

Medico Legal Importance of Questioned Documents in Crime Investigation

Dr. Theju Kumar C

Assistant Professor, Department of Criminology,
Acharya Institute of Graduate Studies, Soladevanahalli, Bengaluru, Karnataka, India

ABSTRACT

Forensic handwriting examination has a new frontier: the digital signature in biometric modality that uses, for recognition purposes, the anatomic and behavioral characteristics that an individual exhibit when signing her/his name. Data such as the dynamically captured direction, stroke, distance, size, pressure and shape of an individual's signature enable handwriting to be a reliable indicator of an individual's identity. "Namirial" is an Italian company that created a biometric signature system named "GrafoCerta" (sure signature) that has a forensic sector particularly suitable for research. In this paper the researcher will try to explain the different characteristics of handwriting examination and examination of questioned document.

KEYWORDS: Document, Characteristics, Handwriting, Forensic

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INTRODUCTION

The examination of questioned documents covers many areas of investigation, including verifying handwriting and signatures; authenticating documents; characterizing papers, pigments, and inks used in writing instruments and copying machines; restoring erased and obliterated writing; and even determining the relative age of documents and inks.

Why would anyone be concerned about a piece of paper? Believe it or not, paper is involved in most crimes—perhaps directly, as with a ransom note in a kidnapping or a forged signature on a check; perhaps indirectly, as with business records in a drug operation or a receipt for a car rental or medical prescription.

The document examiner's tools are the stereomicroscope, templates, protractors, grids, and other measurement devices. The examiner may use different types of light sources to detect forgeries, changes & obliterations.

Questioned Document

Questioned Document can be a handwriting, signature, mark or any handwritten/typewritten document whose reliability or source is doubtful. Questioned Document Examination generally involves handwriting examination in case of handwritten documents.

Main Objectives of forensic questioned document is :

1. That an expert analyst individualize handwriting to a particular person (Suspect)
2. What types of evidence are submitted to the document analyst (is it cross cheq, forgery document, wills, or etc)
3. How to characterize different types of paper
4. The types and impact of computer crime

Characteristics of Hand writing:

Handwriting is writing done by hand with a pen, pencil, digital stylus, or another instrument. The art, skill, or manner of handwriting is called *penmanship*.

Handwriting in which successive letters are joined is called *cursive script*. Handwriting in which the letters are separated (as *block letters*) is called *manuscript style* or *printing*.

Decorative handwriting (as well as the art of producing decorative handwriting) is called *calligraphy*.

Analysis of Handwriting and Handprinting Uniqueness

Each person has their own unique style of handwriting, whether it is everyday handwriting or their personal signature. Even identical twins who share appearance and genetics do not have the same handwriting. The place where one grows up and the first language one learns melt together

with the different distribution of force and ways of shaping words to create a unique style of handwriting for each person.

Characteristics of handwriting include:

- specific shape of letters, e.g. their roundness or sharpness
- regular or irregular spacing between letters
- the slope of the letters
- the rhythmic repetition of the elements or arrhythmia
- the pressure to the paper
- the average size of letters
- the thickness of letters

There are **many styles of handwriting**, but they are categorized into three major **types**; cursive, print, and D'Nealian.

Handwriting experts may be able to make a positive identification if there are enough samples for examination and enough exemplars against which to compare those samples.

To determine whether a signature or writing sample is authentic, a document examiner will generally examine 12 characteristics:

1. **Line quality:** Are the lines smooth, free-flowing, and rhythmic, or shaky, nervous, and wavering?
2. **Spacing of words and letters:** Examine the average amount of space between words and letters. Is the spacing consistent in the questioned and known documents?
3. **Ratio of relative height, width, and size of letters:** What are the overall height, width, and size of the letters in both the known and questioned documents? Are they consistent?
4. **Pen lifts and separations:** Check how the writer stops to form new letters and begin words. Forgeries may have pen lifts or separations in unusual places, for instance within a single letter.
5. **Connecting strokes:** Compare how capital letters are connected to lowercase letters and how strokes connect between letters and between words.
6. **Beginning and ending strokes:** Compare how the writer begins and ends a word, number, or letter. Are the strokes straight, curled, long, or short? Are they made on the upstroke or down stroke?
7. **Unusual letter formation:** Look for unusual letter formation; for instance, letters written backward, letters with a tail, or unusual capitals.
8. **Shading or pen pressure:** Individuals use different amounts of pressure with a pen or pencil, making the lines lighter or darker, narrower or wider. Check for pressure on the downward and upward strokes.
9. **Slant:** Does the writing slant to the left or right, or is it straight up and down? Are some letters consistently slanted more or less than others?
10. **Baseline habits:** Does the writing tend to follow a straight horizontal line, or move downward or upward? Is it above or below the baseline?
11. **Flourishes or embellishments:** Are there any fancy letters, curls, loops, circles, double loops, or underlines?
12. **Placement of diacritics:** Check the crossing of *t*'s and dotting of *i*'s, *j*'s, or any other letters or punctuation marks. Is the cross on the *t* long in proportion to the

stem? Is it located to the left or right of the stem? Are the *i*'s dotted above or to the right or left of the stem?

The examiner also looks for irregularities such as an awkward or unnatural appearance or circle shapes made up of different strokes. There is wide variation in how people make their uppercase (capital) letters and the lowercase letters *y*, *j*, *g*, and *q*.

Methods of Forgery:

The most common forgery is a signature. There are three types of forgery. One of the most common types, and probably the easiest to detect for a layperson, is a blind forgery, where the forger uses his or her own handwriting. The forger does not even try to copy the original signature, and may not even know what the signature looks like. This is usually the case in petition fraud and anonymous harassing subscriptions, as well as in many other civil and criminal cases. Investigators have the highest success rate in identifying this type of forger.

Copying a genuine signature by carefully drawing it is termed a simulated forgery. Often the forger practices the signature so much that he or she can avoid many of the hesitations and pen lifts usually seen in a forgery. Investigators can detect a simulated forgery by identifying the individual microscopic handwriting traits consistently present in the known signatures but missing from the questioned signature. The forger is often unable to duplicate *all* the victim's individual handwriting habits. This type of forgery can be very difficult to link to a suspect.

A third type of forgery is a traced forgery, which can be done by tracing a genuine signature onto a document using a light box or similar device. Forgers may use other methods such as carbon paper or even pressing hard over a genuine signature and then tracing the indentation.

Stereomicroscopic examination can disclose this type of forgery, because the line quality may be inconsistent. Sometimes oblique lighting will show off the indentations.

Obliterations:

Often documents are changed after they are prepared. Common methods include physically erasing with a rubber eraser or scraping the ink off the paper's surface. Both methods disturb the upper layer of fibers or the paper's coating; you can see these disturbances under the microscope in reflected oblique lighting. Many papers today are coated with optical brighteners that make the paper look very white when seen under UV light. Disturbing the coating may cause a darker area to appear.

Forgers also use chemical methods to obliterate words. For example, a strong oxidizing agent such as chlorine or sodium hypochlorite can make ink become colorless. Examining the sample under a microscope or in UV or infrared (IR) light may reveal the alteration

Indeed, use of alternate sources of lighting, that is, lamps or lasers with specific wavelengths, can be a powerful way to show the differences among inks of the same color but with different composition. Investigators have successfully used infrared photography to find erasures, read content covered by intentional obliterations (crossing out), and even reconstruct writing from charred documents.

Digital image processing is becoming a more useful tool in making obliterated markings more visible through lightening, darkening, contrast, and filters.

- Watermarks
- Dyes or bleaches
- Fluorescence under ultraviolet light
- Thickness as determined by using a micrometer

Indentations:

Often an indented impression is left on paper beneath the primary writing because of the pressure of the writing utensil. These impressions can sometimes be used to forge a signature, but often they have also led to the arrest of criminals. The method we have all seen of rubbing the impression with a soft pencil is the worst thing to do. It doesn't work very well and alters the evidence. Often, oblique lighting will enhance the indentations.

Indentations also increase a paper's capacity to hold an electrostatic charge. This property is used to "develop" images using an electrostatic detection apparatus (ESDA). Pouring toner powder from a copy machine over a charged sheet of plastic covering the paper in question can create an image of the impressions, which is then photographed.

Individualizing Typing and Printing

When typewriters were commonly used, investigators could often individualize their printing by examining wear and defects in the typeface and misalignment of characters. The FBI maintains a library of makes and models of all manufactured typewriters as well as thousands of type fonts.

Word processors and printers have largely replaced typewriters, yet there are still ways to trace and compare output. For example, color printers and photocopiers may add a pattern of minuscule yellow dots to the printout, encoding the printer's serial number.

Investigators can also sometimes compare copy machine output. Debris, gripper marks, platen defects, and dirt can all contribute to what are termed *trash marks* on copies from a copier. These marks can change over time, so sometimes the material can even be dated.

Paper

Most modern paper is made from wood pulp. Some types of paper are manufactured mechanically, some are treated with chemicals, and some have additives, such as cotton fibers. Paper can be graded depending on the percentage of cotton fibers; from 25 to 50 percent cotton may be called *bond paper*. Mechanically produced wood pulp paper is used for newspapers. Special writing paper such as stationery is chemically treated with sodium sulfite. Shopping bags are treated with a sulfate for extra strength.

Some manufacturers include their own watermark design during the manufacturing process by reducing the number of fibers within a certain patterned area. The manufacturer can change the watermark and sometimes can use it to indicate when the paper was manufactured and even where the paper was sold.

The forensic scientist may look at the following characteristics to identify paper:

- What raw material the paper is made from
- Color
- Density

Inks:

Investigators often compare inks by their composition. Sometimes they can even chemically establish how long the ink has remained on the paper.



Counterfeiting:

Counterfeiting money is one of the oldest crimes known. It was a serious problem in the 19th century, when banks issued their own currency. In 1863 the United States adopted a national currency, but counterfeiting was still extensive. In 1865 the U.S. Secret Service was established to suppress counterfeiting.

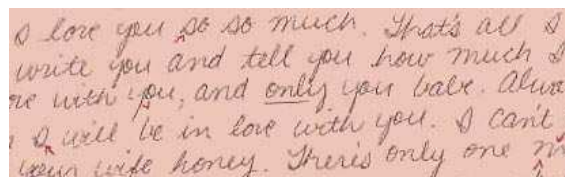
Although counterfeiting has substantially decreased since the creation of the Secret Service, this crime continues to be a potential danger to the nation's economy and citizens. Production methods used in counterfeiting operations have evolved over the years.

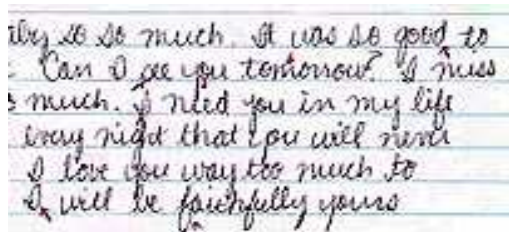
COMPARISON OF QUESTIONED DOCUMENT:

The Questioned Documents unit is responsible for determining the authenticity and/or authorship of documents. The examination can be a handwriting comparison; detection of alterations, obliterations, or indented writing; or discovery of the typewriter, printer, or fax machine that generated a document.

The most common examination is comparison of handwriting or hand printing. Authorship of any type of document may come into question during an investigation. Everyone has similarities in their handwriting; otherwise we wouldn't be able to read what each other writes. Although the following documents have a great deal of pictorial similarity, they were written by different people.

The forensic document examiner trains for 2 to 4 years in the study of handwriting and other document-related problems. It is the expert's responsibility to examine every element of a writing, including the minute details, and to look for both similarities and differences between known and questioned writing. Notice the similarities between the 2 documents below:





Given enough writing evidence, both known and questioned, the forensic document examiner may be able to identify or eliminate a suspected writer of having prepared a questioned document. The examiner is often called to testify in court and present exhibits to demonstrate the opinion.

Conclusion:

The medico legal expert should visit the death scene before the autopsy if it is possible. Although, death investigation differs in different countries, there is always a crime scene investigation team with different branches. The study is about questioned document and medico legal importance of documents, inks, printer and etc. researcher discussed about the medico legal importance of documents at criminal investigation, it is very much important to know about document types before going to analyses of any documents, inks and printer, so in this paper the researcher studied about obliteration, indentation, individualizing typing and printing, papers, ink and counterfeiting and also studied important characteristics of document examination.

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