"Human Behavior Prediction Based on Signature, A Comprehensive Review"

Gathiyawala Nainesh Jayeshbhai [#1]
PhD Scholar,
G H Patel P.G. Department of Computer Science & Technology, Sardar Patel University
Vallabh vidhya nagar, Gujarat, India
nainesh.sdjic@gmail.com

Dr. D.B.Shah [#2]
Professor & Director,
G H Patel P.G. Department of Computer Science & Technology, Sardar Patel University
Vallabh vidhya nagar, Gujarat, India
dbshah66@yahoo.com

Abstract

Signature reveals the personality of human including honesty, defenses, emotional outlay, fears, and many others. The study of Signature analysis is called Graphology. Graphology is the investigation of the sensible state of mind at the time of writing. It is introduced as the field of graphology. The person who analyzes personality based on handwriting called graphoanalysis or graphologist. Graphology can be utilized to analyze the characteristic features of an individual. Graphology is a scientific method of identifying, evaluating and understanding personality through the strokes and patterns Signature may be unique for each person and a person's nature, behavior, and certain psychological aspects can be inferred based on it. Signature reveals true personality including fears, emotional outlay, defenses, honesty and over many other individual personality traits. The fundamental aim of this research paper is to study and analysis various techniques used on basis of accuracy and number of features selected by researchers for human behavior prediction based on signature analysis.

Keyword

Signature analysis, Graphology, Personality Traits, Human Behavior Prediction

Note

This paper is **presented** in Virtual International Multidisciplinary Conference Organized by IQAC Cell of Commerce Discipline D.R.Patel & R.B.Patel Commerce College & B.C. Patel B.B.A. College On date: 19th July 2020

1. <u>Introduction</u>

Signature Analysis is described as a scientific study and analysis of handwriting. The Professional person who Examines signature is called graphologists. She/he can predict the personality of the writer with a piece of handwriting. The Accuracy of Signature analysis depends on the skills of the graphologists and Manual process is of Signature analysis is costly and prone to fatigue. So proposed methodology that focuses on developing a tool for behavior analysis which can predict the personality traits automatically with the System. A system will be trained to perform the analysis without much human intervention [3]. Tool will implemented so that it can be used for analysis personality from scanned signature that will automatically generate the report, even if required any improvement in signature for future growth bases on Graphology prediction. It is useful to obtain an overall picture of the personality. This system provides Convenience to the public in identifying personality easily. Here a major obstacle is the variability of the writing and of the signature styles and result accuracy.

By examining all elements of person's signature and interpreting them separately, we could generate a result of the writer's character traits, emotional nature and social style using standard of graphology and we can take review and feedback again from person after using tool and match with result report so accuracy of system can be improved.

2. <u>History of Graphology</u>

Handwriting began 400 years back. Camillo Baldi, can correctly be called as father of graphology as he did a deliberate perceptions in the way of handwriting and wrote in 1622, the primar graphological essay. Abb Jean-Hippolyte Michon who authored the term 'graphology' by merging two Greek words 'graphein' (to compose), and 'logos' (science). He is the originator of The Society of Graphology' and the first to do scientific work on handwriting. His follower J. Crépieux-Jamin arranged the progress of Michon and allocated the handwriting into seven basic components as speed, pressure, form, dimension, continuity, direction, and order[1].

Graphology is the study of writing in view of a developing group of information which is always being tested in handy utilize.[2] Since it is a Proceeding and developing knowledge of learning, and not a classified framework like fundamental arithmetic, the student ought not to be frightened to discover shifting, now and then clashing understandings approaches to a stroke or shape. It is conceivable to comprehend composing character, by utilizing diverse methodologies to the particular starting points, similarly as the restorative and psychological fields comes about even when beginning from various positions [7].

3. <u>Literature Review</u>

Laxmi durga ET AL says that graphology is useful to understanding into the morality, hidden Talents. When we are writing cerebrum state is reflected in our handwriting. At a learning time few samples are utilized to learn author attributes and different samples are utilized to test the learnt models. Author has reviewed 36 paper and come to the conclusion that graphology can be used in diverse fields such as psychology, employment, education, medicine, Criminal detection, recruitment etc. There are different analysis methods used like Rule-Based system, Back propagation neural network, ANN, Simple Linear Regression method, Support Vector Machine, Multi-Structure algorithm and Artificial Neural networks.

Ernesto P´erez Costa ET AL, As per Author view personality is most difficult attribute of human to understand. Author has also craft clear that automated tools will never replace qualified experts for the analysis of personality and mention that automated techniques will represent a support tool that can simplify the task to specialists. Author has proposed a Solution that combined information from different modalities and succeeded at obtaining satisfactory results. For Future enhancement author has planned feature like polarity, gender, Part Of Speech (POS) etc.

Nicola S. Schutte1 ET AL has focused on using Signature character strengths. Twenty nine sizes is reported and allowed to examine several outcomes. Author has concluded after enough result. As a result they shows when positive affect or happiness, depression, life satisfaction etc.

Anamika Sen ET AL believes that personality can be analyzed by handwriting. Using handwriting we can reveal emotions, intellect, creativity, social adjustment, your desires, fears, weaknesses, strengths, and sexual appetite among others. Author has suggested an algorithm to extract feature using letter 'i'. They have used tool MATLAB. Author has suggested using ANN or Machine Learning Approach can be further employed to increase the scope of the system.
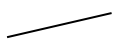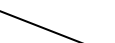
Afnan H. GarootET AL has developed computerized graphology systems to overcome issues like time consuming and labor intensive task. Author told Development of computerized graphology systems is an active research area so author present literature review on their methodologies and achievements. Author has given different analysis technique from their review like Classical crisp and fuzzy Methodologies, Back propagation neural network, ANN, Rule based System and also present accuracy level 80 to 100 percent. Author has suggested to applying a combination of analysis methods and using features of signature besides handwriting features resulted in Remarkable accuracy.

Kukuh Adi PrasetyoET AL told that Identifying personality of person can be done using graphology. They also said that it is science that is studying about handwriting. Author has talked to develop technology that can be utilized and is very trend in public and that is mobile technology on android application. In application doing identification of personality based on writing direction, slant of writing, writing width, writing margin, pointed or rounded letter, and space between lines in writing. Author has examined 25 tested handwriting and compares it with the Graphology Expert and gets 25 similar results from 25 tested writings available.

4. An analysis on Graphology

4.1 Baseline

The baseline in an individual's handwriting reveals a lot of information about the user. Baseline can be downwards, rising upwards and balanced. Each type reveals a particular personality trait of writer. And the traits of personality are shown in below Table 1.

Table 1 : Baseline and Personality Traits		
Baseline		**Personality Traits**
╱	Rising upwards	Optimism, faith in future, feeling of being loved, excitement, joy
╲	Slanting Downwards	Pessimism, fatigue, discouragement, depressions, illness
──	Straight	Reliability, even temper, control of emotions, Reason rules, unwavering resolutions

So if a person has baseline rising upwards than he may be optimism. If baseline of the signature is straight then he is consistent [1].

4.2 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. Below Table-2 shows different meaning of letter slant [3].

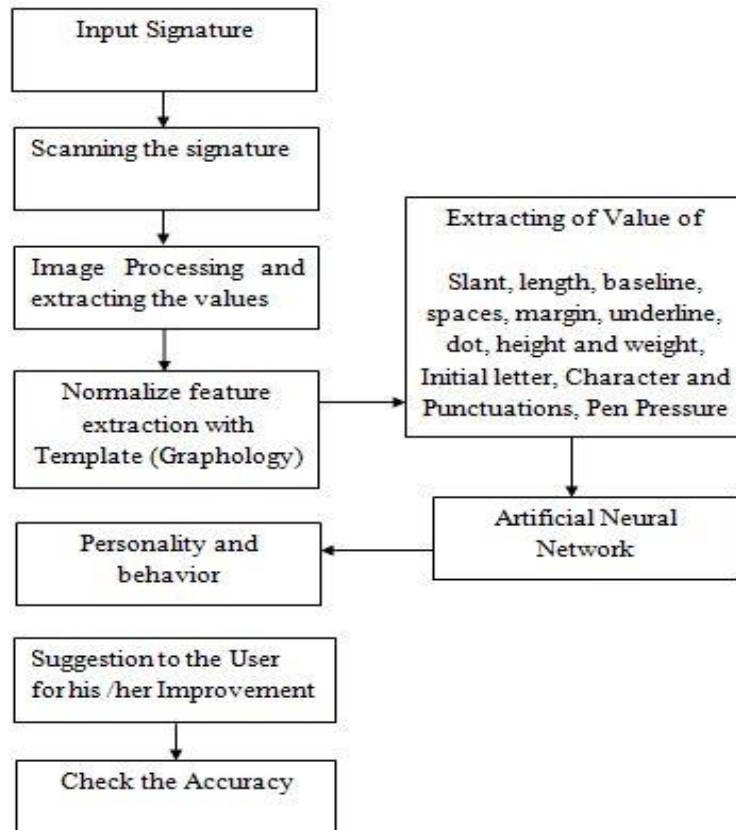| Table 2 : Letter Slants and personality traits	
Letter Slant	**Personality Traits**
Vertical	Head Controls over heart, Independent emotional nature, Oriented to work well alone, Ability to control emotions in crises.
Moderate Right	Ability to express opinions, Confidence in convictions, Freedom of thought, Extroverted, future oriented , expressive
Extreme Right	Lack of self-control, Impulsive, unrestrained, Intense, very expressive, low frustration tolerance
Moderate Left	Reflective , independent , objective , no understanding , Difficulty in expressing emotions, Difficulty in adapting
Extreme Left	Repressed childhood , early rejection, Fear of the future, defensive

4.3 Pen Pressrure:

Pen pressure is used to measure of the writer's energy, strength and determination. Some of the writer writes with heavy pressure and some of the writing with light pressure. What personality can be reveals with the pen pressure is shown in Table-3.

Table 3 : Pen pressure and personality traits	
Amount of pressure	**Personality Traits**
Heavy	Very deep and enduring feelings, may Forgive but will never forget, Feels situations intensely
Light	Endure traumatic experiences without being seriously affected; Emotional experiences do not make lasting impressions.

So if the writer writes with heavy pressure than he may be have deep feeling. And if the pressure of the pen is light than suffer from upsetting experiences. [3]
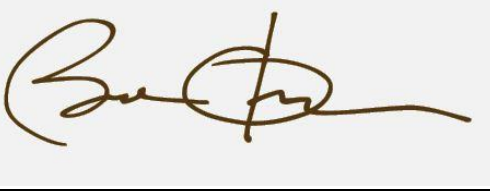
5. Proposed Methodology

It gives a method which provides a training to the system.Trained System architechtue is shown in figure 1.0.

[Figure 1.0 Proposed model]

6. Proposed Results of different sample

SR No	Signature	Analysis
1		High Ego and self-pride. Highly creative. Moody responsibility
2	(NARENDRA MODI)	Desire to be seen, but not known. Person avoids any dialogue on a few matters relating to his personal life. He does not like others' interference and keeps all ideas at bay.
3		frank, honest and blunt nature toward others responsible Socially prominent and is overconfident.

7. **References**

[1]A. McNichol, "Handwriting Analysis Putting It to Work for You", Contemporary Books, 1994.

[2] B. Ludvianto, "Handwriting Analysis", Gramedia Pustaka Utama, 2011.

[3] P.D. Sunar, "Read the full review Graphology Personality Through Writing His handwriting", Yogyakarta : Diva Press, 2010.

[4] Taufik, M., Rosette, "Step By Step to analyzed personality trait through handwriting", Jakarta, 2010.

[5] H.N Champa, K.R AnandaKumar, "Artificial Neural Network for Human Behavior Prediction through Handwriting Analysis", International Journal of Computer Applications (0975 – 8887) Volume 2 – No.2, May 2010.

[6] S. Prasad, V.K. Singh, A. Sapre, "Handwriting Analysis based on Segmentation Method for Prediction of Human Personality using Support Vector Machine", International Journal of Computer Applications (0975 – 8887) Volume 8– No.12, October 2010.

[7] P.K.Grewal, D Prashar, "Behavior Prediction Through Handwriting Analysis", IJCST Vol. 3, Issue 2, April - June 2012

[8] S. Madhvanath, V. Govindaraju, "The Role of Holistic Paradigms in Handwritten Word Recognition", IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, VOL. 23, NO. 2, FEBRUARY 2001.

[9] Z. Mohd Zam, "Handwriting Analysis for Employee Selection Using Neural Network", Thesis of Intelligent System Faculty of information Technology and Quantitative Science of University Technology MARA, 2006.

[10] EC. Djamal, "Recognition of Human Personality Based on Handwriting Using Multi Structures Algorithm and Artificial Neural Networks", 2nd IEEE Conference on Control, Systems & Industrial Informatics Bandung, Indonesia June 23-26, 2013.168.

[11] Parmeet Kaur Grewal, Deepak Prashar "Behavior Prediction through Handwriting Analysis" , IJCST Vol. 3, Issue 2, April - June 2012

[12] Esmeralda Contessa Djamal, Risna Darmawati, Sheldy Nur Ramdlan, "Application Image Processing to Predict Personality Based on Structure of Handwriting and Signature" , International Conference on Computer, Control, Informatics and Its Applications.

[13] Rashi Kacker and Hima Bindu Maringanti, "Personality Analysis Through Handwriting,", GSTF Journal on Computing (JoC) Vol.2 No.1, April 2012.

[14] Surabhi Garhawal, Neeraj Shukla "A Study on Handwritten Signature Verification Approaches ",International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)
Volume 2, Issue 8, August 2013

[15] Lakshmi Durga ,"Handwriting Analysis Through Graphology: A Review", IEEE,2018

[16] Surabhi Garhawal ,A Study on Handwritten Signature Verification Approaches", (IJARCET),2013

[17] Tomai et al, "Discriminatory power of handwritten words for writer recognition", IEEE Explore