International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 04 | April - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

A Comparative Study of Traced and Simulated Forgery on Signature

Ms. ANJALI. A[1] , Ms. STINY SABU[2]

[1]Ms. ANJALI A, M.Sc Criminology and Forensic science, Department of Computer Science and Engineering, anjaliappu14@gmail.com, Dr. MGR UNIVERSITY, Chennai, India
[2]Ms. STINY SABU, Assistant Professor ,Center of Excellence in Digital Forensic, Chennai, Tamil Nadu, India

---

Abstract - Signature forgery remains an important issues in the field of forensic document analysis especially in financial, legal and administrative scenarios. This study compares two forms of signature forgery that is traced and simulated by manually. The objective of this study is to analyze and differentiate the class and individual characteristics of traced and simulated forgery on signature. For the analysis, 40 genuine signature samples are collected from random persons of age groups of 18 to 25. Then performed the traced and simulated forgery. This study helps to identify which type of forgery are easier to recognize by manual forensic method. The findings provide clarification on the capability of manual signature analysis. Traced forgery exhibit closely resembles to the genuine signature samples in overall size and shapes but shows difference in fluency, poor line quality and unnatural pen pressure. Simulated forgery fails to replicate fine details and appear more naturally but some are enlarged in size. From the analysis it is found that simulated forgery is more difficult to identify.

Key Words: Forgery, Genuine, Traced forgery, Simulated forgery, Fluency, Line quality.

1.INTRODUCTION

Forgery is an unlawful act of fabricating, modifying or imitating the writings with the intention of deceiving or defrauding someone. Signature forgery, document fabrication, and digital forgery are examples of common kinds. Signature forgery refers to the act of falsely replicating or duplicating someone's signature without their consent or permission. It is generally conducted for financial gain or fraudulent purpose.

Among the various types of forgery traced and simulated forgeries are quite difficult to recognize because of their deceptive precision and imitation. When a person directly copies or traces a genuine signature with the help of mechanical or transmitted light is called traced forgery whereas a person tries to copy or draw a signature with the help of model is called simulated forgery.

The study of signature forgery plays a vital role in forensic document examination. The present study analysis manually both class characteristics, which are common to a group people and individual characteristic, which are unique to each and every person. By comparing these features forensic specialists can determine the authenticity of the documents. The research will provide an in-sights into which type of forgery are easier and difficult to identify and also helps to determine the problem connected with each.

Each person`s signature is unique and it reflects their handwriting styles. Natural variations can be seen on every signature but in traced and simulated forgery it shows certain differences. The need of the study is to analyze and reduce forgery related crimes. It increases the level of precision and reliability of signature verification activities. It can also help to aid a development in training programs of document examiner in analyzing procedure.

2. METHODOLOGY

2.1 Aim

The aim of the study was to compare the traced and simulated forgery on signature.

2.2 Ethical consideration

Every member's written consent was obtained and this study ensure confidentiality for all participants. Collected signatures are stored securely to prevent from unauthorized use.

2.3 Materials and Methods

2.3.1 Sample criteria

This research represents qualitative and comparative study of manual comparison of traced and simulated forgery on signature by random sampling method. Signature samples of 40 persons are collected for this study from the age group of 18-25. Each participants provided a set of genuine signatures for conducting

forgeries. The purpose of the research is to compare the detectability and visual similarity between the forged signature.

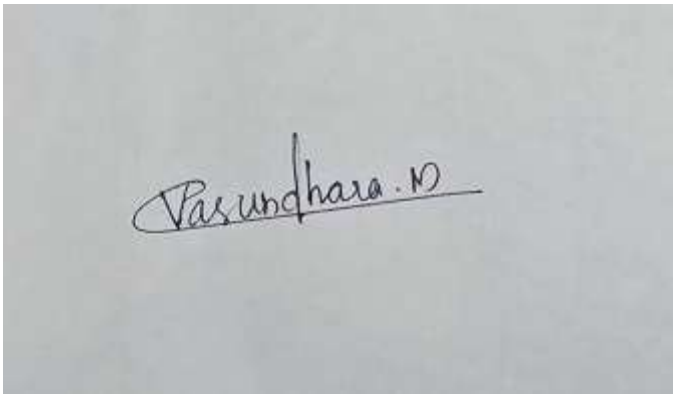
2.3.2 Sample collection

For this study 40 genuine signature samples were obtained from individual participants (fig1 shows genuine signature sample). Each genuine signature samples was given to two different persons who were instructed to perform both type of forgeries yielding a total of 160 forged signature samples (80 traced and 80 simulated) and making the total sample size 200 (fig 2 shows traced signature sample and fig 3 shows simulated signature sample). Traced forgeries were made using instruments a transmitted light, transparent board and a magnifier for close imitation of signature whereas simulated forgeries were done with no guiding assistance. All signature samples were written using the same paper and pen to maintain the integrity of materials used during the collection procedure.

1 : Genuine signature sample

Fig 2: Traced signature sample

Fig 3: Simulated signature sample



2.3.3 Data Analysis

Compare the collected traced and simulated forgery with the genuine signature manually by analyzing the class and individual characteristics. Analyze the samples using magnifier and scale to evaluate the intra- and inter-class variations of characteristics such as stroke, pen pressure, alignment, size, embellishment, line quality. Consistency in writing materials ensured observed variations were due to signature genuineness rather than external factors. The analysis permitted the identification of trustworthy criteria for distinguishing between the real and fake signatures, thereby helping to development of strong signatures.

3.RESULT AND DISCUSSION

Table 1 represents the comparison of traced and simulated forgeries using several class and individual characteristics. Traced forgery exhibits visible hesitation and stiffness in strokes and visible tremors also poor replication of specific features. They fails to duplicate the exact stokes and shows 85% similarity to genuine signature. Simulate forgery shows more natural appearance with good line quality and stoke sequence with experience. They try to copy the individual traits and moderate to high resemblance with 70% recognition rate.

Table 1

Criteria	Traced forgery	Simulated forgery
1. Fluency of strokes	Shows hesitation/stiff	moderate to natural
2. Line quality	Tremors are seen mostly	Medium to goods
3. Pen pressure	Low to medium	Medium to heavy
4. Stroke sequence	Fails due to tracing imitation	improved with practice
5. Replication of individual traits	Poor: usually absent or mechanical	Attempts to try the best
6. Overall similarity	Highly similar	Moderate to high similar
7. Detection rate	85% identified as forgery	70% identified as forgery

The study highlights the importance of manual forensic examination distinguishing the traced and simulated forgeries. The comparison of traced and simulated forgery reveals that class characteristics such as alignment, slant, general appearance can be recreate easily while individual characteristics such as very difficult and they fail to recreate it. Traced forgery mostly maintain great authenticity in class characteristics due to strict copying procedure, but they lack the fluidity and flow of real writings. Simulated forgery capture more natural movement due to the unfamiliarity of actual wrister's style. The comparative study of traced and simulated forgery helps to reveal the behavioral pattern of the forger and the technique used for the forgery. Signature forgery requires more neuromuscular coordination than any other forgery so it is very difficult to imitate.

4. ACKNOWLEDGEMENT

I would like to express our sincere gratitude to all those who contributed to the successful completion of this research work. First and foremost, we extend our heartfelt thanks to Dr. M.G.R. Educational and Research Institute, Chennai, for providing us with the necessary infrastructure and academic environment to carry out this project.

I deeply thankful to Ms. Stiny sabu, Assistant Professor, Centre of Excellence in Digital Forensics, for her invaluable guidance, continuous support, and insightful feedback throughout the research. Her expertise and mentorship were instrumental in shaping the direction and quality of this work.

I also extend our appreciation to our colleagues and peers who provided constructive suggestions and moral support throughout this journey. Special thanks to the faculty of the Department of Computer Science Engineering for their encouragement and academic assistance.

5.CONCLUSION

By addressing the difference between the traced and simulated forgery we can contribute significantly to the field of forensic science and legal practices. This study implies manual examination of both class and individual characteristics remain a viable option for detecting forged signature. Traced forgery are more noticeable due to their mechanical and unnatural execution where as simulated forgeries are more fluid and fail to mimic the complex uniqueness of real signature it resembles to natural variation of signature and it is most difficult to identify. As a conclusion we can clearly distinguish the traced and simulated forgery on signature.

6. REFERENCES

[1] Afreen Tarannum , "Traced forgery a case study'', Academic Journal of Forensic Science, Volume 01, issue 01, April 2018.

[2] Marcus Liwicki, C. Elisa Van Den Heuvel, Bryan Found, Muhammad Imran Malik, " Forensic Signature Verification Competitopn 4Nsigcomp2010 – Detection of Simulated and Disguised Signatures'', IEEE , 715-720, 2010.

[3] Katrin Franke, "Analysis of authentic signatures and forgeries, Computational forensics'', proceedings 3, 150-164,2009.

[4] Moshe Kam, Kishore Gummadiala, Gabriel Fielding, Robert Conn, "Signature Authentication by forensic document examiners'', Journal of Forensic Science, 46 (4), 884-888, 2001.

[5] Tahnee Ngair Dewhurst, " The dynamic characterization of forgery behavior and its application to

static forensic examinations of disputed signatures'', la trobe, 2015.

[6] Carolyne bird, Bryan Found, Kaye Ballamtyne, Doug Rogers, Forensic Science International 197 (1-3),103-107,2010.

[7] Sandip Shankar Sallawad, Manju Sahu, Bharati Ahirwar, " Examination of Simulated Forgery and its Investigation Protocol'', Research Journal of Pharmacy and Technology volume 10 (12) 4211-4214,2017.

[8] Pavlos Kipouras " The Evolution of the Simulated Signature by the forger'', International Journal of Law in Changing World, Volume 1, Issue 2, 2022

[9] Linton Mohammed, Bryan Found, Michael Caligiuri, Doug Rogers, "Dynamic characteristics of signatures: effects of writer style on genuine and simulated signatures, Journal of Forensic Science Volume 60, Issue 1, 2014.

[10] Mohd Hafizuddin Mohd Yusof, Vamsi Krishna Madasu, "Signature verification and forgery detection system, Student conference on research and development 9-14,2003.

[11] Bhavana Desai, JL Kalyan, "Forensic examination of handwriting and signatures'', International Journal of Innovation Research and Deveoplment,Volume 2 Issue 5,2013.

[12] Gek-Kwee Lee, Bei-Sing Yap, Chiew-Yung Yang, Lee-Tiang Lee, Sock-Kim, Koon-puay Tan, "A study on the levels of difficulty in the simulation of individual characteristics in a signature'', Journal of the American Society of questioned Document Examiners, Volume 9, Issue 1,2006.

[13] Jinhong Katherine Guo, David Doermann, A Rosenfield "Off-line skilled forgery detection using stroke and sub stroke properties'', 355-358, 2000.

[14] Arend WA Van Gemmert, Gerard P Van Galen "Dynamic features of mimicking another persons handwriting and signature'' Radbound Respository Sharing Science,1996.

[15] Abhijith Mitra "An offline verification scheme of skilled handwritten forgery document using pressure characteristics, IETE Journal of Research, Volume 50, Issue 2, 2004.