

DETERMINATION OF CHARACTERISTICS OF DISGUISED SIGNATURES  
AMONGST MALAYSIAN

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**DETERMINATION OF CHARACTERISTICS OF DISGUISED SIGNATURES  
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requirements for the award of the degree of  
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*Specially dedicated to.....*

*My beloved parents, Mohammed Cheyakutty & Beebi Ali, and my sisters*

*My supervisors; Dr. Joazaizulfazli Jamalis (UTM) & Mr.Wong Kong Yong (JKM) and*

*My friends*

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## ABSTRACT

Verification of the signature is critical because there is no two identical signatures by the same person and no two persons write alike. Signatures are used on a wide range of documents, many of which bind an individual to an agreement, as such, signature forgery is common. By disguising his signature, an individual may hope to disclaim it at a later date, so as to exonerate himself from any consequences that may be linked to the document. In this study, 100 respondents were selected randomly amongst Malaysian in an equal amount of both genders. The respondents were required to produce five disguised signatures and a single genuine signature for comparison. The signatures were analyzed using magnifying glass. Out of 34 disguised characteristics observed, only 30 characteristics were observed from 50 male respondents while 32 characteristics were observed from 50 female respondents. The highest percentages for both genders were recorded for characteristic structural detail differ which exhibited 38% and 50% respectively. Female respondents showed higher percentage than male respondents for 21 characteristics out of 34 characteristics observed in this study. Besides, female respondents used up to twelve characteristics when disguising their signatures compared to male respondents which only used one to seven characteristics. Based on these findings, female respondents were more likely to use a variety of features during the disguising process which shows that they were more prone to do mistakes during the disguising process compared to male respondents.

## ABSTRAK

Pengesahan tandatangan adalah kritikal kerana tiada dua tandatangan yang sama boleh dihasilkan oleh individu yang sama dan tiada dua orang yang menulis sama. Tandatangan digunakan ke atas pelbagai dokumen, banyak yang mengikat individu kepada sesuatu perjanjian, maka, pemalsuan tandatangan adalah perkara biasa. Dengan penyamaran tandatangan, individu boleh berharap untuk menafikannya kemudian, bagi melepaskan dirinya dari sebarang kesan yang boleh dikaitkan dengan dokumen itu. Dalam kajian ini, 100 orang responden telah dipilih secara rawak di kalangan Malaysia dalam jumlah yang sama bagi kedua-dua jantina. Responden dikehendaki untuk menghasilkan lima tandatangan menyamar dan satu tandatangan asli untuk perbandingan. Tandatangan tersebut dianalisis menggunakan kanta pembesar. Daripada 34 ciri-ciri menyamar yang didapati, hanya 30 ciri-ciri dapat diperhatikan daripada 50 responden lelaki manakala 32 ciri-ciri telah diperhatikan daripada 50 responden perempuan. Peratus tertinggi untuk kedua-dua jantina telah direkodkan bagi ciri butiran struktur berbeza yang menunjukkan 38% dan 50% masing-masing. Responden perempuan menunjukkan peratusan yang lebih tinggi daripada responden lelaki bagi 21 ciri-ciri daripada 34 ciri-ciri yang diperhatikan dalam kajian ini. Tambahan pula, responden perempuan menggunakan sehingga dua belas ciri-ciri apabila menyamar tandatangan mereka berbanding dengan responden lelaki yang hanya menggunakan satu hingga tujuh ciri-ciri. Berdasarkan penemuan ini, responden perempuan didapati lebih cenderung untuk menggunakan pelbagai kriteria semasa proses menyamar. Ini menunjukkan responden perempuan lebih cenderung untuk melakukan kesilapan semasa proses menyamar berbanding responden lelaki.

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## LIST OF ABBREVIATIONS

ABNI	Absence of name or initial
ABO	Absence of ornamentation
ABS	Absence of stroke
ADNI	Adding name or initial
ADO	Add ornamentation
ADS	Adding stroke
AIL	Absence of initial letter
AILD	Altering initial letter design
ALBI	Adding letter before initial
ALM	Adding letter at the middle
ALT	Adding letter at the terminal
AML	Absence of middle letter
AML D	Altering middle letter design
APS	Altering the position of stroke
ATL	Absence of terminal letter
ATLD	Altering terminal letter design
CCSL	Change capital or small letter
CO	Change ornamentation
DL	Decrease legibility
DS	Decrease spacing
DSGL	Decrease signature's length
DSS	Decrease signature's size
DSTL	Decrease stroke's length
FDE	Forensic Document Examination

FDEs	Forensic Document Examiner
FHE	Forensic Handwriting Examination
FHEs	Forensic Handwriting Examiner
GMM	Gaussian Mixture Models
GSCC	Grey-Scale Co-Occurrence Matrix
IDF	Introduce different features
IL	Increase legibility
IS	Increase spacing
ISGL	Increase signature's length
ISS	Increase signature's size
ISTL	Increase stroke's length
KNN	<i>K</i> -Nearest Neighbours
PL	Pen lifts
PT	Patching
SDD	Structural detail differ
TFN	Triangular Fuzzy Number
TM	Tremor
UNS	Unnatural start
WED	Weighted Euclidean Distance

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background of Study**

Signature verification has been an active research topic for several decades (Plamondon and Lorette, 1989). Despite continuous effort, signature verification remains a challenging issue. It provides a way of identifying the writer of a piece of handwriting in order to verify the claimed identity in security and related applications.

Variation in handwriting has, for a long time, attracted the attention of graphologists. Unfortunately, despite the perceived importance of this issue, very little empirical research has been devoted to it (Matuszewski, 2004). Handwritten signature has been widely accepted in personal attributes for identity verification and also a symbol of authorization, especially in the prevalence of credit cards and also bank cheques that had been long become the target of falsification. The problem arises when irresponsible people manipulates the signature for their own benefit. Therefore, the owner of the signature suffer losses of any kind of the owner property especially their financial (Zakaria *et al.*, 2010).

Forensic Document Examination (FDE) is a forensic science discipline pertaining to documents that are in dispute in court proceeding. The major purpose of forensic document examination is to answer questions concerning a disputed document using a multiplicity of scientific methods and processes. Several of these examinations involve a comparison of the questioned document or the details of the document, to a set of known standards. The most common form of examination involves in handwriting is when the examiner tries to address concerns concerning potential authorship (Srihari *et al.*, 2007).

Generally, a document is a physical illustration of information intended to communicate effectively. Usually, signature will be interrelated with document as it binds an individual to an agreement. Signature is normally handwritten and it represents someone's name or nickname. Signature also plays a role as a proof of identity. Therefore, irresponsible individual tends to disguise other person's signature and expect to deny it at later date, afterward to disclaim himself from any responsibilities that may be connected to the document (Coupland *et al.*, 2004). Thus, the widespread occurrence of signature falsification on many types of documents has become a common task to document examiners to identify the genuineness of the signature.

A document examiner is often required to provide an opinion on the authorship of handwriting or signatures, which is essentially an exercise of distinguishing forgery from genuineness. To be successful, forgers must discard all their own writing habits and at the same time, assume those unfamiliar characteristics of another writer. The conscious mental task is enormous and it involves the physical struggle of using an alien writing process in place of the well-founded, usual writing movements as well. Therefore, truly successful forgeries are rare. It is generally recognized that there are two methods of forgery, namely simulation and tracing, which have been extensively reviewed (Leung *et al.*, 1993).



Besides that, forensic document examination field concerned with issues such as writer of the questioned document, for example, a ransom note is the same as the known writer of samples documents, and also the signature is genuine or fake. The individuality of the handwriting is the most important point in this field which is in becoming evidence. Every person's writing is different and every person's signature is unique (Srihari *et al.*, 2007).

## **1.2 Statement of Problem**

The task of forensic signature verification is to prove if a questioned document sample is genuine or forgery when samples of signatures of an individual are given. Besides, it still remains a challenging problem as the analysis result is based on the opinion of the FDEs as well as peer review. The assessment of signature disguise, where an individual attempts to disguise their own signature with the intention to disclaiming it later (so-called 'view to deny' signatures), is a problem faced by many document examiners.

In this study, the characteristics of disguised signature were determine based on comparison made between the genuine signature and several samples of disguised signatures collected randomly from 100 respondents amongst Malaysian. Also, the characteristics of disguised signatures are differentiated based on gender to observe any uniqueness in the features used.

### **1.3 Significance of Study**

Nowadays, the profession as examiners of questioned documents is crucial in the courts to aid in interpreting evidence related to the preparation evaluation of documents. Thus, the result of this study will be very useful to guide and save time for the examiners as it provides information on the characteristics of disguised signature which is commonly being used by an individual and also the difference between male and female in choosing the disguise characteristics.

### **1.4 Objectives**

The objective of this study is to determine the characteristics of disguised signatures amongst Malaysian. This study also aims to reveal the disguised characteristics according to gender and compare the characteristics observed between both genders.

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