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Personality Identification Based on Handwriting

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Abstract: Graphology and handwriting analysis is now accepted and increasingly used technique for appraisement of people in organizations. The Handwriting analysis is an effective reliable indicator of personality and behaviour. It is useful tool for many organizational processes. Handwriting reveals the true personality including honesty, fears, defenses and over many other individual personality traits. Handwriting is brain writing, it representing the mental status of the person. The handwriting analysis is a prediction technique as the body language that profiles the human behaviour in areas of the social skills, achievements, thinking styles and work habits. The handwriting analysis can happen with the help of some features like size of the letter, slant, and baseline in a document to identify the personality of the writer. The handwriting analysed through Image Processing using MATLAB. In this paper a method has been proposed to predict the behaviour of a person through the baseline, slant of the letter and size of the letter as found in a person's handwriting. These parameters are the inputs to the Artificial Neural Network which outputs the personality trait of the writer.

Keywords: Graphology, Handwriting Analysis, Artificial Neural Network, personality traits

I. INTRODUCTION

Handwriting Analysis or graphology is a scientific method of classifying, valuating and understanding personality through the strokes and patterns revealed by handwriting. The Handwriting reveals the true personality including fears, defenses and emotional outlay. The professional handwriting examiners are called graphologist often identify the writer with a piece of handwriting. Although human interference in handwriting analysis has been effective and costly. Hence the proposed methodology focuses on developing a tool for behavioral analysis which can predict the personality traits automatically with the aid of a computer without the human interference. This paper mainly concentrate on handwriting recognize and prediction of the characteristic of the person whose handwriting it is. For the first step is to training the computer what handwriting is and how to segment it. we proposed artificial neural network method to predict the personality of a person from the baseline, slant, size of the letter in an individual's handwriting.

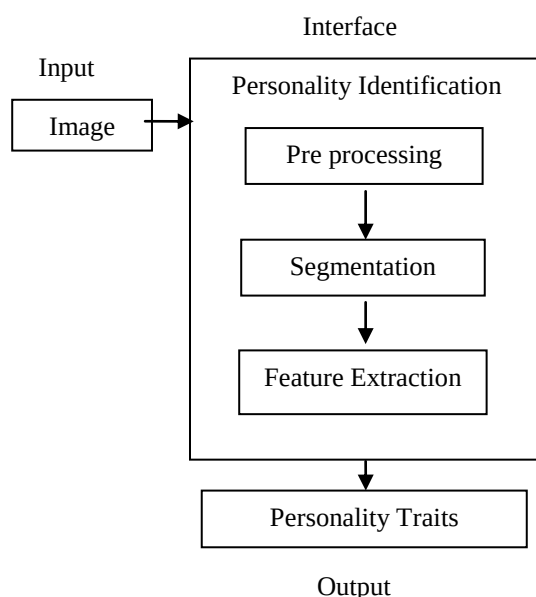


Figure 1 Architecture diagram

In this paper a method has been proposed to predict the personality of a person from the features extracted from his handwriting using Artificial Neural Networks. Preprocessing have few types of sub process to clean the document image and make it appropriate to carry the recognition process accurately such as binarization, noise removal etc. The segmentation is the process which is used to split the document images into 3 sections that are words, lines and characters. The feature is defined as a function of one or more measurements, which specifies some quantifiable property of an object and it is computed such that it quantifies some significant characteristics of the object.

II. RELATED WORK

Handwriting analysis is a method to predict personality of an author and to better understand the writer. To predict the personality of the individual there are various features, such as slant of letter, size of the letter, baseline these are enough to predict the behavior of the person who written by mentally mature and are skillful and many others. Handwriting reveals the true personality including, fears, honesty, defenses, emotional outlay and many other personality of the person is predicted from the above traits. The developed system distinguishes handwriting closely which may not be possible for a graphologist.

III. PROPOSED METHODOLOGY

Professional handwriting examiners called graphologist often identify the writer with a piece of paper written by the individual writer which is very time taking. The efficiency in the result is totally depending on the knowledge and experience of the graphologist. The human intervention in handwriting analysis has been effective and it is costly. The method is focus on developing a tool for behavioral analysis which can predict the personality traits automatically.

The most common feature of handwriting that can serve as scheme to predict personality traits are spacing between letters, word-slant, baseline, words and lines, starting strokes, size of letters, end-strokes and width of margins. In this paper we are using the size of letters; baseline and slant of the words are considered for predicting the personality of the writer [10]. The proposed paper [2] [3] [4] have mainly three steps: pre-processing, segmentation, and feature extraction has been mentioned in Figure 1.

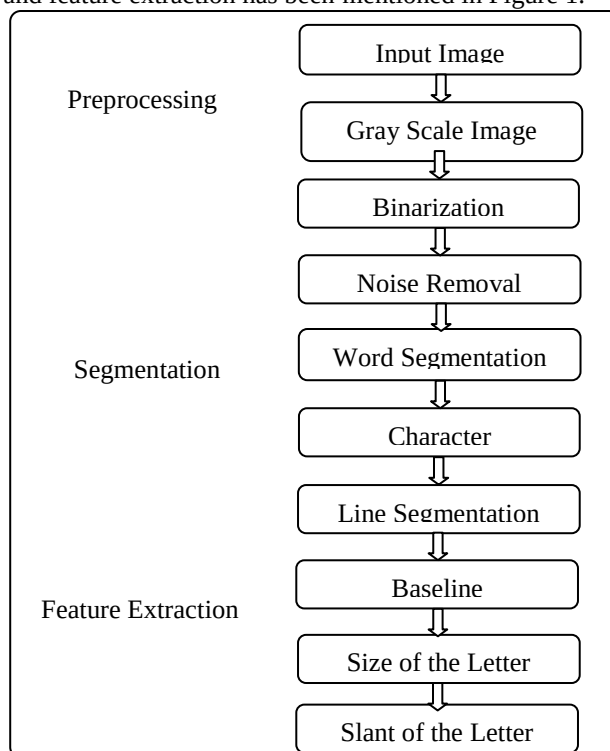


Figure 2: Block Flow Diagram of proposed system.

In preprocessing phase, any writer identification system for better performance requires noise free images. The preprocessing steps such as removal of non-text regions, noise removal and binarization. In the proposed method the text portion of the document image was separated from the non-text region manually. A global threshold approach [12] is used to binaries' the scanned gray scale images where black pixels having the value 0's correspond to object and white pixels having value 1's correspond to background.

A handwritten document is first scanned and is converted into a gray scale image [1]. Binarization is a technique by which the gray scale images are converted to binary images. The goal is to remove only the background by setting it to white and leave the foreground image unchanged. Thus, binarization separates the foreground and background information. Scanned documents often contain noise that arises due to printer, scanner, print quality and age of the document. Therefore, it is necessary to filter this noise before we process the image

In segmentation the handwriting image is segmented into three different types of segments, i.e. word segmentation, letter segmentation and line segmentation, each used for different processing. The words segmentation process is used to segment the words in handwriting document to calculate different features related to words indicating the disposition towards criticism, and towards argument. The letter segmentation is performed on each letters in the word in handwriting document of each individual. This segmentation is used in feature calculation related to letter for the prediction of the personality of individuals. Letter segmentation which is future used to calculate various slants in letters indicating the openness of sentiment and consequently of the intelligence. The line segmentation is used to find

baseline features to judge the writer's emotional stability and dispositions in the baseline of the writing. Segmented image is then processed to calculate some numerical values mathematically to classify the personality of writer's on psychological factors.

In feature extraction, major goal of feature extraction is to extract a set of features which maximizes the recognition rate with least amount of elements. In this paper features are the three important factors on which a graphologist predicts the behavior of human being. These features are explained in below. The size of the letters in a document represents the author's desire to be noticed. In handwriting the large and bold writing indicates that the writer wants to say 'notice me'. While in the case of small writing author is less desired to be noticed. Middle writing is the normal writing indicating the desire to be fit in the running world.

The emotional stability and disposition of writer is judged by the baseline in the handwriting. The baseline in one's handwriting reveals a lot of accurate information about the writer. Pertinently each one relates to a specific personality trait of the writer The baseline in an individual's handwriting—the imaginary line on which the bottoms of the middle zone letters align--reveals a lot of information about the writer. The direction of the baseline may be dependent on temporary conditions, such as mental state or physical condition. The common baselines are found in handwriting slanting downwards, rising upwards and balanced. Each type reveals a particular personality trait of writer.

Another feature is letter slant. It is related to writer's emotional direction and degree of emotional control. About 77 percent of writers write with a right slant, 15 percent with left slant and rest 8 percent write vertically. In this proposed field we introducing three types of slants that are right slant vertical and left slant. The slant of the letters indicates the connection between the writer's inner and outer world. It is the writer's reaction to environmental factors.

IV. EXPERIMENT AND RESULT

In our paper we are using Artificial Neural Network as an algorithm. To find the personality traits using the following steps.

1. Load the input sample image.
2. Image Enhancement
 - (i) Noise filtering
 - (ii) Histogram equalization
3. Image Segmentation

The lines are segmented from the image.
4. Feature extraction
 - (i) The baseline of the lines are detected and the slope of the line is calculated by using tangent.
 - (ii) The vertical height of the lines is detected and the average height of the line is calculating.
 - (iii) The spaces are detected by horizontal Distance between the letters. If the distance is greater than specific threshold then it is classified as line space.
 - (iv) A single letter from the word is identified using narrower threshold.
 - (v) The top most point and bottom most point are Selected from the letter and vertical slope is maintained as the line slant.
5. The personality identification is made using the preset templates depending on the feature extract results.

In figure 3. We show how to work the Artificial Neural Network algorithm to find the personality identification based handwriting. The baseline, size of letter and slant of the letter will be different from one person to another. Through ANN we can find each person's character. The scanned image will take as input then it will perform preprocessing. The preprocessed image will take for do the segmentation. The segmentation happed in two ways line segmentation and character segmentation. The segmented line and character will used for feature extraction.

The feature extractions have three features that are baseline, size of letter and slant of the letter. This feature will give personality traits for each handwriting.

Figure 3: Personality traits predicted by various handwriting styles of writer.

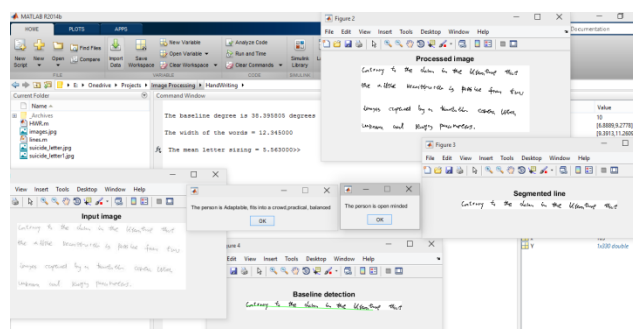


Table 1: Psychological personality traits predicted by various handwriting styles of writer.

S.No.	Writing Categories	Psychological Personality Behavior
1.	Large Letters	Likes being noticed, stands out in a crowd
2.	Small Letters	Introspective, not seeking attention, modest
3.	Medium Letters	Adaptable, fits into a crowd, practical, balanced
4.	Right Slant	Sociable, responsive, interested in others, friendly
5.	Left Slant	Reserved, observant, self-reliant, non-intrusive
6.	Vertical	Practical, independent, controlled, self sufficient
7.	Raising Baseline	Optimistic, upbeat, positive attitude, ambitious, hopeful
8.	Falling Baseline	Tired, overwhelmed, pessimistic, not hopeful
9.	Straight Baseline	Determined, stays on track, Self-motivated, controls emotions, reliable, steady

V. CONCLUSION AND FUTURE WORK

A method has been proposed to predict the personality of a person from the features extracted from his handwriting using Artificial Neural Networks. The personality traits revealed by the baseline, size of the letter and slant of the letter as found in an individual's handwriting are explored in this paper. Three parameters, the baseline, size of the letter and slant of the letter are the inputs to the ANN which outputs the personality trait of the writer. This paper proposes an off-line, writer independent handwriting analysis system. Even though offline handwriting recognition lacks the interactive nature of on-line handwriting recognition, this is taken care in this work by allowing the user to select the required character from the input image for feature extraction. The future work can be to include more features of the handwriting like the size of the letters, the margins and others as inputs for personality trait determination.

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