Mini Review

Forensic Graphology: Assessment of Personality

Abstract

The analysis of handwriting has been studied for almost four hundred years. Forensic graphology is the study of handwriting. It is unique meaning and has many things for the study. Integrative graphology focuses on various strokes and their relation to personality of an individual. Holistic graphology is based on form, movement during writing, and use of space. Forensic investigators use handwriting pattern/technology to determine personality traits of an individual. In different agencies use graphology for checking application for jobs, recruitment procedure, compatibility for marriage, career guidance, motivates different employees and child behavior and development. In this study we discussed that forensic graphology helps in analyzing handwriting on ransom notes in kidnapping cases or blackmailing letters or in the cases of pen poison letters. It helps in investigation by determining the psychological state of the writer, identifying the writer as well as helping in criminal profiling. The various features of handwriting (such as, spacing, margins, pen pressure, size of the letters etc.) are discussed in this report as well as their significance in describing various behavioral aspects of the persons.

Keywords: forensic science, forensic graphology, handwriting analysis, personality traits, writing features

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Introduction

The analysis of handwriting has been studied for almost four hundred years. In 1622, the first person that carried out systematic and practical observations on the way of handwriting was Camillo Baldi. He published the book named 'Treated how, by a letter missive, one recognizes the writer´s nature and qualities', which is considered the first known graphological essay in the world.[1] In 1897, the term "graphology" was coined by Abb Jean-HippolyteMichon in Paris by combining two Greek words graphe in, to write and logos, science. He was the founder of The Society of Graphology and the first person to give scientific grounds to the handwriting analysis. The Michon´s work was continued by one of his pupils, J. Crepieux-Jamin. He put of the order in Michon´s work and divided the writing into 7basic elements: speed, pressure, form, dimension, continuity, direction, and order.[2]Handwriting analysis is an operation that has been carried out for decades to centuries. But its effectiveness when analyzing the behavior and personality traits of an individual is still a debate from old days.[3] Forensic graphology is the study of handwriting. It is unique meaning and has many things for the study. It is applied when there are a ransom notes, signatures, letters and other bad things which are not found in common scenario. Forensic document examination is requested in the event of a formal debunking of signatures fixed on contracts, in civil law cases, and in all those cases in which handwriting is applied in order to commit a crime for which it becomes necessary to identify the authorship/ownership of a piece of handwriting, this same action obtruding criminal liability and responsibility.[4]

Forensic investigators use handwriting pattern/technology to determine personality traits of an individual. In different agencies use graphology for checking application for jobs, recruitment procedure, compatibility for marriage, career guidance, motivates different employees and child behavior and development.[5,6] It is also stated that the social& economic status, environment, psychological/ mental health, and cognitive development are also a part of a person's intensions to participate in aberrant behavior. Some biological, psychological, and sociological theories and concept have been used as principal classifications to explain interpretations and discussion of aberrant behavior.[3]To determine handwriting traits that correspond to particular characteristics, forensic experts study large portions of handwriting samples from known/control and unknown/suspect sources. Apart from examination of handwriting samples by a person, there have been numerous technologies/ methods developed to help handwriting experts with carrying out this mind-numbing task. Various studies have validated handwriting analysis as a method of assessment of personality, using various experiments and scientific techniques. Integrative graphology focuses on various strokes and their relation to personality of an individual. Holistic graphology is based on form, movement during writing, and use of space.[4]There have been a number of studies on handwriting and effect of gender available. Uniformly the scientific research indicates that gender can be determined at a significant level in handwriting study for assessment of personality. The published studies on ethnicity of individual, his/her race, age, nationality, gender, weight, height, and their relationship to handwriting have had mixed results.
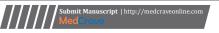
Methodology

Basically there are two ways to carry out the handwriting analysis with the intend to determine personality traits through it and these are:

I. Manual way

II. Automatic handwriting analysis through computer

Manual analysis

The graphology or handwriting analysis through manual way is done simply by the graphologist in which he/she analyze the given handwriting by using the various tools such as magnifying glass etc.

and observe the various features of handwriting and then determine the personality of the writer on the basis of these features.[7] Manual analysis relies on the knowledge and observation of the graphologist. After the handwriting sample is obtained, the graphologist looks for the various handwriting features and tries to identify them to analyze the writer's personality, few of the important features are as follows:

a. Word Spacing

b. Line Spacing

c. Page Margins

d. Alignment

e. Pen Pressure

f. Slant

g. Size and Position of Letters

h. Movement

i. Headings

j. Tendencies towards right or left

k. Observing the Position as well as Shape of i-dots

l. Observing the Position as well as Shape of T-bars

All these features have their significant meaning and hence should be carefully observed and identified as it will help in determining the personality of the writer as a whole.

Automatic handwriting analysis through computer

Extracting the features manually from the given sample of handwriting could be tiresome and error prone also. It is possible that few features could be overlooked while analyzing the sample manually also it could be possible that graphologist's analysis can be influenced by the script or content of the given handwriting sample. So in order to overcome these limitations and to assist the graphologists, the computers are used. There are software's that can help the graphologists to do the analysis more efficiently and in error free manner. Computer aided graphology (CAG) system is one of the system which enables the graphologist to take advantage of computer in order to achieve faster and error free analysis of handwriting and to obtain the personality description of the writers on the basis of the analysis. The CAG system involves the following steps:

Scanning: It involves scanning of the handwriting sample

Preprocessing of the image: It involves cropping of the image in order to remove the extra pixels and changing the RGB image, (i.e. Red, Blue, Green image) to Gray scale image etc. After preprocessing step a binary image is obtained which is then used for feature extraction.

Feature extraction: In this step the image is subjected to segmentation and each segment is studied to extract the various features of the handwriting such as slant, direction of lines, spacing etc.

Analyzing features: In this step the extracted features are subjected to interpretation. For this step context free grammar is implemented in a CAG system in order to apply graphology rules. A context free grammar is nothing but a set of some rules of recursive rewriting which is used in order to create patterns of strings.

Result

Then after performing the interpretation step the results are obtained which can be printed and stored as well. There are software's which are available now for handwriting analysis such as WANDA, CEDAR-FOX, etc. Shelia Guberman was the author of the program which was the first program of applied pattern recognition. However companies for instance, Communications Intelligence Corporation as well as IBM are the one who brought the commercial examples of pattern recognition program. Apart from them Para Graph International (a Russia based company whose founder was Stephan pachikov) and Lexicus (which had two founders: Ronjon and Chris) brought the systems that were capable of cursive handwriting recognition.

Discussion

The various handwriting features can be analyzed in a given handwriting sample and they can tell a lot about the writer's personality if they are observed carefully. Few of these features and their corresponding meaning in terms of describing one's personality traits are as follows:

Word spacing

It is indicated by observing the width of one letter in handwriting. It is the easiest way to judge a person by looking at narrow or wide space between the words.

a. If there is wide space found between the words then the writer usually avoids the crowd and is comfortable in spending some alone time.

b. If there is narrow space found between the words then the writer may be intrusive and usually found to be enjoying in the crowd.[7]

Line spacing

Line spacing can be better observed if the handwriting samples are taken on a blank (or unlined) sheet of paper. It has been found that:

i. Those who have wide spaced lines in their handwriting are usually open minded persons and have an attitude to take a stand back.

ii. Those who have narrow spaced lines in their handwriting are usually narrow minded persons and are used to react when close to the action.[7]

Page margins

The margins should not be neglected while analyzing a handwriting since they can provide a lot of information, such as:

a. The left margin indicates towards the roots or family.

b. The right margin indicates towards the other people in a person's life as well as future.

c. The top of the page indicates towards the goals and ambitions.

d. The foot of the page indicates towards the energy, practical approach as well as instincts of a person.

A wide left margin in handwriting indicates that the writer likes moving on, however a narrow one indicates towards the cautious behavior and to avoid being pushed before the person is ready to do a task. A wide right margin in handwriting indicates that the writer has a fear of the unknown, however a narrow one indicates towards the eagerness and impatience to do the things.

Alignment

The alignment of handwriting can be better judged when the writing samples are taken on a blank sheet of paper. The alignment can be analyzed by checking the handwritings against an imaginary baseline usually three cases are found:

Upward alignment: In this case the handwriting is found to be in the upward direction as compared to that of the imaginary baseline. It usually indicates that the writer is optimistic; also it could be found if the person is excited or happy while writing.

Downward alignment: In this case the handwriting is found to be in the downward direction as compared to that of the imaginary baseline. It usually indicates that the writer is pessimistic; also it could be found if the person was emotional or upset while writing.

Straight alignment: In this case the writing is found to be straight and somewhat parallel to the imaginary baseline. It usually indicates that the writer likes discipline or is an organized person.

Pen pressure: Some people writes with heavy pressure and those are usually found to be slow writers. It has been seen in many cases that illiterates write with heavy pressure. Also the persons who are very emotional are tending to write with heavy pressure.

i. Mostly people writes with moderate pressure having fewer indentations. The persons who writes in this way are tend to be balanced emotionally.

ii. Some people are used to write very lightly with smooth and uniform thickness and rhythmic writing. They are used to have empathy to people and are sensitive.

iii. However uneven pressure indicates lack of vitality.[8-10]

Slant: Slant refers to the angle of inclination of handwriting or a letter of it from that of the baseline, following cases can be observed:

a. The slant could be forward if the words or sentences are leaning towards the right.

b. The slant could be backward if the words or sentences are leaning towards the left.

c. The slant could be vertical also and if more than any two above categories then it could be inconsistent.[9-11]

Size and proportion of letters: It is a habit in which combination and comparative size of block and small letters are taken into considerations. Size and proportion can be estimated by comparing the sizes of the letter specially the middle case letters with the capitals thus comprising of three zones which could be attributed as:

a. Upper

b. Middle

c. Lower

A usual criteria is to judge the size by attributing 3 mm per zone and thus sets a measure of 9mm for full height ; the size more than this will be large whereas that less than this is small.

Large size handwriting: It indicates towards the extravert as well as confident behavior of the person.

Small size handwriting: It indicates towards the introvert as well as academic behavior of the person.If the handwriting is small and

delicatethen the person may be comfortable only to those who are known (or are similar in one way or the other) to him/her.[12]

Position and Shape of i-dots

a. If an 'I' is written without any dot then it indicates toward the absentmindedness of the writer.

b. If the dot on the letter 'I' is placed high above then it indicates that the writer is imaginative.

c. If the dot on the letter 'I' is formed like a circle then it indicates towards the artistic personality of the writer.

d. However an open dot may also indicates towards the affection and a visionary.

Position and Shape of T-bars

i.   There are various ways in which the stem as well as the cross bar can be written and hence the letter 't' is very revealing in terms of graphology.

ii. If the letter 't' looks like a star then it is a sign that the person has the strong sense of responsibility.

iii. If the cross bar is slanted in the upwards direction then it is a sign that the writer is ambitious.

iv. If the cross bar is high and rises away from stem in the right side direction then it indicates leadership qualities and intelligence.

Conclusion

A study was done for the purpose of identifying personality traits through manual way of handwriting analysis and the current technology (automatic handwriting analysis through computer) available for such process. Identification of personality traits through handwriting samples can be done both by humans and by machines. In this study we discussed that forensic graphology helps in analyzing handwriting on ransom notes in kidnapping cases or blackmailing letters or in the cases of pen poison letters. It helps in investigation by determining the psychological state of the writer, identifying the writer as well as helping in criminal profiling. The various features of handwriting (such as, spacing, margins, pen pressure, size of the letters etc.) are discussed in this report as well as their significance in describing various behavioral aspects of the persons.

Acknowledgments

None.

Conflicts of interest

None.

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