

Personality Prediction Through Offline Handwriting Analysis

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Abstract—Handwriting analysis can be mean of writer's personality prediction. It will reflect the human personality, through the hi-tech handwriting analyzer. Handwriting analysis can be performed according to different categories for example age, gender, social status, such categorization helps us to focus on certain categories. Classification Which will be possible on the basis of certain features along with human dimensions (physical, Mental, Emotional) and trying to find out the personality traits by using the different features of handwriting. These features are defined in the parameters form, with calculations and several geometric formulas to fill the performance of different features. These different features are extracted very carefully after it classifies.

Classifications depend on feature mining and improvements of the system depend upon features [1]. These feature to perform the classification of handwritings regarding age, gender and social status. Such features are used to identify the personality of the writer. Personality prediction through user define Handwriting Analyzer step by step analysis. This Handwriting Analyzer will be designed according to a sustainable environment.

Keywords—Handwriting analysis, image, mining, personality Recognition, Adaptation, Expression.

I. INTRODUCTION

A person's actions can be analyzed by performance and expression [2]. Handwriting is a combination of Adaptation and Expression, [3] these are highly important factors in personality prediction. It was difficult to predict the personality trait in the past with conventional signs and personal elaboration of graphic shapes. But now it's become easier to find out personality traits with the use of different methods. The graphologist provides a window into personality structure [4]. By examining all elements of handwriting and interpreting them separately and together the graphologists generate a thumbnail Outline of the writer's character traits. With the help of graphology, handwriting analysts predict the viewpoint, behavior, mood or pose. In this paper, a method has been proposed to predict the personality of a person from the features extracted from his handwriting. The personality traits revealed by two aspects. Sentence wise and Paragraph wise [5]. Five parameters will be defined of a

sentence, Length of sentence, slop of words, slant, pen pressures, and printed sentences. We can analysis person's handwriting. It's not true that writing and writing styles of persons will be same. Graphology is the study of handwritings. [6] It is valuable technique or method for the assessment of a person's personality. It gives us help in many organizational processes for example Employment, Job seeking interviews and future planning. Handwriting Analyzer is a scientific method for writer identification and evaluating the behavior. To make this general layout as direction of lines, spacing, speed of writing, impressions. Many European countries are well known in graphology, Particularly in France, Germany, Switzerland, Belgium, Netherlands and Britain. Graphology is taught as a subject. Graphologists are license holders in these countries. They are applying it in many ways, for example Psychologists taking it as a useful diagnostic tool. It's understood that it is a cheapest and fastest information provider about writer character, emotions and self-awareness and aptitudes.

Handwriting features can be identified by Graphologist.[7] These features are used for analysis. Such user defined Handwriting Analyzer will provide a base of features which will be extracted by inputting some information. For such information define some parameters. Scammers can use to read such parameters.

Personality predictions through user define Handwriting Analyzer uses a step by step approach.

First step is to enable a computer to detect and understand handwriting. Here our software helps us to generate a full picture of our handwriting sample Furthermore. The digital sample collection is easy and cheaper which can be used as input for computer and through image processing technique. Features are calculated and prediction about the personality of the writer is passed there on. Initially, some features are used which are most vital for judging and the prime focus is feature mining and its classification. Here are writing samples of different age groups and different gender

II. Proposed Method

Graphology is classified into different types or kinds of handwritings. This will allow us to tell not only where in certain handwritings look like one another, but also to distinguish the differences between the chirography of one person and that of another, for it very repeatedly happens that although realize there's a difference between two handwritings we are unable to tell in just what particular features the differences exists, so that perceive at once the necessity for adopting some method of classification as a

basis for the proper understanding of the subject. Our first classification, then, is made up of the General Features of handwriting. Our second classification consists of the Special Features, as exposed in the various details of handwriting.[8] It not infrequently happens that a number of different handwritings will very closely resemble one another in their general appearance, for they may all possess the same general features; but upon examination it will be found that they differ from one another in certain details or special features. In one of them, perhaps, the fonts are all crossed very heavily and firmly; in another they are crossed very evenly and in a third the cross may be wholly absent.

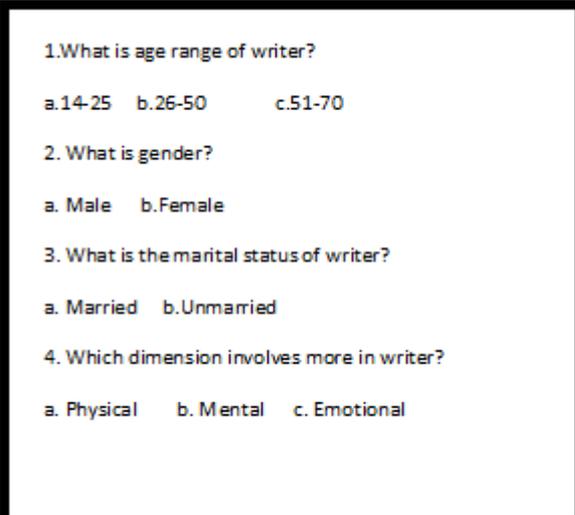
Therefore the proposed methodology is focal point in developing a tool for handwriting analysis, which can predict the personality traits automatically with the help of a computer. The various features in handwriting through which personality can be predicted are pen pressure, baseline, slant, Spacing between letters, spacing between words, the size of the writing, height of bar on different letters and so on

In this paper a method has been proposed to predict the personality of a person from five parameters- base line, slant, pen pressure, and different letters.

An expert graphologist is the sign of high accuracy.[9] Data collection or sample is the first stage of analysis. During the collection of data or samples we should care of human dimension. They have an influence on human handwriting for example if a person is mentally upset, any physical problem and emotionally disturb. The level of result accuracy depends upon the experience and knowledge of a graphologist because he/she considers all aspects. Handwriting analyst is known as graphologist. During handwriting analysis a graphologist need important stages. When for example studying any type of handwriting we should gather data or images with in different ways we have to perform preprocess steps to organize data it should be according to the requirement of the analyst.

During this research, various Images of handwritten samples are collected by two methods.

- i. Uploading images to the system
- ii. Input images through digital image Input devices (camera or scanner). The uploaded image is preprocessed and resized to the actual orientation.[10] In the image preprocessing steps such as noise removal and binarization [11].The main goal of binarization to provide important information and remove unwanted.[12] A form will be filled with following question before data gathering.



1.What is age range of writer?
a.14-25 b.26-50 c.51-70

2. What is gender?
a. Male b.Female

3. What is the marital status of writer?
a. Married b.Unmarried

4. Which dimension involves more in writer?
a. Physical b. Mental c. Emotional

Fig.1. (Basic information form)

In a next step adjust the parameters according to certain features can be applied different techniques about such features for example line spacing, word space and word recognition. When we take a sample of handwriting Analyzer at once start working. Read all required parameters and calculate them, which help us in predicting.

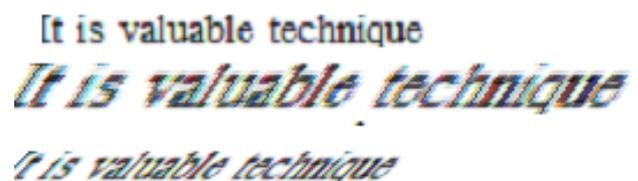
During analyzing many problems can occur for example word size, line separation, Word segmentation, Word recognition. We can remove such problems by using different techniques for example RTF and OCR. The baseline can be defined in a proper way to reduce line separation. Arrange the words in an organized form maintain their size. All these problems should manage and remove by using proper techniques for example Ritch Text Format.



“Fig.2.”(Line spacing)

III. Line Segment

It is a valuable technique



“Fig.3.”(Line segmentation)

IV. Word Segmentation

In word division ascertain the distinctive components identified by words demonstrating the attitude towards feedback, and towards argument. With the help of simple segmentation algorithm word segmentation will be performed. $2n-1$ segmentation of a word with n letters. A segmentation of "information" separate letters are displayed in vertical bars. As "in | for | ma | tion". Which $n-1$ gaps contain a vertical bar or do not. It can represent with segmentation. A computer expert can do all this with binary numbers as $n-1$ digit. Relate to valid segmentations, and these range from 0 to giving total numbers.

The main and challenging task is word reorganization, we need fast word recognizer system. With the help of such system where we are using Intelligent Recognition with the OCR software comparing and recognizing the specific areas: Curves of curves of cursive writing communicate it into ASCII text.

All problems can be removed with the proper techniques. When different techniques are applied following features should be considered on the base of age, gender and social status. The authors divided handwriting into gender, handedness, age and ethnicity as writer-specific sub-categories [13].

Sentence Length, character size, Slant, Slop, pen Pressure, small writing, and Close Words, etc. When we are selecting main features e.g. age gender or social status makes our work easier.

In proposing system the features Paragraph feature, paragraph words, Sentence length, Slant, roundness and sharpness, writing style are playing vital role in personality traits mining. During feature extraction some things are deducted and some are calculated [14]. Deduct base line, the vertical height of lines and space. And calculate slope of the line is calculated by using tangent, the average height of the line.

Main Factors which are affecting our handwritings

Age

Gender

Table 1:

Age	
More than 25 years	Uncertain in their writings
More than 51 years	Committed and taking things seriously
More than 71 years	They try to give detail view

We collected handwritings of different age groups. According to age chart.

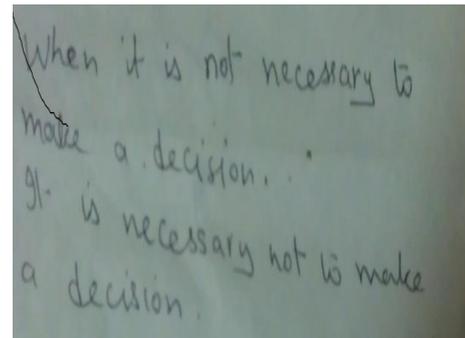


Fig.4.(More than 25 years)

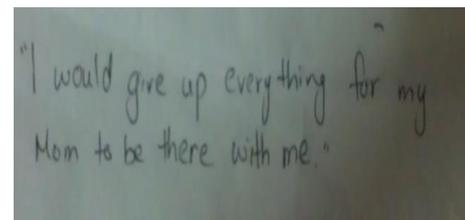


Fig.5". (More than 51 years)

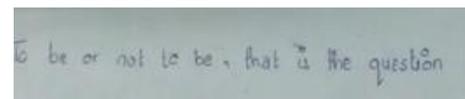


Fig.6."(More than 71 years)

Table 2

Gender	Indicators
Male	A sign of technical personality.
Writing is neat and strong	Show lack of animation
	Indicates social attitude to others.

Here we collected handwritings of both genders.

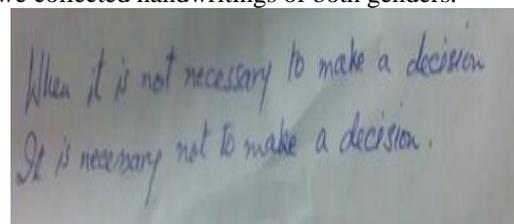


Fig7."(MALE HANDWRITING)

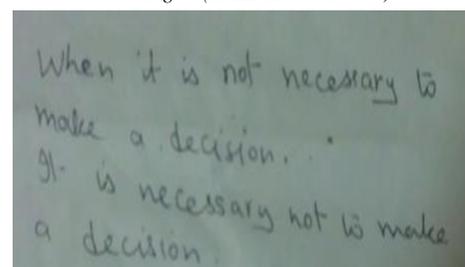


Fig.8."(Female Handwritings)

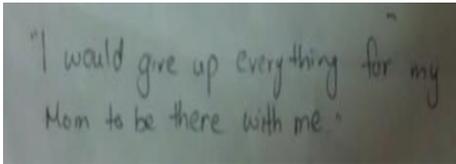


Fig.9.(Male Handwriting more than 51 years)

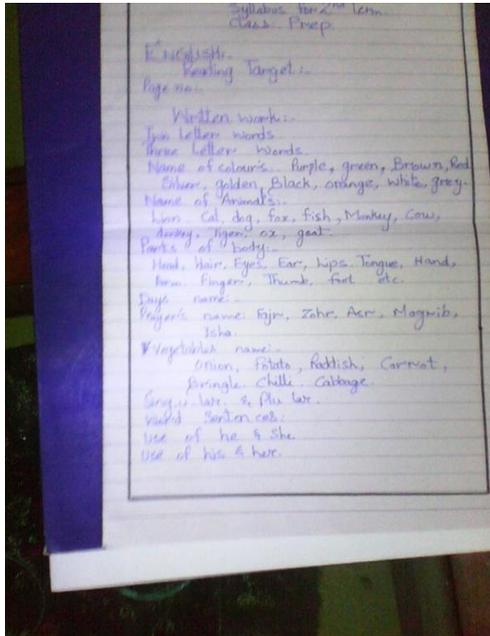


Fig.10.(Female Handwritings more than 51 years)

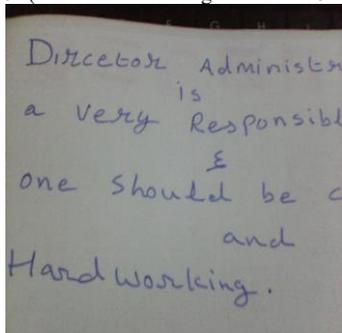


Fig.11.(Female Handwritings more than 25 years)

Table 3: Human Dimension

Physical	Mental	Emotional
Full left-pulled lower loops	Uneven upper loops	Large size, broad upper loops

Table 4: HANDWRITING SIZE AND PROPORTIONS

Handwriting Size and proportions	Indicators	Samples
Large size, broad upper loops	These peoples have passion	When
Right-pulled lower loops	They are well wisher for others	Abcdef
Left-pulled upper case	They show their attachment with the past.	Pak
Uneven upper loops	Lack of expectation	RAIN
Full left-pulled lower loops	Shows physical fitness	
Small writing	Technically minded	Abcdef

Table 5: SPACING

Handwriting Spacing	Indicators	Samples
Space between words	Social attitude.	Design machine with
Close words	Sign of sociability.	Design machine with
Large spaces between words	The person is relaxed alone.	Design machine with
Spacing between letters	Artists	Design machine with

Table 6: PRESSURE/IMPRESSION

Handwriting pressure	Indicators	Samples
Heavy pressure	Committed and taking things seriously	
Pressure is excessively heavy	These writers react first and ask questions later.	
With light pressure	Sensitivity to atmosphere and understanding to people	
Uneven Pressure	Show lack of animation	

V. Result

Such users define handwriting Analyzer will provide a base of features which will be extracted by inputting some information. Such information defines some parameters. These parameters can use from a software or Digital image Input devices. Personality predictions through user define software uses a step by step approach. First step is to enable a computer to detect and understand handwriting. Here our Analyzer gives help to generate a full picture of our handwriting sample Furthermore. The digital sample collection is easier and cheaper which can be used as input for computer and through image processing technique features are calculated A prediction about the personality of the writer.[15] At the start, some features are used which are most important for judgment and the main focus is feature mining and its classification.

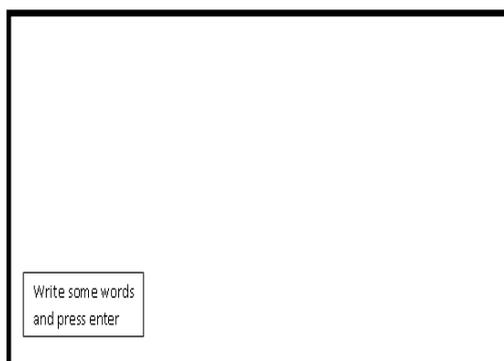
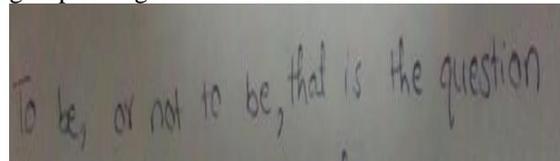


Fig.12.Analyser

Basically, when this form will be used and write some words in this space it will be stored as an image and will be acquired with defined parameters. These images will be read and the required information will be divided into three categories. Each option will consist of 1, 2 and 3 codes. When calculated them not only writer personality traits, but also show what size, curves and patterns. In response of such software will be very supportive in handwriting analyzing. Here we have different methods of sample collection, e.g. digital sample

collection.[16] We can also find out result by filling a Performa which is defined in the software. Performa a form will be displayed which shows the filled parameters. No need for additional training, it mostly depends on filling and at once gives us the output. The main disadvantage of Handwriting, most operations belongs to filling Performa. Nevertheless, here we discussed and exemplified how to employ a one-against-one strategy in order to produce accurate results even if your data set is unbalanced. The various parameters are calculated by simple use of trigonometry and thresholding techniques. For the experiment we enter the handwriting of different age groups and genders



"FIG.13." THIS HANDWRITING BELONGS TO MORE THAN 25) YEARS.

Length of sentence
 SLOP OF WORDS
 Lengthy || Medium ||
 Small Way Down || Level
 || Way Up
 ○ ○○○○

SLANT
 PEN PRESURES
 Way left || Straight || Way
 Right Min Pressure || Max
 Pressure|| Scale
 ○ ○○○○

PRINTED SENTENCES
 Very different || Similar
 || Almost identical
 ○ ○○

PARAGRAPH Features
 SLOP OF paragraph words
 Way Down || Level ||
 Way Up
 ○ ○○

SLANT
 Way left || Straight ||
 Way Right
 ○ ○○

Roundness and Sharpness
 Curved/rounded || Balance
 || Angular Sharp
 ○ ○○

Very different || Similar
 || Almost identical
 ○ ○○

Writing style
 Cursive Writing ||
 Balanced || Manuscript
 ○ ○○

WE EXTRACT MAIN FEATURES OF HIS WRITING.

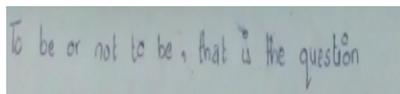
Table .7

Age	Gender	Length of sentence	PARAGRAPH Features	Slant & Slop of Words
More than 25	Male	Small but more space	Lengthy in English	Level

VI. Prediction of his personality

The result of our analysis shows the writer has a passion and naturally relaxed person.

The writer has a technical mind and used it time by time.



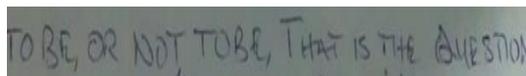
“Fig.15.”(samples of male writer Prediction)

VII. Prediction

The Writer has passion, Sign of sociability and positive Social attitude. Usually printed sentence writer belongs to IT field and very successful in their fields.

Table 8

Age	Gender	Writing size in English	Sentence length	Slant & Slop of Words	Printed Sentence	
Less than 51	Male	Large and Close and printed sentence	Lengthy in English	Level	Very	differed



“Fig.16.”(samples of female writer)

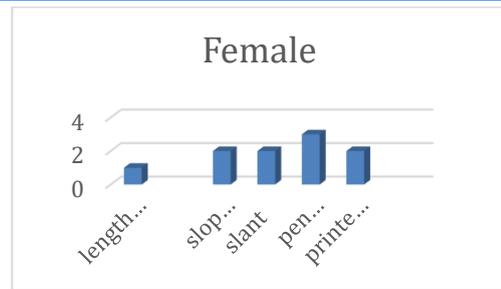
Table 9

Length of Sentence	Slop of Words	Slant	Pen Pressure	Printed Pen
1	2	3	3	2

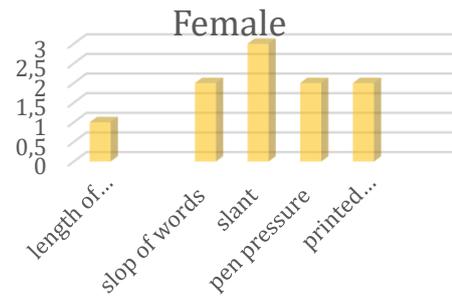
Table.10

Age	Gender
Less than 70	Female

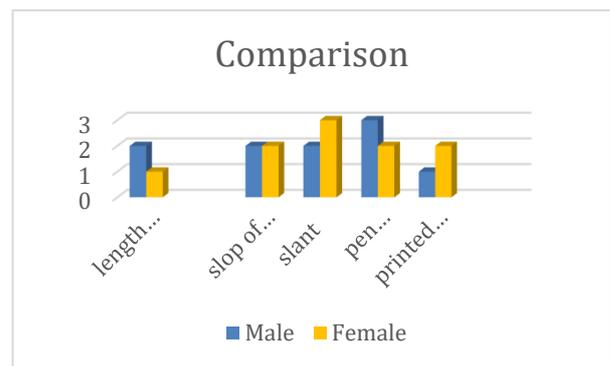
The Writer has passion and naturally relaxed personified. It has shown as an Artistic aptitude and uses its time as a writer.



“Fig.17.”(Male Handwriting analysis)



“Fig.16”. (Female handwriting analysis)



“Fig.18.”(Comparison of male and female handwriting)

VIII. Conclusion

An Analyzer helps us to predict the personality of a person by his/her writing sample. With the help of samples a comparison chart is created. It shows that a female writer writes lengthier sentences in comparison of male. Slop of words is similar. Slant of male handwriting is in straight while female writing shows way right. Pen pressure of a male is scale while a female writer is max-pressure. In print sentences males writer has very different while females are similar. With these features a male writer has a technical mind and use it time by time. But the female writer has an Artistic aptitude and uses its time as a writer. This is a real-time handwriting analysis system which is writer independent. In the future, the features can be increased for more correct results such as page margins, arcade, garland, thread, etc. We want to enhance the proposed system be used as a stretcher out detector on the basis of writer’s handwriting along with writer identification.

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