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Handwriting Recognition Using SVM

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Abstract— **A design of a better pattern recognition system requires a standard database which will help in evaluating the algorithm and comparison of different methods check the usefulness of this methods for extracting the features of individual writers we created our own database, writer samples are collected scanned and stored as image files Writer identification is the process of determining the genuine writer from the list of candidates. According to the type of input data writer identification can be classified as either online or offline**

Keywords— SVM, Pattern Recognition, Feature Extraction ,Writer Identification

INTRODUCTION

Handwriting is one of the most important ways of communication. It was used since the Stone Age where symbols were drawn on stones in order to express or convey some meaningful information. Later, handwriting was done using pen and paper. Handwriting was used for personal benefits like writing reminders and notes for ourselves or for business purposes such as writing letters, statements and filling up forms.

The handwriting of each individual is unique because the process of handwriting is a physical process, which involves the mind, skeleton and muscles, controlled by the brain. Even so, individual handwriting could also differ, based on the mood and the state of mind of the person writing. The handwriting among the different stock of people are normally different, due to the conditioning and training during the period of growing up. However, even though the same stock of people has similar handwriting, it is an accepted fact that no two people have the same style of handwriting.

Handwriting has continue to persist as a means of communication and recording information in day-to-day life even with the introduction of new technologies.

This overview describes the nature of handwritten language, how it is transduced into electronic data, and the basic concepts behind written language recognition algorithms , both the online and off-line cases are considered.

EXISTING SYSTEM

In earlier days it was a notion of the people who were using computers for their work have to adapt their style of input in a way computer expects-whether in typing, or filling out forms with letters.

Biometric features, which are used for personal identification, use the concept of pattern recognition [Plamond and G Lorette,1989; A.K. Jain, R. Bolle, S. Pankanti,1999;
Jain, L. Hong, S. Pankanti,2000;G.R. Ball and S.N. Srihari,2009]. Biometric data of each individual is acquired, features are extracted and matched with the features available in a database to obtain most accurate results.

These results may be used for variety of purpose including personal identification, crime or other security requirements.

Disadvantages:
- To avoid interference with the human-readable address field which can be located anywhere on the letter, special ink is used that is clearly visible under ultraviolet light.
- To avoid manual changes.
- Fraud Detection.

PROPOSED SYSTEM:

A Design of a better pattern recognition system requires a standard database which will help in evaluating the algorithms and comparison of different methods To check the usefulness of our method for extracting the features of the individual writers, we created our own database. Writer samples are collected, scanned and stored as image files. From each writer, 5 samples of handwriting is collected at different time of the day to take care of possible variation in their writing due to change in their psychological behavior at different time of the day. This may due to stress level or their psychological attitude.

Step 1: Take a sample of the writer handwriting. Step 2:

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For each sample repeat steps 3 to 5.
Step 3: Find the features for each writer.
Step 4: Compute the average value of features selected in step 3.
Step 5: Compute the average value of each member in the group.
Step 6: Use the computed value in step 5 to get overall classification of the writer handwriting.

By literature survey

Paper[1]: In this paper we present a hybrid system which is able to achieve a mode detection performance of 95.6% on seven classes; handwriting, lines, arrows, ellipses, rectangles, triangles, and diamonds. The system consists of three KNN classifiers which use global and structural features of the pen trajectory and a fitting algorithm for verifying the different geometrical objects

Paper[2]: this paper presented a feature extraction technique for offline handwritten Gurumukhi character recognition based on the boundary extent of the character image and used various feature selection techniques, to reduce the dimensionality of feature vectors. This paper also compares their recognition performances using two different classifiers, namely, Nearest Neighbors (NN) and Support Vector Machine (SVM)

with linear kernel.

Paper[3]:This review paper will focus on different technique which is used on handwriting recognition. There are basically two different types of handwriting recognition system online and offline handwriting recognition. So this paper is an overview of different approaches of handwriting recognition system with their limitations and accuracy rate.

Paper[4]:This review paper presents on Optical Character Recognition (OCR) technique .English OCR system is compulsory to connect numerous published books of English into editable Computer files A system is required which can handle all Classes of English test and identify character among these classes
Start, Follow, Read: End-to End Full-Page Handwriting Recognition: Start, Follow, Read (SFR) model is composed of a Region Purpose Network to find the start position of text line, a novel line follower network that incrementally follows and preprocesses line of text into de warped images suitable for recognition by Convolution Neural Network Long Short-Term Memory (CNNLSTM) network

PROPOSED METHODOLOGY
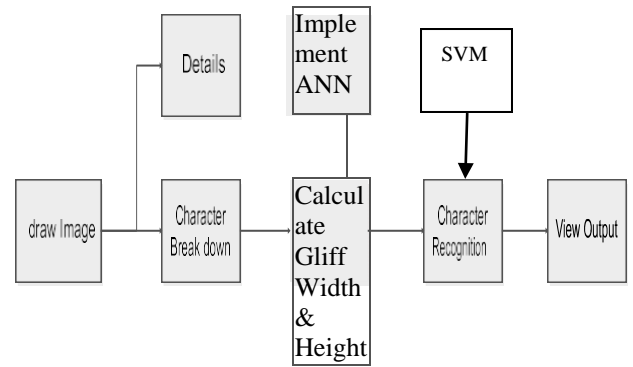The system architecture of the proposed system is shown below

Fig 1: System Architecture Draw image

this is the first step in this system architecture. The trained image is uploaded by the user. this image is stored in the database

Character Breakdown
Character breakdown is an operation that seeks to decompose an image of a sequence of characters into sub images of individual symbols

Glyph width
This is simply the glyph horizontal extent more simply it is (bbox.xMax,-bbox,Xmin) for unrelated font coordinator , for related glyphs its computation requests specific case described in the grid-fitting

Glyph height
This is simply the glyph horizontal extent more sim ply it is (bbox.xMax,-bbox,Xmin) for unrelated font coordinator. Its computation represents specific case

Calculate Glyph width and height
To determine the average character width and height at a particular font size, you can divide the resulting width and height

SVM CLASSIFER

Case 1: Consider the case in figure that to find the best hyperplane which can separate the two classes .In SVM we try to maximize the distanced between hyperplane and nearest data point
Case 2: In this case all decision boundaries are separated classes. Case 3: In this case data is not evenly distributed on left and right.
Case 4: While selecting hyperplane, SVM will automatically ignores the data point and selects the best performing hyperplane.
Case 5: In this case non linear classifiers are highlighted and Data cannot be separated by any straight line

Case 1:
•   To maximize the distance between hyperplane & nearest data point. This is known as margin.
•   Since 1st decision boundary is maximizing the distance between classes on left and right. So, the maximum margin hyperplane will be ―1st‖

@dataaspirant.com
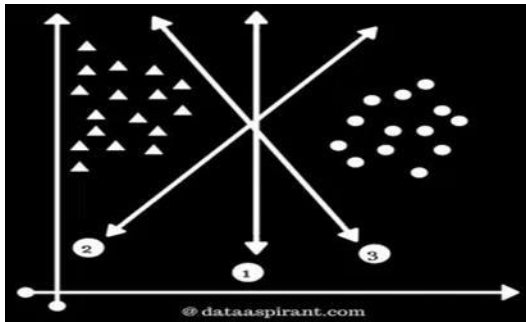
CONCLUSION

- Handwriting identification is the process of determining the genuine writer from the list of candidates

- Handwritten digit recognition: Support vector classifiers can be applied to the recognition of isolated handwritten digits optically scanned.

- Text Categorization: In information retrieval and then categorization of data using labels can be done by SVM SVMs are effective when the number of features is quite large.

- It works effectively even if the number of features are greater than the number of samples.

- Non-Linear data can also be classified using customized hyperplanes built by using kernel trick.

- It is a robust model to solve prediction problems since it maximizes margin.

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