Off-line Signature Verification using Local Patterns

ABSTRACT:

Recently, several papers have proposed pseudo dynamic methods for automatic handwritten signature verification. Each of these papers uses texture measures of the gray level signature strokes. This paper explores the usefulness of local binary pattern (LBP) and local directional pattern (LDP) texture measures to discriminate off-line signatures. A comparison between several texture normalizations is made so as to look for reducing pen dependence. The experiments conducted with MCYT off-line and GPDS960Graysignature corpuses show that LDPs are more useful than LBPs for automatic verification of static signatures. Additionally, the results show that the LDP codes of the contour are more discriminating than the LDPs of the stroke interior, although their combination at score level improves the overall scheme performance. The results are obtained by modeling the signatures with a Support Vector Machine (SVM) trained with genuine samples and random forgeries, while random and simulated forgeries have been used for testing it.

Existing System:

Our existing system handwritten character recognition using Modified Direction Feature (MDF), it is nothing but a system which recognize a hand written character Modified Direction Feature (MDF) generated encouraging results, reaching an accuracy of 81.58%.

In this system each and every hand written character of a separate person is scanned and stored in database the scanned images are verified using MDF.

Disadvantage of the existing system
- ➢ Accuracy of 81.58% is very less when compared to existing system
- ➢ since each and every hand written character of a separate person is scanned and stored in database it is very time consuming and it takes more manpower

> ➢ Since handwritten character recognition is not a most important identity of a human being this system is not widely used

Proposed system:

Our proposed system is Off-line Signature Verification using the Enhanced Modified Direction Feature and Neural-based Classification in which we are using MDF with signature images. Specifically, a number of features have been combined with MDF, to capture and investigated various structural and geometric properties of the signatures to perform verification or identification of a signature, several steps must be performed. After preprocessing all signatures from the database by converting them to portable bitmap (PBM) format, their boundaries are extracted to facilitate the extraction of features using MDF .Verification experiments are performed with classifiers We are using Radial Basis Function (RBF) which is a classifier which gives an accuracy level of 91.21%

Advantage of proposed system
> ➢ Accuracy level of 91.21% which very high when compared to the existing system
> ➢ It is very time saving
> ➢ It is user friendly

Hardware Requirements
- **SYSTEM**   : **Pentium IV 2.4 GHz**
- **HARD DISK**   : **40 GB**
- **FLOPPY DRIVE**   : **1.44 MB**
- **MONITOR**   : **15 VGA colour**
- **MOUSE**   : **Logitech.**
- **RAM**   : **256 MB**
- **KEYBOARD**   : **110 keys enhanced.**

<u>**Software Requirements**</u>

- **Operating system** :- **Windows XP Professional**
- **Front End** :- **Microsoft Visual Studio .Net 2005**
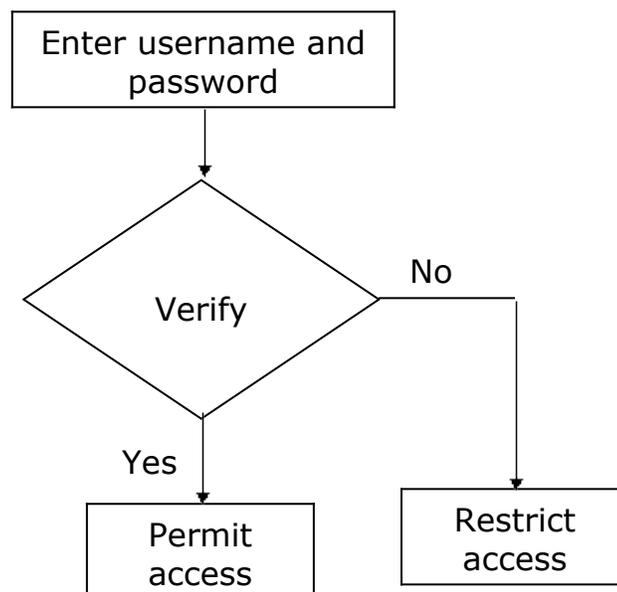- **Coding Language** :- **VB.NET**

Modules

There are four modules available in this project they are

- ➢ Authentication
- ➢ Preprocessing
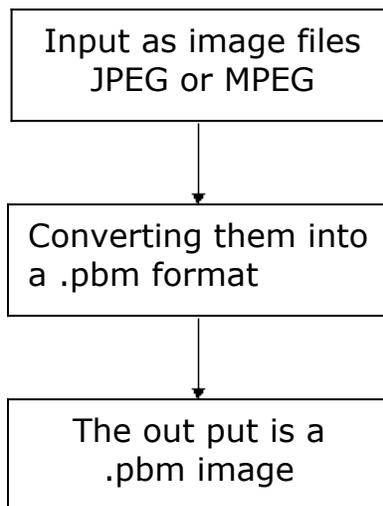- ➢ Feature extraction
- ➢ Classification

Authentication

The first module of Off-line Signature Verification using the Enhanced Modified Direction Feature and Neural-based Classification is authentication. Authentication is done to secure the application from unauthorized user. The username and password is checked and the unauthorized user is ignored. The user can access the application if the username and password is valid. As it is the first module of the project it gives security to our application.

```
┌─────────────────────┐
│  Enter username and │
│      password       │
└─────────────────────┘
           │
           ▼
         ╱────╲          No
        ╱ Verify ╲──────────────┐
        ╲        ╱               │
         ╲──────╱                │
           │ Yes                 │
           ▼                     ▼
   ┌──────────────┐      ┌──────────────┐
   │    Permit    │      │   Restrict   │
   │    access    │      │    access    │
   └──────────────┘      └──────────────┘
```
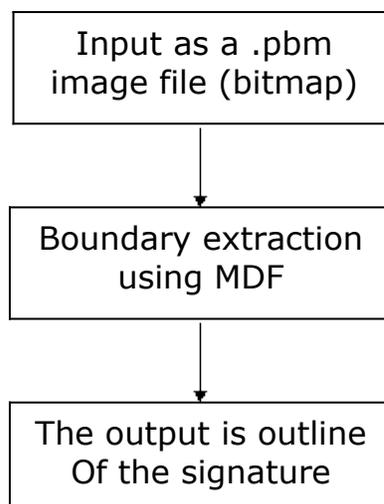
Preprocessing

Pre processing is nothing but a process in which input is an   image   the input image is converted into .pbm format which is a bitmap format And sent for further execution the purpose of converting it into bitmap format is that in second module we are going extract the boundaries of the signature if it is in bitmap format it would easy for the boundary extraction

```
┌─────────────────────┐
│  Input as image files│
│     JPEG or MPEG     │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│  Converting them into│
│   a .pbm format      │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│   The out put is a   │
│      .pbm image      │
└─────────────────────┘
```

Feature extraction

In feature extraction the boundaries of the signature image is extracted using MDF (modified extraction feature) for further modification purpose of extraction of the signatures boundaries is that

It would be easy for the classifier to identify and verify the signature because in the in the Feature extraction the size of the image is reduced.

```
┌─────────────────────┐
│    Input as a .pbm   │
│   image file (bitmap)│
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ Boundary extraction  │
│     using MDF        │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ The output is outline│
│   Of the signature   │
└─────────────────────┘
```

Classification

    In classification process the input is an image   file the classifier verifies and identifies the signature this is the last module of this project which uses trained classifier which gives an accuracy of about 91.21% which much greater than the existing system

```
┌─────────────────────┐
│  Input is a signature │
│        image          │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   Verification of the │
│        signature      │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Identification of the │
│        signature      │
└─────────────────────┘
```
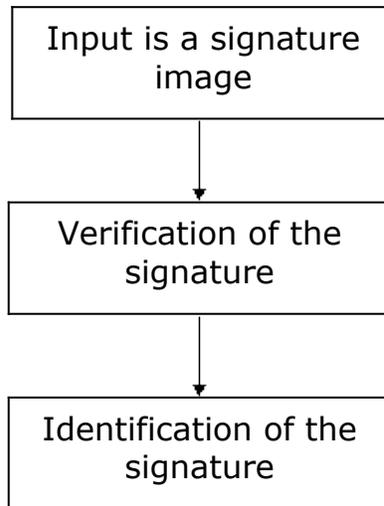
REFERENCE:

Miguel A. Ferrer, Aythami Morales and J.F. Vargas, "Off-line Signature Verfication using Local Patterns", **IEEE Conference, 2011.**