

EVALUATION OF COMMON AUTHORSHIP CHARACTERISTICS IN SIGNATURES AND HANDWRITINGS OF DIFFERENT WRITERS

Anurag Srivastava*¹ and Dr. Kavita Sharma²

Shri Vaishnav Institute of Forensic Science, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore (M. P.)

Abstract: *Handwritten Signature is used as an identification mark for a person. Signature contains intrinsic handwriting characteristics which are produced after a long practice of peculiar formation and adaptation to needs and abilities. These features make any signature unique and identifiable. Signature is so significant that it is frequently used in routine paper works as well as in financial and confidential activities [1, 2]. This is the reason due to which signature is prone to forgery. On the basis of formation signatures may be categorised into three groups- first in which a signature is constituted of letters only, second in which a signature is constituted of certain letters as well as certain non- letter patterns and third in which a signature is constituted of non- letter patterns only. Signatures may be examined for various reasons but the most common are to know whether a particular signature is forged or not. For this purpose, questioned signature is required to compare with specimen signatures. In certain cases, it becomes essential to know who wrote the particular signature, this is called authorship fixing. For any handwriting expert it is often easier to detect whether a particular signature is genuine or forged but tough to know who wrote it. Authorship fixing by comparing handwriting with handwriting is common but by comparing signature with handwriting is unusual. Here in this study comparison of signature with handwriting has been carried out on collected samples to extract those handwriting characteristics which are common in signatures of the same writer. This method of authorship fixing is applicable in many cases specially in which handwriting of a subject the only available writing sample for comparison with questioned signature.*

Keywords: Signature, Handwriting, Characteristics, Authorship.

1. Introduction

Handwriting is an acquired skill. The learning process of handwriting in human being starts from childhood when he gets admission in school [3]. First, he tries to follow copy book style being taught in school, then starts making changes in writing as per his needs and abilities, practices the same thing which becomes habit after spanning a long time, thus his handwriting becomes mature [4, 5, 6]. At this stage the way the person writes becomes permanent, i.e. the handwriting poses a fixed set of numerous characteristics produced due to a complex neuromuscular coordination of that person [7, 8]. Therefore, handwriting is also referred to as a neuromuscular task [9].

A signature is also a handwritten sign or mark made by a person which when present on a document is acceptable as identification mark of that person [10]. Signature is also a neuromuscular task which is developed by a person when he learns to write. It is evident that signature and handwriting both possess certain intrinsic characteristics which are unique for a person and thus identifiable [9, 11, 12, 13, 14]. On the basis of formation signatures may be categorised into three groups- first in which a signature is constituted of letters only, second in which a signature is constituted of certain letters as well as certain non- letter patterns and third in which a signature is constituted of non- letter patterns only. Signatures may be examined for various reasons but the most common are to know whether a particular signature is forged or not. For this purpose, questioned signature is required to compare with specimen signatures. In certain cases, it becomes essential to know who wrote the signature, this is called authorship fixing. For any handwriting expert it is often easier to detect whether a particular signature is genuine or forged but tough to know who wrote it. Authorship fixing by comparing handwriting with handwriting is common but comparing signature with handwriting is unusual. Here in this study comparison of signature with handwriting has been carried out on collected samples to extract those handwriting characteristics which are common in signatures of the same writer [9, 15]. This method of authorship fixing is applicable in many cases specially in which handwriting of suspects are the only available writing samples for comparison with questioned signature.

2. Methodology

For present study 8 English signature samples and 3 English writing samples were obtained from each of 100 subjects. All subjects were skilled writers with graduation and above education. The texts provided for writing sample was selected in such a way that it may contain all alphabets of English language. Total letters present in each subject's

signature were noted (as shown in figure 1). Then out of total alphabets present in each signature, number of alphabets matching with alphabets of writing samples of the same subject in respect of manner of their formation were noted. Similarly type of line quality and skill present in the signatures were also noted (as shown in figure 2(a) and 2(b)). Data thus obtained were analysed through data analysis software- Statistical Package For The Social Sciences (SPSS).

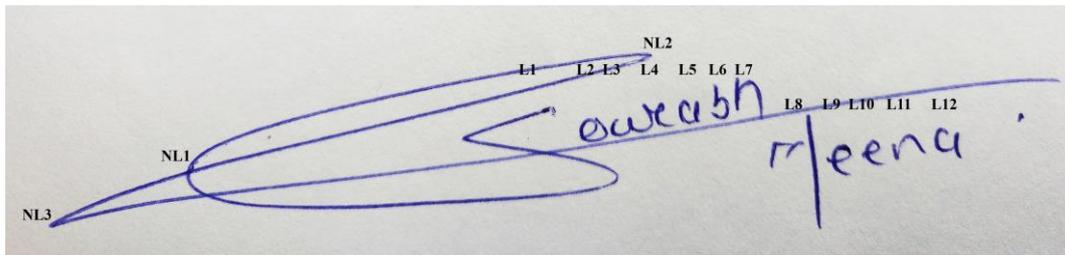


Figure. 1: A sample signature showing marking patterns of letters (indicated by L) and non- letters (indicated by NL).

3. Result & Discussion

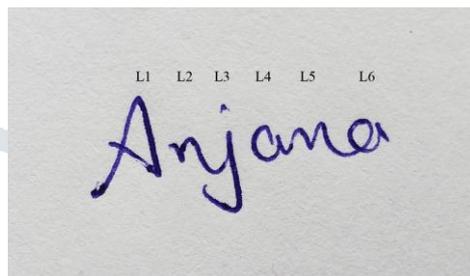


Figure. 2(a): Letters present in a signature sample.

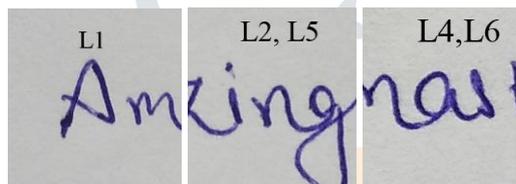


Figure. 2(b): Letters present in handwriting samples.
Figure. 2: Showing match of letters of signature with letters of handwriting written by same writer.

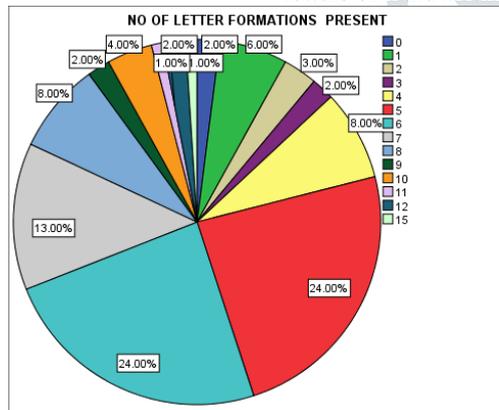


Figure. 3

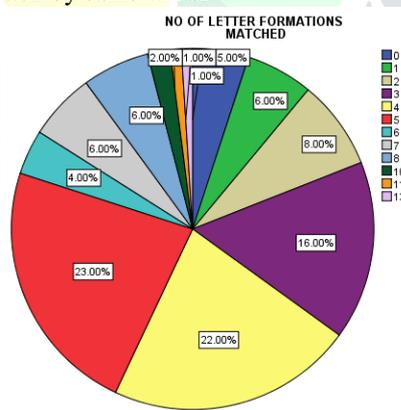


Figure. 4

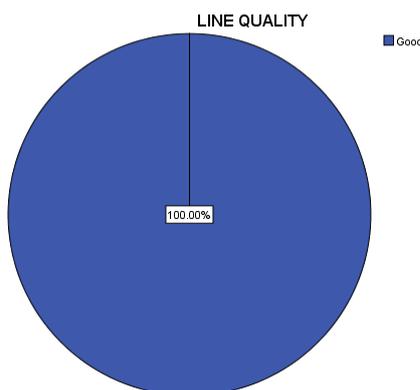


Figure. 5

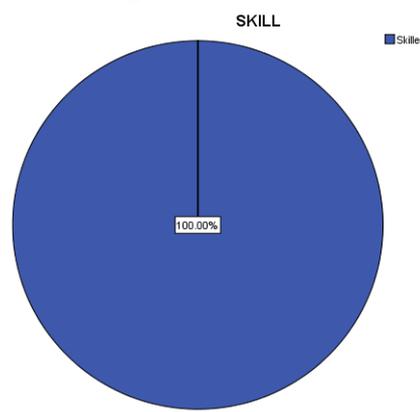


Figure. 6

As shown in Fig. 3 there was 2% cases in which signatures didn't contain any alphabet, 24% cases in which signatures contained 5 alphabets and next 24% cases in which signatures contained 6 alphabets i.e. the number of alphabets present in majority of signatures was 5 or 6. Frequency of number of letter formations matched as shown in Fig. 4 reveals that there was only 5% cases in which no letter matched with letters of handwriting. However, there was 22% case in which 4 alphabets matched and 23% case in which 5 letters match was found. As shown in Fig. 5 100% signature samples showed good line quality i.e. there was 100% matching of signature line quality with handwriting line quality. Similarly, as shown in Fig. 6 100% signature samples showed skilled writing i.e. 100% matching of skill of signatures with handwriting.

4. Conclusion

Every questioned signature is a unique case in itself i.e. it requires case specific plan as how to conduct examination and from where to manage standards for comparison. In certain cases, in which an examiner is provided with limited handwriting and signatures samples or he has got only handwriting samples to be compared with questioned signatures then being an expert he has to exert best of his knowledge and skill to find a way to come to a result.

The present study explores the significance of comparing signature with handwriting in certain unusual cases. As per above result 98% signatures contained letters as a constituent writing. The result also showed that out of all alphabets present in any signature there was only 5% probability of any letter to be not matching with letters of same person's handwriting. Most importantly there was 100% matching in line quality and skill of signatures and handwritings of the same writers. Thus, at this end it is clear that letter formation along with line quality and skill cumulatively increase the reliability on inference made regarding common authorship of signatures and handwritings.

5. References

1. Tarannum, A. 2018. Traced forgery- A case study. *Academic Journal of Forensic Science*, 1(1): 1-4.
2. Dubey, S. K. and Shukla, A. K. 2016. A Grid Based Offline Signature Verification System. *International Journal of Scientific Research and Development*, 4(1): 1584-1588.
3. Desai B. and Kalyan J. 2013. Forensic Examination of Handwriting and Signatures. *International Journal of Innovative Research & Development*, 2(5): 514-526.
4. Sallawad, S. S., Sahu, M. and Ahirwar, B. 2017. Examination of Simulated Forgery and its Investigation Protocol. *Research J. Pharm. and Tech*, 10(12): 4211-4214.
5. Harrison, D., Burkes, T. M. and Seiger, D. P. 2009. Handwriting Examination: Meeting the Challenges of Science and the Law. *Forensic Science Communications*, 11(4): 1-13.
6. Choudhary, S. K. and Mathur, S. 2018. Significance of Forensic Stylistics in Fixing Authorship of Handwriting. *J. Forensic Sci. & Criminal Invest*, 7(4): 555718. DOI: 10.19080/JFSCI.2018.07.555718
7. Sahu, M., Yadav, A. and Rao, I. A. 2017. Examination of Handwriting for Gender Identifying Features. *International Journal of Current Research*, 9(1): 45923-45928.
8. Bozza, S., Taroni, F., Marquis, R. and Schmittbuhl, M. 2008. Probabilistic Evaluation of Handwriting Evidence: Likelihood Ratio for Authorship. *Journal of the Royal Statistical Society*, 57(3): 329-341.
9. Huber, A. R. and Headrick, M. A. 1999. *Handwriting Identification: Facts and Fundamentals*. CRC Press, Boca Raton New York.
10. Sahu, M. and Shukla, I. 2017. Study of Variation in Repetitive Signature of Same Writer. *International Journal of Current Research and Review*, 9(5): 9-11.
11. Mathur, S., Chaudhary, S. K. 2014. Examination of Handwritten Documents of Unfamiliar Scripts: A Forensic Viewpoint on Various Indian Languages. *International Journal of Research in Applied, Natural and Social Sciences*, 2(4): 137-144.
12. Matuszewski, S. 2004. Natural Variation in Selected Constructional Features of Female Signatures. *Problems of Forensic Sciences*, LVII: 24-43.
13. Kumar, S. Saran, V., Vaid, A. B. and Gupta, A. K. 2013. Handwriting and Gender: A Statistical Study. *Problems of Forensic Sciences*, 95: 620- 626.
14. Patil, P. and Patil, A. 2013. Offline Signature Recognition Using Global Features. *International Journal of Emerging Technology and Advanced Engineering*, 3(1): 408-411.
15. Osborn, A. S. 1929. *Questioned Document*. Albany, N.Y.: Boyd Print. Co., 2nd edition.