

Signature Verification

DSIP MINI-PROJECT

Introduction

Even in today's age signature is the most important and most used form of proof of identity of a person. Signatures are used for all documents in financial services, legal services or on letters, documents, checks, security documents.

Thus to reducing illegal acts like forgery are a great concern in our day and age.

Negligence of signature verification is one of the main cause of fraud in our country. So to avoid such cases, we decided to make this project.

Problem Statement

To write a program in MATLAB that can distinguish between genuine and forged signatures.

Methodology

- Database Preparation
- Pre-Processing
- Feature Extraction
- Verification using extracted Features
- Working

Database Preparation

For the code we have written, we require a square image with high resolution and which is noise free.

Signature should be made on an uncrumpled blank sheet of paper and shot with a camera which is focused on the image.

The image should then be modified to a square resolution to be used.

So we took a database from internet with Genuine and Forged Images.

Pre-Processing

The Steps of Pre-Processing of the image from database is :

1. Cropping
2. Filtering
3. Conversion of Colour Image to Gray scale
4. Binarization of Grey scale image
5. Thinning
6. Rotation for Skew Correction
7. Resizing

Feature Extraction

The following features are extracted from the processed image:

- Normalised Signature Area

Total number of black signature pixels divided by total number of pixels of the image

- Aspect Ratio

The Aspect ratio of the processed image = width/height

- Maximum Horizontal Projection

It is the maximum number of black pixels among all horizontal rows of the image

Feature Extraction

The following features are extracted from the processed image: (continued)

- End Points

It is the number of endpoints of the signature

- Centroid of vertically divided images

It is the pair of centroid of the 2 images formed by vertically dividing the main image

- Skew Angle

It is the angle made by the centroids of the vertically divided images

Verification using Extracted Features

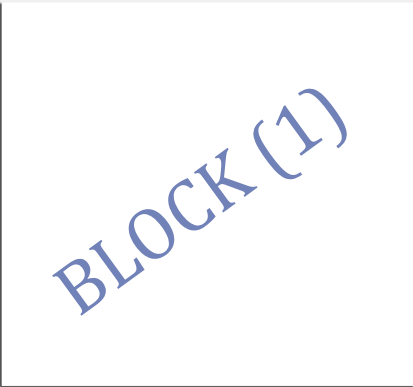
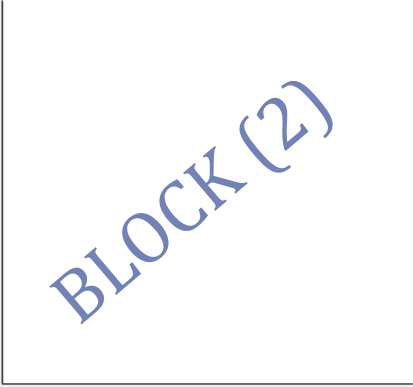
Once the Features are extracted they are stored in a Vector. Now we need to fix minimum error threshold values for each feature implemented using which it classifies genuine signatures.

We have done this step manually by generating the tables of data for input and selecting error threshold values. The more images this step is applied to the more accurate our algorithm becomes.

Working

STEP 1:

Images are inserted in the insert blocks. In Block (1), Original Image is inserted and in Block (2), Checking Image is inserted.

Signature 1	Signature 2
 A large white square placeholder with the text "BLOCK (1)" written diagonally in blue.	 A large white square placeholder with the text "BLOCK (2)" written diagonally in blue.
<input type="button" value="Browse Image"/>	<input type="button" value="Browse Image"/>

Working

STEP 2:

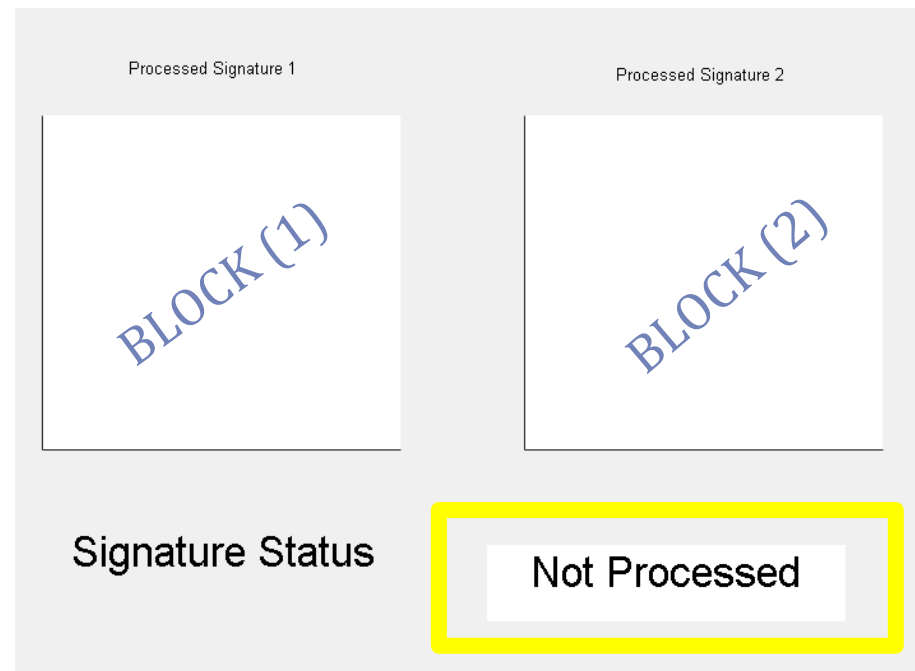
After Image is inserted, Press “Validate Signature” Button.



Working

STEP 3:

Both Images are processed and their extracted features are compared to get the output.



Results

We have written a program in MATLAB that identified and distinguishes between genuine and forged signatures with a high accuracy.

References

Research Paper Followed :

http://shodhganga.inflibnet.ac.in/bitstream/10603/176862/8/08_chapter%202.pdf

THANK YOU