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Automatic Predict Personality Based on Structure of Handwriting

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ABSTRACT: Handwriting Analysis or Graphology is a scientific method of identifying, evaluating and understanding personality through the strokes and patterns revealed by handwriting. Handwriting stroke reflects how the author faced his world and the emotional honesty. By examining the handwriting, we can develop a sketch which reflects the writer's emotional outlays, fears, honesty, mental state and many other personality traits. Emotions include the interpretation, perception and response of the feelings related to the experience of any particular situation. In this research, using graphical approach based on handwriting to predict the more personality using structure algorithms and multiple rule based technique. The image area had pre-processing performed to improve the recognition accuracy. Handwriting area is classified using multi structure algorithm based on four features (margins, spacing between words and lines, and zone domination) and using rule based technique after hill valley extraction based on baseline features. Eight features are processed using multi-structure algorithms that provide 87-100% accuracy. In the meantime, six features are classified using anrule based technique which result an accuracy of 52-100%. The system has been implemented with the software so that it can be used for Automatic Emotion Recognition and classification of personality from handwriting scanned automatically.

KEYWORDS: Predict personality, Handwriting and signature analysis, Graphology, Structure algorithms,SVM, Rule based technique.

I. INTRODUCTIONS

A. Background:

In Recent years there is much work has been done in automated human behavior prediction system. It appears that there are many research studies exploiting various techniques blended with automated human behavior prediction system/ Graphology. If the graphology test is still done manually it takes a longtime considering the aspects reviewed in graphology very much. Besides, accuracy of handwriting analysis depends on how skilled the analyst is. Development in image processing and pattern recognition lead to analyzing of handwriting can be done automatically. So it can be used by society at large. Handwriting is an image, so that recognition can be done through the stages of conversion of images into numerical vector, image processing for quality improvement, followed by feature extraction and pattern recognition

B. Motivations:

Handwriting and signature are image that have certain pattern reflecting anything such personality prediction. Handwriting analysis is also known as graphology which is pseudoscientific study of handwriting in relation to human mind or called the personality. One of methods in analyzing structural graphic element of handwriting is graphology. Graphology can do to identify the qualities, traits, attitudes, sentiments or postures that seem indicated in the handwriting; they further seek insight into how these aspects of selfhood may integrate together to constitute the dynamic organization that we recognize as the personality of that writer. Some of guidelines for handwriting analysis are seven basic elements: speed, pressure, shape, dimensions, continuity, direction, and order. Personality

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overview was obtained from the research on handwriting psychiatric patients. Handwriting can be classified on the various aspects of personality. Meanwhile the use of signatures is usually used to identify certain personality as with appearance of dots, streaks, shapes or shell bottom line. There are two approaches in graphology i.e. graphical analysis of the structure type of writing and analysis of the type of symbol or letter. Signature analysis includes first approach.

C. Goal:

1. Identifying, evaluating and understanding personality through the strokes and patterns revealed by handwriting.
2. Recognizing the emotion based on handwriting.

D. Objective and Scope:

1. To determine a person's emotions and personality based on structure of handwriting.
2. Increase the accuracy of personality prediction.
3. System takes minimum time for emotion recognition and personality prediction.

II. RELATED WORK OR LITERATURE SURVEY

[1] BehnamFallah, Hassan Khotanlou, "Identify human personality parameters based onhandwriting using neural network", 2016 IEEE.

Technique:

To identify the character parameters in training stage, The MinnesotaMultiphasic Personality Inventory was applied, and for identification of one's personality fromhis/her handwriting, a hidden Markov model and neural network(MLP) to perform classification was used so that MLP was used to identify those properties which are not related to the writerand a hidden Markov model was used to classify those propertieswhich are related to the target writer.

Advantages:

- Using dependent and Independent features of text in the process of feature extraction.
- The proposed personality recognition system is automated, particularly in the process of feature extraction(None automated systems are very unendurable and timeconsuming).

Disadvantages:

- The problem is computationally difficult (NP-hard).

Referred Points:

- Handwriting recognition
- Persian handwriting
- Neural network
- MMPI personality test.

[2] Champa H N, K R AnandaKumar, "Automated Human Behavior Prediction through Handwriting Analysis", 2010 IEEE First International Conference on Integrated Intelligent Computing.

Technique:

To predict the personality of a person from thebaseline, the pen pressure**,** the letter**'t'**, the lowerloop of letter 'y' and the slant of the writing as foundin an individual's handwriting. These parametersare the inputs to a Rule-Base which outputs thepersonalitytrait of the writer.

Advantages:

- Writer independent handwriting analysis system.
- Effectiveness of predicting the character and personality of that individual

Disadvantages:

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- Does not include features of handwriting like the size of the letters, the margins and others as inputs for personality trait determination.

Referred Points:

- Personality Traits.
- Baselines.
- Handwritten character for personality prediction.
- Handwriting analysis.

[3] RicardColl, Alicia Fornes, JosepLlados, "Graphological Analysis of Handwritten Text Documents for Human Resources Recruitment", IEEE 2009 10th International Conference on Document Analysis and Recognition.

Technique:

Model ofmeasuring active personality and leadership of the writer.Graphological features that define such a profile are measuredin terms of document and script attributes like layoutconfiguration, letter size, shape, slant and skew angleof lines, etc. After the extraction, data is classified using aNeural network.

Advantages:

- Writer identification since they differ from one person to another.
- Performance is measured by examining multiple samples.
- Fast and useful tool, more reliable.

Disadvantages:

- Level of accuracy in the result is totally depending on the knowledge and experience of the graphologist.

Referred Points:

- Graph logical attributes.
- Image Feature Extraction Correspondences between personality characteristics and graphological features.

[4] PankajKumawat, AshaKhatri, BaluramNagaria, "Comparative analysis of offline Handwriting Recognition Using InvariantMoments with HMM and combined SVM-HMM classifier", IEEE 2013 International Conference on Communication Systems and Network Technologies.

Technique:

Hidden Markov Model HMM produces good result for largenumber of statistical patterns. However, the performance of the system depends entirely on the feature vectors. Unlike thecases of usual patter recognition like face recognition, a user's training and test sample may vary. Hence recognition of thesame is tough. Therefore in this work we propose a novel technique for offline handwriting recognition based on Invariant Moments and curve let transform. Curve lettransform and Invariant moments are used predominantly for character recognition problem and hence are more suitable for the work.

Advantages:

- Effective handwriting analysis.
- Proved to be satisfactory especially for large number ofclasses.
- High Accuracy.

Disadvantages:

- Success of the algorithm largely depends uponpreprocessing steps and the efficiency of preprocessing.

Referred Points:

- Hidden Markov Model (HMM).
- Curve let transform(CT).
- Invariant Statistical Features (IFS).
- Thresholding.
- SVM

Referred Points:

- Handwriting recognition
- on-line
- off-line
- Written language
- Signature verification,
- Cursive script
- Handwriting learning tool
- Writer identification

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III. EXISTING SYSTEM AND DISADVANTAGES

In existing system identifying the personality of a human being by his handwriting is an oldtechnique. Before, the nature of an individual waspredicted manually, which took a long time.Recognizing a writer`s personality from hishandwriting has recently become a considerable andinteresting subject in psychology.

Disadvantages:

1. Manually personality prediction.
2. It took long time for personality prediction.
3. Existing system does not recognize the emotions.

IV. PROPOSED SYSTEM AND ADVANTAGES

We proposed new approach for identifying, evaluating and understanding personality through the strokes and patterns revealed by handwriting. Handwriting stroke reflects how the author faced his world and the emotional honesty. By examining the handwriting, we can develop a sketch which reflects the writer's emotional outlays, fears, honesty, mental state and many other personality traits. Emotions include the interpretation, perception and response of the feelings related to the experience of any particular situation. In this research, using graphical approach based on handwriting to predict the more personality using structure algorithms and rule based technique. In this research handwriting analysis carried out on fivefeatures that page margin, spacing between words, spacingbetween lines, dominance of vertical zones, and baselines.Meanwhile signature analysis using nine features that curvedstart, end streak, shell, middle streaks, underline, extreme emargin, dot structure, separate, and streak disconnected.

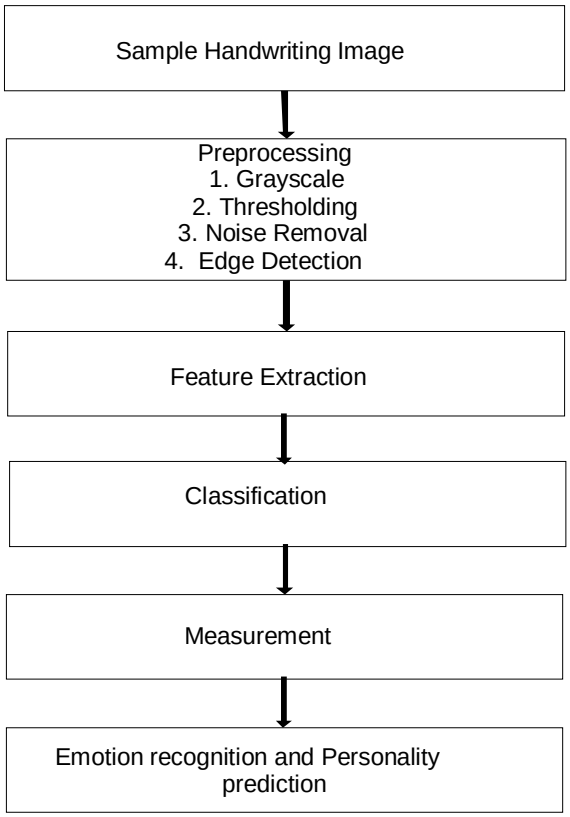

Fig.1. Block Diagram of Proposed System

Explanation-

Above diagram show the architecture of proposed system. We explain every steps in architecture in detail.

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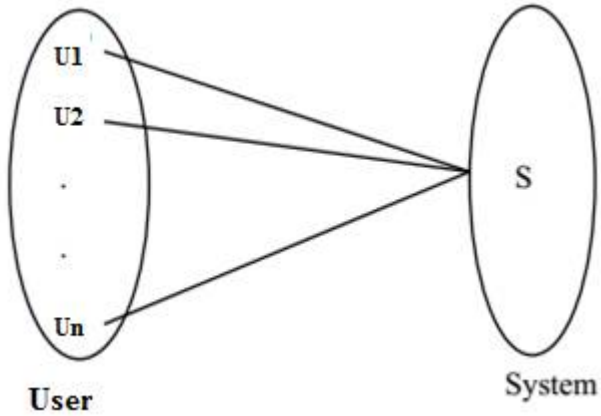
1. Preprocessing :
   In pre-processing stage, image processing was done with gray scale, threshold, noise removal and skew correction.
2. Feature Extraction :
   Feature Extraction is a crucial task that needs to becarried out by experts. Features may be classified as macro or micro features which usually define gray-scale orstructural view respectively. In this step, the writing features such as baseline, slant,pen-pressure, Size, Margin, Zone etc. are determined from the handwriting samples. Feature extraction of handwriting baseline using Hill and Valley and convert to vector.
3. Segmentation :
   Segmentation performed on three stages, ie. vertical segmentation, horizontalsegmentation and lines segmentation
4. Classification :
   Classification is based on following point
   a. Classification using page margin structure.
   b. Classification using spacing between line structures.
   c. Classification using spacing between word structures.
   d. Classification using amount of dominance of zones structure.
   e. Classification of baseline using rule based technique.
5. Emotion Recognition and Personality Prediction :
   Emotion Recognition and Personality Prediction is based on above classification points.

Advantages:

1. Automatic emotion recognition and personality prediction.
2. System takes minimum time to personality prediction.
3. It also helps you to identify the hidden talents and aptitudes, thus, helping you to choose a right career path for yourself.
4. Handwriting analysis plays an important role in motivating employees to get better performance. It also helps a manager to understand the needs of his employees and work on them. It can improve teamwork by helping the manager to understand individual & team strengths and weaknesses.

V. MATHEMATICAL MODELING
VI.

A] Mapping Diagram



Where,

U1,U2…..Un= No.of Users.

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S = System

B] Set Theory

S={s, e, X, P, Y,Φ}

Where,

s = Start of the program.

1. **Authentication.**

Where,

L = Login, UN = User name, PWD = Password

To access the facilities of system, User has to log into system.

X = Input of the program.

2. **Identify Input as**

Input should be Handwriting Image.

$X = \{I_1, I_2, \ldots\ldots I_n\}$

Where,

I_1, I2,……, In=No. of Images uploaded by User.

P= Process of the program

3. **Identify Process P as**

P = {G, T, N, E, F, C}

Where,

G = Gray scale.

T= Threshold.

N = Noise removal.

E = Edge Detection.

F = Feature Extraction.

C= Classification

Y = Output of the program.

4. **Identify Output Y as**

Y = {ER, PP}

Where,

ER = Emotion Recognition.

PP= Personality Prediction.

According to Handwriting Image system detects Emotion and Personality.

φ = Success or failure condition of system.

Failures:

1. Huge database can lead to more time consumption to get the information.
2. Hardware failure.
3. Software failure.

Success:

1. Search the required information from available in Datasets.
2. User gets result very fast according to their needs.

Above mathematical model is NP-Complete.

VII. SYSTEM ANALYSIS

Experimental evaluation is done to compare the proposed system with the existing system for evaluating the performance. The simulation platform used is built using Java framework (version jdk 7) on Windows platform. The system does not require any specific hardware to run; any standard machine is capable of running the application. By observing the graph we can conclude that the graph shows Different Handwriting features.

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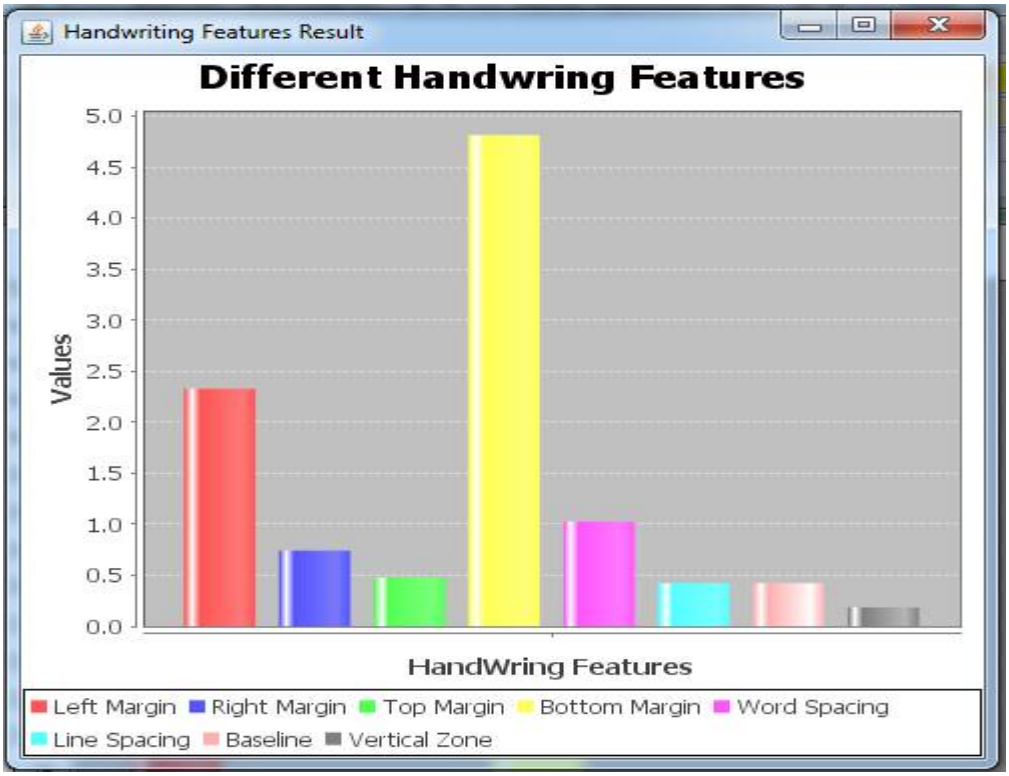

Fig 2. Calculated Different Handwriting Features

Fig 3. Result table of Handwriting Features

VIII. CONCLUSION

This system can identify the typeof handwriting from a variety of features personalities usingmulti structure and rule based algorithm. It is useful to obtain anoverall picture of the personality and automatic emotion recognition. This

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system has been implemented in software to provide convenience to the public in identifying personality easily andquickly. It can be used in the selection of the employee or jobapplication letter. For the future, handwriting pattern recognition system canincrease the number of features in order to provide a morecomplete picture of personality and it helps to more accurate prediction ofpersonality.

The current system has limitations in terms of number of features and accuracy. Future work includes acquiring more accurate in predicting personality. The current system can be extended to smart system in which most of the handwriting features and also signature features can be extracted. So that personality can be recognized from corresponding extracted features.

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