

An Insight into Disguised Handwriting: A Review Study

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Abstract

This review gives an overview of different features of disguised writing based on the individual characteristics of a writer. The study on disguised handwriting has been the most prominent facet in questioned document examination. Disguised handwriting has been and is still a predominant criminal activity encountered in forensic investigation. It is very critical for document examiners to elucidate the handwriting and interpret the source. Various studies and research have been conducted concerning class characteristics and individual characteristics in handwriting analysis. The main contribution of this work lies in encapsulating the methodology used, common features, the success rate of the population in disguising the handwriting, and also, the challenges faced by the document examiners in determining the authorship. The recent technological advancements discovered which can be used to perform the analysis of handwriting are also embraced.

Keywords: Forensic science • Class characteristics • Individual characteristics • Questioned document examination

Introduction

Document Examiner tackles various types of criminal cases that involve fixing the authorship. Among these are those where the handwriting content is disguised as text in a forged document. Writing characteristics vary for each writer. It is possible to identify these characteristics in normal writing content. The main objective of studying the hidden characteristics of complex writing is to find out the minute and subtle features of the writing. It is not possible to completely distort handwriting as forger does not want to conceal his identity. Disguised writing is a type of forgery that occurs when a writer deliberately tries to copy and alter the writing style to hide his or her identity.

To study features of handwriting, it has been differentiated into two types.

- (i) Class Characteristics
- (ii) Individual Characteristics.

Class characteristics consist of the properties which the population share in common. It consists of features such as line quality, direction, size and proportion, spacing, the skill of writing, slant, pen pressure, disguise, halts, hesitations, rhythm, natural variation, and tremors. Individual characteristics consist of shape of letters, initial and terminal strokes, connecting strokes, hook, loop, knots, extent of retracing, the commencement of various letters, embellishments of letters, diacritics, the extent of retracing, uniformity of letters, etc.

Literature Review

In Forensic Science, questioned document examination has a major significance concerning handwriting or signature analysis [1]. These characteristics help the examiner to determine if the document has been forged, simulated, or disguised. By comparing the class and individual

characteristics, the examiner will be able to establish if the questioned document is written by the same writer or not. The main focus of this paper is based on disguised handwriting. 'Disguised Handwriting' is an intentional act to alter one's handwriting to hinder their identity. It is encountered in cheques, banknotes, ransom notes, threat letters, anonymous letters, blackmail letters. People indulge in this activity assuming that their identity can be recognized, which is a delusion. Nevertheless, the attempt made by the writer to disguise is usually ineffective. Although it is not easy for a person to disguise their handwriting perfectly, it is also challenging for the examiner to conclude. However, the recent technological advancements would assist the document examiner to determine the authorship of the questioned document. The overall appearance of a person's writing is most likely the first feature that people notice when they look at it [2]. This is because it shows how big or how narrow the writing is. A pronounced forward slant is different from a backward one. Also, the small space between the letters makes their writing look cluttered. The letter's style will not change as a result of the change in size or slope. The method of writing will also not change. The study was conducted to analyze the master disguised writing with the help of specific individual writing characteristics [3]. Disputed documents are mostly encountered during forensic investigations relating to forgery and disguise. Disguised writings are usually produced to conceal one's own identity where the person modifies his/her writing willingly. The work aimed to study different cases of master disguised writings and compare them with particular individual characteristics to reveal the identity of the writer. After analysis, it was found that the identity of the writer can be established scientifically. The study was conducted based on forensic analysis of characteristic features of disguised writing to fix the authorship [4]. Various types of cases are being dealt with by the document examiners where examination of disguised writings has been the most challenging to fix the authorship. The study examined a large number of disguised writings to determine the characteristic features of writing. It was ascertained that the disguisers are neither consistent nor successful in concealing their handwriting. Conducted a study based on probability to prove the difference between disguise and natural handwriting of Egyptian Arab writing [5]. The study was based on 40 student volunteers and 40 Forensic Handwriting Experts. Copy of two documents with different texts was obtained from each volunteer. Statistical analysis using SPSS software was done to differentiate between the writings. It was inferred that the forensic handwriting examiners group showed a high degree of disguise whereas the students showed a moderate and low degree of disguise. The study also indicated that an increase in age will associate with an increase in the ability and degree of disguise. However, the disguise in handwriting was said to be high in females (students) and high in males (forensic examiners group). The study was conducted based on the rare case of disguised signatures using the form of lateral expansion [6]. One of the most common practices

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Received date: 06 October, 2021; **Accepted date:** 20 October, 2021; **Published date:** 27 October, 2021

in white-collar crime is signature disguising. To deny the authenticity of a document an individual purposely changes his/her genuine handwriting. The study was done to decipher the unique methodology of disguising, which was done in the form of lateral expansion. The study is based on a case study of disguised signature where the subject used the form of lateral expansion instead of overlapped alphabets. It was observed that the subject was not able to change his characteristics in a few letters/alphabets. Conducted a distinguishing study between disguised and natural behaviors of handwriting by considering the skills of forensic document examiners [7]. For document examiners, disguised writings have always been a problem by attracting higher rates of inconclusive opinions concerning authorship. The study was done by determining 140 pairs of disguised and natural writings and then comparing them with a control group of laypeople. The study showed a significant difference between the lay group and examiners. It was determined that the document examiners exhibited a greater skill in determining the disguised handwriting samples. Although, it is said that most of the opinions given by examiners are inconclusive compared to laypersons. Conducted a statistical examination of common characteristics for disguised handwriting amongst the Malaysian population [8]. For examination, normal handwriting specimens were taken from 60 subjects and then classified into class and individual characteristics, where individual characteristics included letters such as "a", "e", "g", "y", "d", "f", "h", "o", "E", "D" and grapheme "th" whereas class characteristics included slant, script types, word spacing, angularity alignment, and letter size. To compare between normal and disguised handwritings 50 sets of handwritings were requested. To determine the relationship between race, age, first education system, occupation, and gender with normal habits of handwriting Pearson Chi-squared statistical technique was used. The study showed that handwriting can be classified uniquely. It was also observed that disguising one's handwriting tends to show certain changes concerning size, slant, speed, and initial capital letter but one element remains inconsistent which is spacing between words. Conducted a comparative study on disguised Chinese handwriting executed by Chinese-Canadian writers [9]. The study was done to compare the features of disguised handwriting with an earlier study done by S.C. Leung and M.W.L. Chung. Examination of 144 sets of disguised and normal Chinese handwriting was obtained from Chinese-Canadian writers in Toronto. After examining the handwriting, it revealed several methods of disguise which were not reported in the previous study. The study concluded that it is very easy to disguise Chinese handwriting since it lacks originality. Carried out a study on disguised handwriting [10]. The study was done on 98 subjects and three groups were assigned that is, age, occupation, and social background. Two types of text were created one was using their natural handwriting and the second was disguised handwriting. The study aimed to examine the characteristics that were most frequently disguised and in which age group it was significant. The study showed a result that the majority of them followed the common pattern of disguise along with certain intersecting differences between the groups. Conducted a comparative study for examining disguised Chinese Handwriting [11]. The study involved 437 sets of ordinary and disguised Chinese handwriting. A survey revealed that, in terms of the various methods of disguise, the patterns were more similar to those found in English handwriting. It was concluded that, in terms of the various features that are altered in disguise, the most notable ones are those which are most easily modified. It was also confirmed that Chinese Handwriting is simple and lacks originality due to which it's easy to disguise. A study was conducted to check the ability of the students to disguise their handwriting [12]. It was inferred that most of the students failed in disguising their handwriting. However, more than 10% of the students were successful in disguising their writing.

From the review of the researches that are discussed, it can be said that the methodology used by the writers to disguise their handwriting is generally similar. From the large number of studies conducted by various researchers, it can be ascertained that only a handful of writers are successful to perfectly disguise their handwriting. Usually, criminals fail to disguise their handwriting due to a lack of understanding of the method and the various aspects concerning disguise their handwriting.

During the examination of the disguised writings, a lot of characteristics (individual and class) are considered for the analysis. Most of the characteristics in disguised handwriting were found to be homogenous, there were not many differences. However, the studies deduce that age, occupation, education, and background play an important role for a writer who is disguising their handwriting. The research-based on disguised handwriting is made from all over the world. This paper includes the disguised study of Malaysians, Swedish, Arab and Chinese. Although the language of disguise varies according to the region of people, the characteristics used to disguise remains the same.

The common features used in disguising the handwriting are change of slant, size of letters, spacing between the letters or the words, the alignment and quality of line, alteration in the formation of letters, usage of pen lettering, change in pen pressure, and pen lifts, change in the formation of stroke, change in the pictorial appearance, replacement of diacritics.

Most of the studies have revealed that the change of slant is the most commonly used disguised feature. If the disguiser originally uses the forward slant, he may change it to vertical or backward slant and vice-versa. Change of size of letters is another characteristic used by the disguiser. The letter size may be increased and decreased based on his/her original writing. Some of them try to disguise by using unusually large letter formation and some of them squeeze the words together causing them difficult to understand. Most of the time the disguiser tries to add embellishments or anything uncommon with his/her original writing. The disguisers also change the alignment of the words or the letters either ascending or descending opposite to their original handwriting. The skilled person who tends to disguise their handwriting changes their writing like an unskilled person by creating a lot of tremors, halts and hesitations, pen lifts, and pen pauses. The speed of writing will also be contrasting to that of the original writing. The placement of the dot in the letter 'i' or the horizontal strokes in the letter 't' will also be altered by placing the diacritic left, right, or middle or with a dot or a circle contrasting to how they place in their usual handwriting. The researchers have been successful in providing the statistical data of the population concerning the disguised handwriting characteristics.

From the amount of analysis on disguised handwriting it can be inferred that no individual can perfectly disguise their handwriting. By changing certain features, the writer gives rise to artificial looks of the letters or words. While disguising their handwriting the writer impulsively will bring back their original writing or they try to exaggerate the letters. The consistency in the letters or words will be completely contradictory to one another. Lateral expansion is also one of the new techniques to disguise the handwriting or a signature. However, it is also not 100% successful as the writer would reveal his characteristics eventually.

On the other hand, the document examiner has an important role in the analysis of the questioned document. It can be said that sometimes it is easier for him/her to analyze the handwriting and most of the time it is very challenging to provide a conclusion. The major issue faced by document examiners is that to find the author of the questioned document. When the disguiser attempts to disguise their handwriting, if it is very inconsistent with a lot of tremors and artificial looks. Also, when it reveals the individual characteristics of the writing when compared to the admitted samples it is easier for the examiner to conclude. Nevertheless, when an individual who is an expert in disguising their handwriting makes it uneasy for the examiners. Lack of questioned samples and known samples to compare the characteristics is also the drawback faced by the examiners. The confusion while analyzing the questioned document arises due to the natural variations when the known samples are compared.

In this study, most of the samples are analyzed in the naked eye and hand magnifier. In recent studies, the researchers have used a stereomicroscope with a camera. Stereomicroscope has an important significance in questioned document examination. It helps to reveal the characteristics of handwriting when examined which would be difficult to find out with the naked eye. The minute details that go unnoticed by the

naked eye can be overcome by using the microscope. Apart from using these three instruments, no one has included any other instrument in this study. Criminal activity concerning document examination has elevated when compared to old times. Due to the ineffectiveness of the methods or the instruments used to examine the questioned document, many cases are pending in the court of law especially in a country like India. To overcome this issue an alternative must be instilled to examine the documents.

Various light sources like ultraviolet light or Infrared light must be used to examine to check any signs of overwriting or retouching of the words or the letters. However, the most feasible instrument to use for handwriting analysis would be the 'Visual Spectral Comparator'. The major advantage of VSC is that it is a non-destructive technique. It helps in determining even the slightest feature which is in common with the known samples. Disguised handwriting can be analyzed by comparing the admitted and questioned samples. However, there are no studies of disguised handwriting analyzed under VSC. Therefore, it is necessary to use various instruments in determining the source of the questioned document to draw a definite conclusion and limit the error.

Conclusion

Disguised handwriting is a commonly instilled criminal activity that has been taking place for decades. Since people are aware of forgery, they try to disguise their handwriting and claimed that it does not belong to them. Although, major of the population lack the knowledge of how to disguise their handwriting. Nevertheless, a small amount of the population is successful in disguising; somehow, they reveal their identity as it would be embedded in their subconscious mind claimed by few studies. The methods of disguising are confined to limited and most used features such as change of slant, change of size and proportion, alignment, skill, speed, pen pressure which are often encountered. However, the effort put in disguising is most of the time ineffective. From the research conducted, the method used for disguising handwriting is the same irrespective of any language. Also, certain studies have recommended that it is important to consider the background, education, age, and occupation of the suspect for disguised handwriting.

However, simple it is to identify if the document is disguised or not, which, is mainly due to the disguisers' lack of awareness about the features of disguising their handwriting the document examiner is often in trouble to identify the loopholes in the document. This is due to various reasons. Firstly, because of the lack of admitted samples and natural samples where the examiner fails to understand the natural variations of the writer. It is possible for the person to even disguise their handwriting in the admitted samples too. Secondly, the lack of usage of an instrument in analyzing the handwriting.

The studies conducted by various researchers have been the same for many years. However, one advantage of the previous researches conducted is that the researchers have provided proper statistical data of the ability of the population on various disguised features. Nonetheless, there is no advancement, technologies, or techniques used to enhance the analysis of the questioned document. In most of the studies, the analysis of handwriting has been made without the use of any instruments. Although, very few researchers have made use of magnifiers and stereomicroscopes.

For the genuine conclusions concerning questioned documents in future, the instruments such as VSC should be made use of as it is a non-destructive method. Various light sources such as UV light, IR light, and transmitted light should also be used for precisely concluding which will also be helpful in future studies. A large amount of admitted samples must be collected along with the natural sample for the analysis of the handwriting. The research on disguised handwriting has been done concerning age, gender, occupation, education, country, and various other variables. However, a future study would be recommended on analyzing the disguised handwriting of transgenders in comparison with the male and female populations.

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How to cite this article: John, AM and Ashwini RSV. "An Insight into Disguised Handwriting: A Review Study." *J Forensic Res* 12 (2021): 477