

ORIGINAL ARTICLE

Forensic Examination of Legitimacy of Signature

Sakshi Sunilrao Jagdhan¹, Anita Yadav², Anuwanshi Sharma³,
Isha Rajput⁴, Tanushree Johari⁵

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ABSTRACT

A signature is a handwritten representation of a person's symbol, name, or even just a simple mark that they add to documents as evidence of their identity and intent. A signature writer is known as the writer or signer. The writing of a signature is important due to its use in authentication, validation and authorization of documents. A Signature is an important evidence for document examination. The signatures can be characteristics by using various classes and individual CharacteristicsClass characteristics are common in writing and Individual characteristics are unique features of letters. Examination of control signature and fraud signature are compared based on characteristics. Signatures depend on general patterns and personal unique characteristics. Examiners focus on characteristics like initial and final Strokes, Slant, Alignment, Movement, Skill, Arc, Hook, Buckle, Loops, Spacing, and Staff to examine handwriting and signature.

KEYWORDS

• Handwriting • Characteristics • Comparison • Signature • Strokes • Document

AUTHOR'S AFFILIATION:

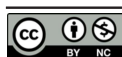
¹ M.Sc. Student, Department of Forensic Science, School of Science, Sanjeev Agrawal Global Educational University, Bhopal, Madhya Pradesh, India.² Associate Professor, Department of Forensic Science, School of Science, Sanjeev Agrawal Global Educational University, Bhopal, Madhya Pradesh, India.³ Ph.D. Scholar, Department of Forensic Science, Golgotias University, Grater Noida, Uttar Pradesh, India.⁴ Assistant Professor, Department of Forensic Science, School of Science, Sanjeev Agrawal Global Educational University, Bhopal, Madhya Pradesh, India.⁵ Ph.D. Scholar, Department of Forensic Science, School of Science, Sanjeev Agrawal Global Educational University, Bhopal, Madhya Pradesh, India.

CORRESPONDING AUTHOR:

Anita Yadav, Associate Professor, Department of Forensic Science, School of Science, Sanjeev Agrawal Global Educational University, Bhopal, Madhya Pradesh, India.

E-mail: anitakakas7@gmail.com

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INTRODUCTION

A broad definition of “Forensic science” is that scientific field focuses on identifying, recognizing, individualizing, and evaluating physical evidence through the application of natural science principles and methods to improve criminal justice.¹

The questioned document referred to as a document becomes questioned when there is doubt about its authenticity or a portion of it. This type of document is also sometimes called a “disputed” or “contested” document.

A “document” is any statement made or depicted in any manner by more than one of that subject or by letters, numbers, or marks. “The term document” as used here refers to a very broad range of materials, including writing on paper, ink, pencil, or with any other material, inscriptions or engravings on metal plates, stone slabs, or any other material, typewritten, cyclostyled, printed, lithographed, photographed matter, chart maps, plans, etc. The authenticity of a document or a part thereof may be challenged on many grounds. Documents questioned on the ground of authenticity of signature or thumb Impression In a broad sense, “handwriting” refers to specific visual signals or marks that are recognized by two or more groups, persons, or individuals in a town, city, or nation as a means of communicating ideas to others for a particular matter or understanding, or sending messages to others. This could involve embossing, painting, or sketching.²

A signature can be handwritten, printed, stamped, typewritten, taken with a camera, or cut out of one document and affixed to another. Although signature forgery can happen in a variety of document classes, it is more often with wills, deeds, notes, contracts, and checks than with other types of papers. Advances in technology have led to the widespread use of novel techniques for counterfeiting signatures. Conflicts emerged about the copies of signatures made using rubber stamps, inkjet printing, and color photocopying.³

Classes of Signature

Formal Signatures: Apply on wills and other significant legal documents.

Informal Signatures: These are applied to regular communication and papers.

Careless Scribble: These is applied to sign document for hotel reservations, credit cards, mail deliveries, and autographs.

The combination of writing characters that match the surrounding natural environment and the signed document is known as an authentic signature. These characters are completely at variance with the forger’s mentality. The real signature shows indifference to the composition process. Unlike a forger, an authentic writer is not afraid of accusations. With years of experience signing documents, he writes naturally and freely.

Characteristics of authentic signature and writing

- Written quickly.
- Contain rhythm when written by a skilled author who is in good health.
- Might overlook some facts.
- May overlook some facts.
- Present a few other forms.
- End Strokes flourish smoothly.
- Natural, smooth appearance.

Forged Signatures

Forged signatures are those that are obtained through unlawful means and are not authentic.

Characteristics of writing and fraud signature.

- The impression of being written slowly.
- The lack of rhythm and uniqueness.
- A unique appearance.
- The sensation of being attracted.
- Paying attention to letter formation.

Characteristics of Signature

Slant: The writing angle, which can be either forward or backward, is this. As slant is one of the most established writing habits, it can take on great significance in specific situations. Two longer handwritings that have a minor slant could be signs that the authors are different. but, intentional disguises themselves could account for a noticeable difference.

Movement: The writing is done by using the fingers, wrist, arm, or a fusion of these movements. The motion of a pen to write a letter is called movement. This can assist in identifying the variations in form. Two identical letters can be created in two different ways.

Loops: An oval's circle is created by combining loops and bending strokes. A letter is consists of its upper and lower parts, or its closed, oblong curve, e.g., "l," "h," or "g."

Alignment: Alignment is the baseline of the ordinary line and imaginary line. The words and letters are set up on an imaginary line. Alignment is the combination of a written line, a signature, or a word and this real or imagined baseline. The alignment could be wavy, uneven, irregular, ascending, descending, or even irregular.

T-Crossing and I-Dot: It is twomost visible strokes that will show the forger. The imitator will struggle to maintain his unique qualities when copying these strokes.

Spacing: The space between two words, letters and between two sentences is called as spacing. When the challenges and model signatures are superimposed, spacing is a crucial component in cases of tracked forgeries. However, the font size and spacing in traced forgeries typically don't change mathematically. The spacing might be secure, wide, or average.

Strokes: These are present in both initial and final handwriting and are likely the most minor features, making them the hardest forgers to copy. The final strokes as spur. All of these strokes will be systematically compared to provide the examiner with relevant evidence.

Skill: An individual's skill level is determined by the person's initial training, writing background, and personality. He is unable to make it better. It is impossible for someone with less skill to duplicate the writing of someone with more skill.

ARC: A curved line in a letter, known as an ARC, is unique to a person who writes cursive handwriting.

Buckle: a small oval or loop formed like a knot that sometimes appears in the letters A, K, or F. This is a type of creative handwriting that becomes better with practice.

Hook: A small decorative feature that appears at the start or end of a letter.

Staff: Staff is the name given to the longest unbroken stroke in capital letters specifically.

Rhythm: Only highly educated people with many years of writing experience can produce work with rhythm. The writing's flow, punctuation and line quality, and the proportionate arrangement of the letters and figures all point to the rhythm.

Pen Pressure: The force or pressure used by the fingertips to write. It's an unintentional act. apply pressure to specific letters or words. Slow writers under a lot of pressure. Illiterate people typically write under extreme strain.

Pen Pause: Skilled and skilled writers typically avoid pausing when writing a word's letters. Pen pauses are common in the writing of illiterate people who struggle with handwriting. Even though the reasons for both types of pauses are the same, the pause from a forger's pen is not the same as that of an illiterate. In a forgery, the pen pauses at the initial stroke, ending stroke, embellishment at difficult formation and connectives.

Pen Lifts: Some writers move their pens due to specific letter combinations. For example, some writers lift their pen to cross a t or add a dot to end an incomplete letter. It is evidence of fraud when they regularly do not appear in the genuine signature.

Hesitations: The falsified strokes' beginning and ending show hesitations as seen by their hesitation of firmness. The reason for the hesitancy in the initial strokes is that the forger is uncertain about his ability to perform the task effectively. He thinks in the Ending Stoke if he did a good acceptable job of forging the signature.⁴

Table 1: Characteristics of Signature

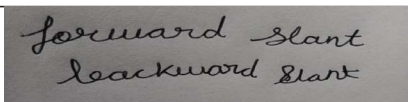
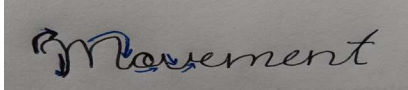
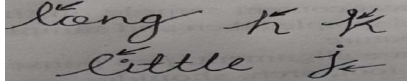
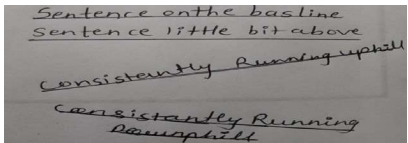
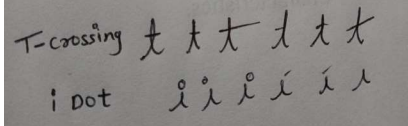
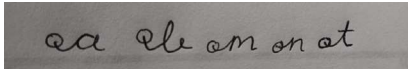
Characteristics of Signature	
Slant	
Movement	
Loops	
Alignment	
T-Crossing and i-Dot	
Spacing	

table Continue...

Characteristics of Signature	
Strokes	ea e le em on at
Arc	le m h
Buckle	A * f
Hook	a t d
Staff	B L H K

Identification of Signatures

By erasing coincidence and simulation while comparing two signatures, a specialist can determine the conclusion that the writings and signatures in dispute and those that are known are both the work of the same individual. It is not just a statement of the likelihood or an ambiguous indicator of similarity if the degree of certainty is very high. If it is correctly arrived at, it can be concluded that all the variances and similarities in the texts and their significance have been taken into account. An incredible competence can create the perfect simulation with no evidence, due to some remarkable coincidence and other assumptions that may be way outside the knowledge of experts. The possibilities are so remote as to be irrelevant.⁵

METHODOLOGY

Control signature	Fraud signature	Observation Table			
		Sr	characterist	control sign	fraud sign
① Ankita	Ankita	1)	Slant	① No slant ② Left ③ Left ④ Left	left left R left Right
		2)	movement	① A, n ② T, a ③ s ④ P, r	A, m tau s P, r
		3)	Loops	① l ② b ③ absent ④ s	absent absent absent g
		4)	Alignment	① on the baseline ② on the baseline ③ uphill ④ uphill	above above uphill on the baseline
② Tanishka	tanishka	5)	T-crossing i-dot	① i, t ② l ③ absent ④ absent	absent, t i absent absent
		6)	Spacing between letter	① A, n ② T, a ③ s, e ④ absent	absent T, a s, e P, r, a
		7)	Strokes	① starting, ending ② ending ③ starting, ending ④ ending	starting, ending starting, ending ending ending
		8)	Arc	① absent ② a ③ absent ④ absent	absent a absent absent
③ Sunny	Sunny	9)	Buckle	① absent ② absent ③ absent ④ absent	absent absent absent absent
		10)	Hook	① absent ② u ③ absent ④ absent	absent u absent absent
		11)	Staff	① A, K ② T, K ③ absent ④ absent	A, K T, K absent absent
④ Prayansh	Prayansh				

Figure 1: Sample of signatures

This study involved the signatures of 100 subjects of signature were taken. The chosen subjects were aged between 18 to 30. Taken the signature sample on the paper sheet content sample on the left side is considered a control signature and a sample taken on the right side is considered a fraud signature.

By using a magnifying glass analyze the sample and distinguish between control and fraud signatures by using characteristics. The characteristics used for the analysis are (Strokes, Slant, Alignment, Movement, Skill, Arc, Hook, Loops, Buckle, and Staff) All these characteristics are included under class and individual Characteristics.

RESULT

Result: The results are observe in control

signature and fraud signature are tabulated in table 1.

Table 1: Characteristics of signature

Characteristics	Control Signature (n=100)	Fraud Signature (n=100)
Slant	39	46
Movement	90	86
Loops	39	30
Alignment	94	92
T-crossing, i-dot	31	31
Spacing	40	30
Strokes	74	69
Arc	46	49
Buckle	26	21
Hook	18	12
Staff	53	60

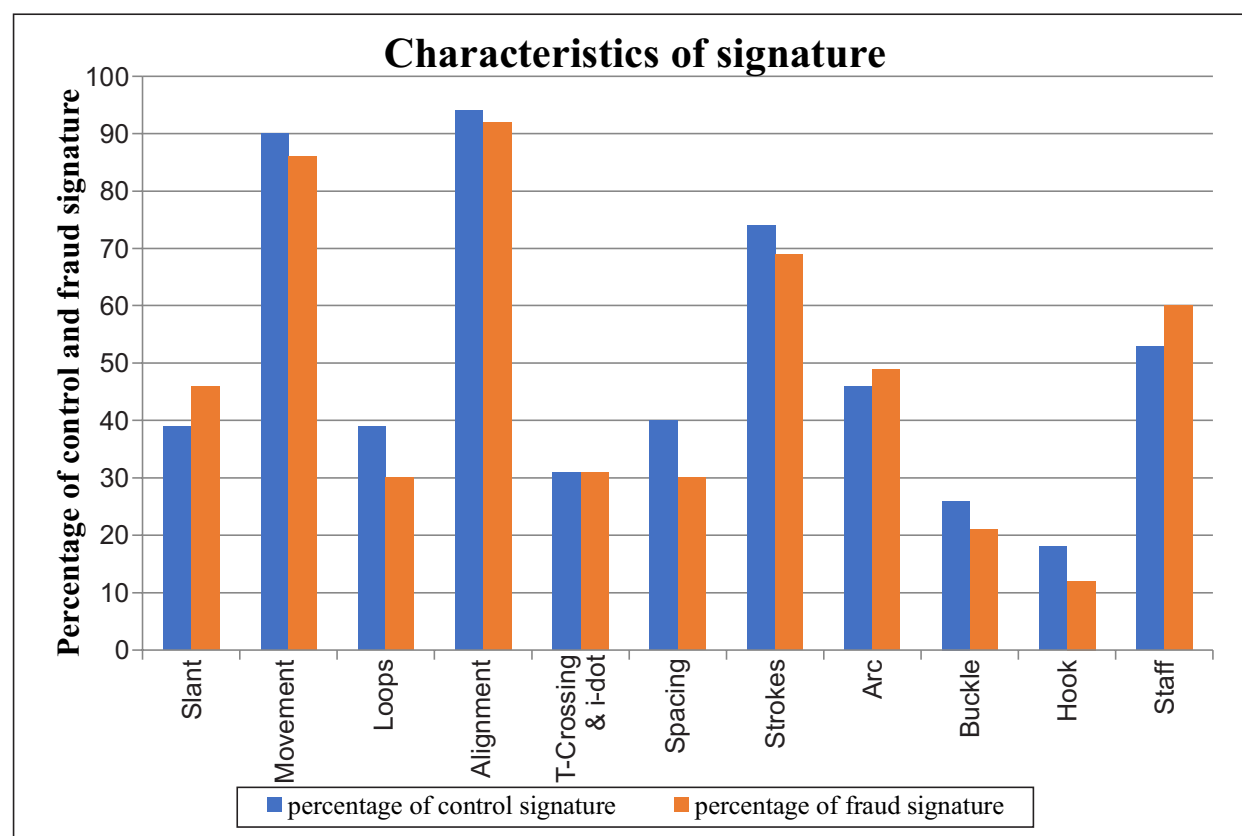


Figure 2: Graphical representations of Characteristics of Signature

DISCUSSION

The difference between the control and fraud signatures is noted in this study. The percentage of control signatures is shown in blue color and the percentage of fraud signatures is shown in orange color on the above graph. Slant is in fraud signature 39% and control signatures 46%. The fraud signature is more

slanted. There is more movement variation in the control signature than the fraud signature as Compared to the fraud signature. the control signature has more loops. T-crossing and i-dot same in both signatures. although alignment variation was greater in the control signature than in the fraud signature. more strokes in the control signature and less in

the fraud signature. a control signature has fewer arcs. Buckle more in a control Signature and less in a fraud signature. Hook more in a control signature and less in a fraud signature. Staff more in fraud Signature as compared to control Signature.

CONCLUSION

This study involved analysis of the control signature and fraud signature. Based on the findings it was observed that fraud signature and control signature are different. The Signatures sample characteristics are dissimilar from the control signatures indicating a duplicate of the control signature. Some characteristics are alike. In fraud signature writer has tried to hide his identity and copy characteristics (fraud) but they did not perfectly fraud their signatures. The control signatures and fraud signatures could be distinguished as the characteristics of individual signatures greatly differ from each other. Characteristics (class and individual) were used to distinguish characteristics between control signature and fraud signature. There is no similarity between a fraud signature and a control signature. Class and individual characteristics are used for analysis (Strokes, Slant, Alignment, Movement, Skill, Arc, Hook, Loops, Buckle, Staff) of fraud writings were found to be changed.

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