculation with matrix based characteristic extraction showed signs of improvement brings about terms of FAR and FRR .

Technique	FAR (%)	FRR (%)
Offline signature verification and identification using Distance Statistics [1]	34.91 (SET 1) 33.80 (SET 2)	28.30 (SET 1) 30.90 (SET 2)
Novel Features for offline signature verification [2]	16.36	14.58

Offline signature verification using local radon transform and SVM [3]	22.0	19.0
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Table 5.1: Comparison with Existing Techniques

Threshold	FAR (%)	FRR (%)
95	0	32
90	5.1	16
80	7.9	11
75	17	4
70	20	1.1
65	29	0
Average	12.6	10.2

Table 5.2: Signature verification results for set -1

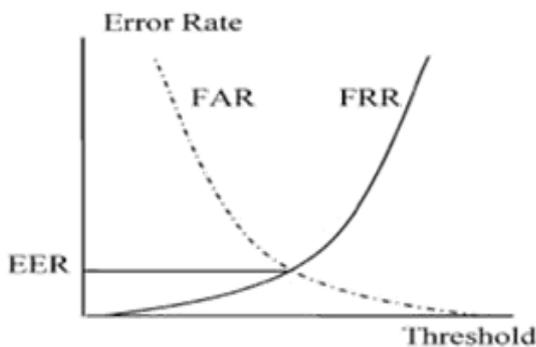


Fig 5.1 Typical FAR v/s FRR plot

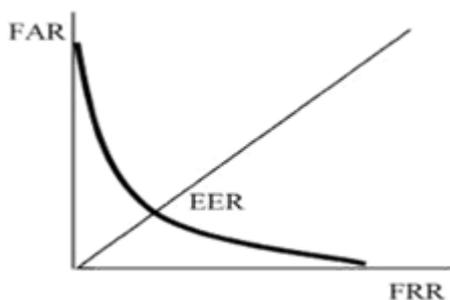


Fig 5.2 Typical plot to show EER

number of dark pixels in columns and sections framed. For confirmation, these two characteristics for preparing and test pictures have been thought about both row and column and the test signature is then arranged in like manner.

Classifier hasn't been implemented yet and the results shown here are that of previous works in this field.

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BIOGRAPHIES:



Ms. Komal R. Jumde received BE degree in Electronics engg. in the year 2015 from RTMNU, Nagpur, India. She is currently doing M-Tech degree in (ECE) from TGPCEAT, Nagpur, India. She has published review paper on detection of near duplicate image using variable length signature.



Ms. Nagma sheikh did her BE (Electronics and telecommunication) and M-Tech (VLSI) in 2013 and 2015 respectively. Currently she is working as a Assistant Professor in electronics engineering department.

6. Conclusion and Future Work:

In this paper, an offline signature verification method utilizing grid based characteristic extraction. The preprocessed signature i.e. resized, binarized, diminished and pivot standardized mark is divided into lattice of size 10x20 cells where each one cell is having 100 pixels. Grid relating to network is structured and clusters holding