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578 Assignment 4

## Brief Overview of Your Topic

Fingerprint analysis has been a standard forensic tool used by analysts for decades, as automated fingerprint identification systems (AFIS) were developed in the 1970's. Since then, technological advancements have expanded fingerprint registries and improved analysis, making it highly reliable, but not infallible. Accuracy of analysis can be compromised by factors such as human error, the natural effects of aging, or poor-quality scanning equipment.

Since their invention, fingerprint scanners have continuously evolved with modern technologies. However, there are still many challenges. Fingerprint scanners capture an image of the fingerprint ridges, and the clarity of that image depends heavily on the quality of the scanning device. Outdated, damaged, or low-resolution scanners can produce blurry images, rendering it difficult for analysts to accurately interpret the patterns on a fingerprint.

Fingerprint analysis relies on the unique ridge patterns of the skin. Overtime, these ridges may become less distinct due to various factors. As humans age, our bodies produce less collagen, the protein responsible for skin elasticity and firmness. This reduction causes fingerprint ridges to lose definition and become less distinct, decreasing the accuracy of fingerprint scans and comparisons. Current fingerprint scanning technologies have not yet full adapted to account for the effects of aging on ridge clarity.

## The Myth(s)/Misunderstanding(s)

### **Myth 1 – Fingerprint Analysis is 100% accurate**

The accuracy of fingerprint analysis is subject to human error, print quality, and capabilities of a matching system. Smudged or low-resolution prints are not easily identified. The process involves judgement and algorithms that are not infallible.

### **Myth 2 – Your fingerprints will never change**

Fingerprints change over time due to aging, skin damage, or scarring. The ridges of a fingerprint become less distinct when humans lose collagen as they age. The clarity of these ridges can also change from physical damage like burns.

## Ethical Implications

When people assume that the technology surrounding fingerprint analysis is 100% accurate, they place trust in forensic conclusions. If those people ever end up on a jury in a case involving fingerprint evidence, that blind trust could contribute to a wrongful conviction by discounting that errors exist in fingerprint analysis. Misunderstanding the limits of automated fingerprint matching systems can obscure the continuing need for human oversight. If society believes that machines eliminate all error, it becomes easier for flaws such as poor image quality, faulty algorithms, and biased datasets to go unchallenged.

Likewise, the myth that fingerprints never change can undermine trust in everyday biometric systems. When elderly persons can no longer unlock a fingerprint-based security device, they may lose trust in the quality of the security system rather than understand the very real effects of aging.

Debunking these myths helps people recognize the limitations of fingerprint analysis.

## Debunking Sources

### Source 1: Fingerprint Evidence: Common Misconceptions

1. **Link:** <https://www.nikouinandassociates.com/fingerprint-evidence-common-misconceptions/> (Specifically looking at Myth 2 & Myth 5)
2. **Does the source use the fact sandwich format?** No. Instead of using the fact→ myth→ fallacy→ fact structure, the website uses myth→ fallacy→ fact structure.
3. **Does the source use any sort of marketing or advertising techniques?** Yes. The article subtly plays into fear appeal which aligns with the site's purpose as it is a forensic consulting company. If the author of the article emphasizes the risks and heightens the uncertainties of fingerprint analysis enough then the reader may call the company itself for a consult, which of course is the goal.
4. **Does the source leave any gaps in the content that really should be filled, or accidentally reinforce the myth they're trying to bust?**
  - The source highlights the myths first, which reinforces them.
  - The first myth listed tries to address the belief that fingerprints are unique for every individual, which has not been completely disproven, just assumed. The author avoids saying that it is a complete myth and goes around the subject. That lack of clear explanation creates more confusion which lessens credibility and also reinforces the myth.

## Source 2: Fingerprints Change Over the Course of a Person's Life

1. **Link:** <https://www.discovermagazine.com/fingerprints-change-over-the-course-of-a-persons-life-1083>
2. **Does the source use the fact sandwich format?** Yes. The fact is clearly stated in the opening paragraph, the myth is in next paragraph, then the fallacy, and finally the fact is stated again in the closing paragraph.
3. **Does the source use any sort of marketing or advertising techniques?** Aside from obvious ads all over the page, I did not detect any moral or emotional appeal in the article itself. As stated in the last sentence, the article is simply food for thought.
4. **Does the source leave any gaps in the content that really should be filled, or accidentally reinforce the myth they're trying to bust?** This article addresses the myth and clearly explains a new study that debunks the myth, however, nowhere in the article is there an explanation as to why fingerprints change as people age. The author should have addressed that due to a lack of collagen as humans age, fingerprint ridges become less defined, or that physical damage, like burns and scars, can change fingerprints.

## Fixes

### Source 1: All highlighted myths & remove the first myth

#### Current State:

Myth 1: Fingerprints Are Unique for Every Individual

Myth 2: Fingerprint Analysis is Infallible

Myth 3: Automated Systems Eliminate Human Error

Myth 4: More Ridges Increase the Likelihood of a Match

Myth 5: Fingerprints Cannot Be Altered or Falsified

#### My Improvements:

Fingerprint Analysis is Subject to Human & Machine Error

Automated Systems Rely on Human Oversight

Fingerprint Identification Relies on Minutiae

Fingerprints Change with Age and Physical Damage

## Source 2: First Paragraph

### Current State:

Since the 1920s, fingerprints have been accepted as evidence in courtrooms due to their uniqueness and permanence. And their uniqueness has been scientifically validated. But what of their permanence? Do those ridges and swirls remain the same from birth to death? According to a new study, our fingerprints *do* slightly change as time progresses — which could have implications for everything from law enforcement to unlocking your iPhone.

### My Improvements:

According to a new study, fingerprints do slightly change as time progresses. Researchers conducted a study that investigates the accuracy of modern identification systems on different age groups. This study helps us understand fingerprint permanence and challenges the long-standing assumption that fingerprints never change.