

# Comparative study of handwriting sample for identification, personality of the person

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## Abstract

Handwriting is one of the unique characteristic to represent what is in our minds, to communicate with others. Handwriting shows the true personality including behavior, emotional outlay, self-esteem, anger, imagination, honesty, fears, defenses and many other personality traits, as well as the person's profession also. According to Profession and work patterns may vary day by day also we study the impact of handwriting in age. The Adult persons and Aged person handwriting is different it vary time to time. It is commonly known as Graphology. Graphology is the scientific method for recognizing, assessing and to understand writer's personality through the shapes and word patterns, characteristics of the handwriting. Personality can be identified through various handwriting features such as zone, baseline, slant, size, spacing, margin, pressure, diacritics formation, speed, connecting strokes, I dot formation etc. Handwriting analysis has wide application in the various fields such psychology, medical diagnosis, recruitment of staff, career counseling, writer identification, forensics studies, Criminal investigation in some cases like forgery property theft etc. This paper provides an outline of handwriting analysis, features of handwriting, its related personality traits, also we study the few papers related to changes of handwriting in age wise, overview of the handwriting analysis system (HAS) and a literature survey of the existing papers on handwriting analysis. In this review we studied some research articles for further identification, analysis methods for study.

## Keywords

Handwriting• Handwriting Analysis• Personality• Handwriting Features• Graphology

## Introduction

Handwriting also termed as brain-writing is a useful measure in identifying the characteristic personality traits of an individual. Handwriting analysts also known as graphologists can examine an individual's handwriting to predict the personality traits of the writer. Automated handwriting analysis can be used to examine personal traits of candidates during interviews accurately as the accuracy of an analyst highly depends on his skill set. Every person has unique handwriting is will be vary time to time age wise this change we see in persons nature mentality also PROFESSION affects the handwriting.

Handwriting reveals the true personality including emotional outlay, fears, honesty, defenses and over many other individual personality traits. Handwriting Analysis is not document examination, which involves the examination of a sample of handwriting to determine the author. Handwriting is also called to as brain writing. Each personality trait is represented by a neurological brain pattern. Each neurological brain pattern produces a unique neuromuscular movement that is the same for every person who has that particular

personality trait. When writing, these tiny movements occur unconsciously. Each written movement or stroke reveals a specific personality trait.

Graphology is the science of identifying these strokes as they appear in handwriting and describe the corresponding personality trait. Each and every person's writing style is unique and different [1].

Some of the basic features of handwriting which will show each person's uniqueness, personality:-

**Baseline:** The baseline is the imaginary line running from left to right at the same level. It is on this imaginary line that letters rest on dividing upper and lower areas while moving forward to the right. The persons start writing at upper side, sometime baseline and also in middle.

Any movement horizontally along the baseline represents your reaction to experiences, living values, time demands, and learning. Right motion is to advance, expand, and progress and left motion is to revert, constrict, and regress.

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The Stable baseline indicates that the writer should have stable outward behavior, disciplined, realism and straightness.

Ascending baseline indicates that writer should be optimistic and the descending baseline indicates pessimistic nature.

About Suicidal writing, the graphologist came to know that the baseline of the suicidal note is straight at starting and suddenly it is downward at the last i.e. one letter is crashed to another word. And the suicide note is not long it's short and speedy.

Concave baseline defines the enthusiasm of the writer at the starting of work, at middle writer is not sure about completion, therefore writing goes down at the middle and at the end somehow they reach to their goal. The starting and the ending points are at the same baseline. Erratic baseline shows the moodiness of the writer because the writing contains number ups down and then straight forward (Figure 1).

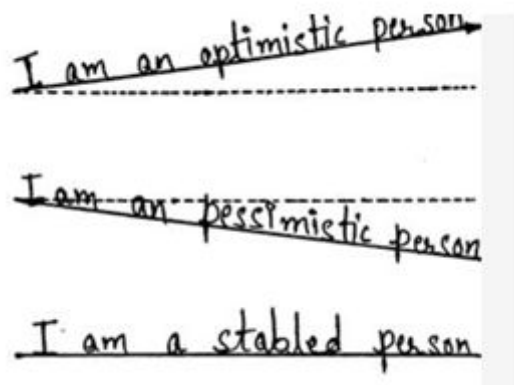


Figure 1: Example of handwriting.

## Slant

When writer writes assuming imaginary line, each letter in the sentence can be at 90 degree, below 90 degree or above 90 degree.

If each letter in the sentence is at 90 degree then writing is considered as vertical slant. And it shows the writer positive qualities of independence, coolness, live present.

If it is below, then considered as rightward slant it shows the bonding of the emotions. And if above 90 degree, then considered as leftward slant [2]. It shows the doubt and fear, negative oriented towards the past. Sometimes, writing may contain combination of above three slants and it is known as unstable slant or variant slant. He was unstable in nature not doing decisions vastly (Figure 2).

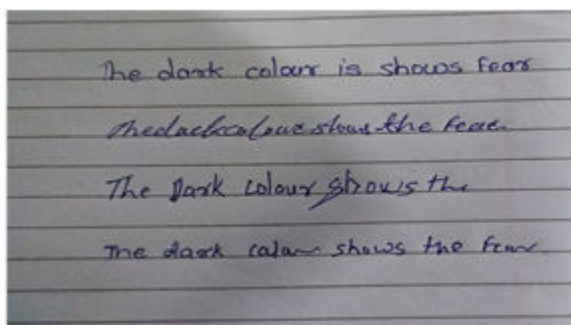


Figure 2. Example of Slant.

## Size

The size of letters can be large, medium or small. These three types of size define the concentration of writer. The large handwriting tells less concentration and extrovert. Actors, politicians and salespersons have large handwriting.

The medium handwriting tells ability of writer to concentrate on things and maintaining them. The writer having small handwriting is introvert, have more ability to concentrate. Scientists, authors, composers have small writing (Figure 3).

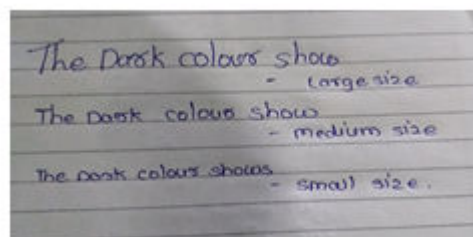


Figure 3. The size specification of hand writing.

## Margin

The layout of the page can be considered as margin. When writer writes on the blank page, they assume margin and writes. The written page when we see, there is blank space on left, right, top and on bottom. These are margins.

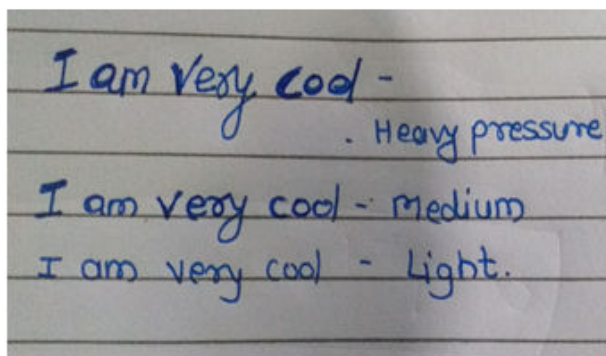
Margin can define the past and future, intelligence, adjustments, truthfulness and fastness. If there is constant left margin, then writer should have the good manners and constant behavior. If it is irregular, then writer is careless about their dressing and behavior.

Constant right margin shows good judgment and the ability to take decision. Top margin tells about convention. Less space on bottom side shows laziness and indecision of writer [3].

## Pressure

The amount of the force exerted at the time of writing is considered as pressure of pen. Pen pressure may be heavy, light or medium. The pen pressure shows the mental energy of the writer. The medium pressure depicts the feeling not so intense.

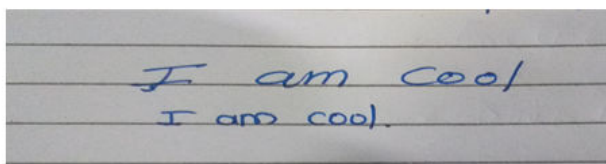
The heavy pressure shows self-assertive, dynamic, heavy in everything, angry, energetic, active, anxious, alert and punctuate. The light pressure shows passivity, calmness, lack of intensity and illness (Figure 4).



**Figure 4.** The pressure variation in hand writing.

### Speed

The speed shows how quickly or slowly the writer writes. It shows thinking ability of writer. Fast writing shows that writer dislike to wait for anything, having large imaginary power and slow writing shows response to a greater degree, less imaginary power and thinks slowly. If writer's speed is fast, then he gives more space between two words and dot of letter "i" and bar of letter "t" is not there mostly or the dot of the "i" is more away from the letter and bar of the "t" is not completely crossed, it is crossed more from t-stem to right. Generally, these are the writers with light pen pressure and right slant. If writer's speed is slow, then he exerts heavy pressure, dot of "i" and bar of "t" is from left to the letter or more accurate. Slow speed handwriting usually have left slant and missing end strokes [4]. When writer copies from the provided material, then speed of the writing automatically goes slow. Also the high speed writer is more positive and intelligent as compare to slow speed (Figure 5).



**Figure 5.** Demonstration of handwriting in fast speed and low speed.

### Zones

Zones are categorized in three parts: upper zone, middle zone and lower zone. Personality is identified by analyzing these three zones.

Here "i" is in upper zone, "o" in middle and loop of "g" is in lower zone. The upper zone consists mainly of letters with upper loops like: "d", "h", "k", etc. The upper zone identifies with the personality trait of Super ego of the writer. Such a person is overly egoistic and has a futuristic approach to life. The middle zone has the letters like "o", "a", "s", "c" etc. A prominent writing in this zone indicates a person with moderate ego and can also tell whether the person is happy or not. This also indicates a person who lives in his present. The lower zone letters include letters having their loops in the lower zone such as "y", "g", "j" etc. A prominent lower zone in the writing indicates that the person enjoys a luxurious and materialistic lifestyle.

### Print writing and cursive writing

There are print, cursive and mixed writing. Print writing shows practicality, profession, consideration, overcompensation, standing out, dishonesty and hiding personality of the person. Cursive writing shows the persons good behavior and print writing shows the persons very fast, saving time [5].

### Connecting strokes

It means the one letter is link to another. They consist of four main groups of connecting strokes: garlands, arcades, angles, and threads. When letters are connected by the underhand When letters are connected with sharp strokes like upward and downward, then we can say that writing have angle strokes. Thread linking strokes are a kind of scribble, a flow of line that can mean practically nothing (Figure 6).

Sl. No	Types of strokes	Sample
1.	Garlands	<i>garlands</i>
2.	Arcades	<i>when when her had</i>
3.	Angles	<i>angle are sharp</i>
4.	Threading	<i>tending, tendency, tending</i>

**Figure 6.** Different kind of strokes.

## Materials and Methods

For this work, we studied various published literature from research gate, google scholar, Journal of forensic Sciences and Science direct databases and handwriting analysis book. For selection of articles, we have selected only those articles and research papers which having comparative analysis related to handwriting sample analysis for identifying personality of the person as well as the person identification.

## Procedure

For procedure I referred only those few article which directly link to my topic from the google scholar, research gate.

Some of papers do the offline identification analysis of the handwriting sample. But in below research paper they used the computer based classification system given by the sir (Hemlata, Manoj Sachan, Shailendra Kumar Singh) He was developed the HAS techniques the sample is analysis by the computer. Image is scanned into small pixels and then anlysis the features [6].

### Scanning

The handwriting samples are taken on a white A4 size paper. This handwriting sample provided as input to system. Then the handwriting sample paper is scanned using a scanner and stored as image file (JPEG or PNG etc.) format or it can be taken using a camera.

## Preprocessing

Pre-processing is done to enhance the image data as input and also some image features quality is improved for further processing. Image preprocessing includes noise removal, binarization, and normalization. Binarization converts the gray scale image into binary image. Noise removal techniques are applied to remove the unwanted data and to improve quality of image. Normalisation is used to remove some of the variations of handwriting styles and to simplify the shapes of symbols.

## Segmentation

Segmentation is the process for segmenting the handwritten page into three different types of segments, i.e. line, word and character segment. Line segmentation is used to segment the handwritten image into text lines, lines further used for word segmentation which are used in feature extraction process, and character segmentation is used to segment the words into characters.

## Feature extraction

Feature extraction is a process of dimensionality reduction or extraction of an important data from a high dimensiona Input data. The output data is used for analyzing the personality of writer. The features can be the size, baseline, slant, margin, zones, connecting strokes, loops etc.

## Classification

Classification is used to recognize the personality traits of the writers. The various features extracted in the feature extraction step act as input to the classifier. According to the feature values the personality of writer is identified. Using classification methods, classifiers or using rule base system the classification can be done.

## Discussion

Handwriting identification is mostly important aspect of today in forensic science for investigation purposes. In those review I searched the literature articles papers books from various search areas like research gate, google scholar, forensic journals etc.

In this review I mentioned the personality traits identification into the handwriting samples. It is also called as brain writing many scientist work on the handwriting Samples in various aspect like gender identification, Person identification, personality identification. In this review I was searched many papers which are related to the shows personality factors in first paper gives Personality Identification through Handwriting Analysis: Prof. Seema Kedar, Ms. Vaishnavi Nair, Ms. Shweta Kulkarni dept. of Information Technology, JSPM's RSCOE, Pune, Maharashtra, India In those paper they says Personality is made up of the characteristic patterns of thoughts, feelings and behaviors that make a person unique. Your personality affects your success in the role. Recognizing about yourself and reflecting on your personality can help you to understand how you might shape your future he has describing the personality traits and impact of handwriting into the human mind. He was use the scanning technique for identification. First scanning the paper then pre processing the data then Segmentation after Segmentation feature

extraction like slant connecting strokes, speed, alignment, baseline, diacritics formation etc [7].

Second paper talk about Personality Detection using Handwriting Analysis: by Hemlata, Manoj Sachan, Shailendra Kumar Singh In this paper extracting the handwriting features for identification of personality traits behaviour, emotional outlay, self-esteem, anger, imagination, he was used the HAS based technique. Then third Joshi P et al. Proposed a machine learning tool with KNN classifier with incremental learning to improve the efficiency of the handwriting analysis. The features baseline, letter slant, height of "t" bar, margin are used for personality analysis. The baseline was calculated using polygonalization method, margin was calculated using vertical scanning method, the height of the t-bar on the stem of alphabet "t" and word slant were calculated using template matching. Third pepar talk about "Automated Human Behavior Prediction through Handwriting Analysis Champa H N Assistant Professor, Department of Computer Science and Engg, University Visveswaraya College of Engineering, Bangalore-560 001, Karnataka, INDIA, K R Ananda Kumar Professor and Head, Department of Computer Science and Engg. In this paper mainly focus on the to predict the personality of a person from the baseline, the pen pressure, the letter 't', the lower loop of letter 'y' and the slant of the writing as found in an individual's handwriting. These parameters are the inputs to a Rule-Base which outputs the personality trait of the writer [8].

## Conclusion

According to all above the data we conclude that the handwriting is a unique feature which will be vary time to time and age, gender, profession.

In my review I am only focus mostly the personality trait and personality of the person identification. The various papers are proposed offline method for handwriting identification some articles gives the computer based technique for extraction of handwriting features. The handwriting sample predicted the behavior as well as the shows the personality of the person. We have easily identify the features by offline as well as HAS based Technique.

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