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Role of Finger Printing in the Administration of Criminal Justice System

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ABSTRACT

In crime investigation, fingerprint procedures are advantageous due to their high accuracy, speed, efficiency, and capacity to analyse complicated patterns and images. Dactylography or the fingerprint system is based on the study of epidermal ridges and their configurations in the palms of the hand. Finger prints collected from crime scene, or on items present at crime scene, can be used in identifying suspects, victims, and other persons who touched the surface. Thus, A fingerprint is an impression left by the friction ridges of a human finger. The recovery of partial fingerprints from a crime scene is an important method of forensic science. Fingerprint records normally contain impressions from the pad on the last joint of fingers and thumbs, though fingerprint cards also typically record portions of lower joint areas of the fingers. The science of fingerprints and its application to crime scene investigation are discussed in this chapter. It seeks to create novel pattern recognition techniques in order to increase the accuracy and dependability of automatic fingerprint identification. The chapter emphasis on the role of fingerprints in the administration criminal justice. The study also presents a thorough overview of crime scene investigation along with recommendations for further research. The evolution of fingerprint science is also covered, along with its roots in history and current methods. The study highlights the growing importance of finger print technology in criminal investigations and discusses the challenges facing the scientific and justice communities in maintaining the highest standards for fingerprint evidence collection, testing, and analysis.

Keywords: *Fingerprint, Crime scene, Criminal Investigation, Criminal Justice.*

I. INTRODUCTION

Since the dawn of civilization, acquiring scientific knowledge has always been fundamental to human nature. A scientific specialist in any technological sector who is able to offer instruction in their area of expertise, technical support, witness testimony regarding test results, and evidence analysis. Scientific evidence analysis is employed in the examination and litigation of civil and criminal cases. It frequently aids in determining the guilt or innocence of potential suspects. Crimes that are believed to be connected to one another are likewise linked together

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by scientific data." Fingerprinting is one of the most important technologies available to law enforcement organisations in the complex web of criminal investigation and justice. This technique has its roots in the use of fingerprints as identification markers in ancient cultures and has developed into a crucial part of contemporary scientific research.² It is impossible to overestimate the importance of fingerprinting in the operation of the criminal justice system since it is essential to the identification of suspects, the investigation of crimes, and the administration of criminal justice.

In ancient Babylon, fingerprints were utilised on clay tablets for economic transactions, which is when fingerprints were first employed for identification. British scientist Sir Francis Galton studied fingerprints in the late 19th century and developed the first pattern-based fingerprint classification system. Galton distinguished three categories for fingerprints: (1) Arches (2) Loops (3) Whorls. But he was unable to sub-classify them which was very much essential to deal with 2500 persons. Edward Henry is known for having created a simple classification scheme that works well and has remained popular since 1900. The first-ever criminal investigation to use fingerprint evidence came about in 1892 when Juan Vucetich, an Argentine police official, used the evidence to settle a murder case.³ Following the creation of fingerprint analysis and classification systems by English police officer Sir Edward Henry in the early 20th century, the use of fingerprints as a means of identification became widely accepted. His method, which is still in use today, classifies fingerprints according to the minutiae points—unique features found in every fingerprint—and the ridge pattern. The Henry Classification System made it possible to quickly identify people and went on to become the industry standard for fingerprint identification. Computer technology advancements in the 1980s paved the way for the creation of Automated Fingerprint Identification Systems (AFIS), computerised systems that analyse and compare fingerprints. Suspect matching and identification in criminal investigations is made simpler by AFIS, which significantly increased the efficiency and accuracy of fingerprint identification.⁴ These days, fingerprint analysis is a crucial scientific method utilised in criminal investigations, immigration, banking, and other contexts requiring identification.

Consequently, the friction ridges on a human finger leave an impression known as a fingerprint. One significant technique in forensic science is the extraction of partial fingerprints from a

² Robert Allen, Pat Sankar & Salil Prabhakar, *Fingerprint Identification Technology*, in BIOMETRIC SYSTEMS: TECHNOLOGY, DESIGN AND PERFORMANCE EVALUATION 22 (James Wayman et al. eds., 2005), https://doi.org/10.1007/1-84628-064-8_2 (last visited May 3, 2024).

³ Ananya Mathew, *Use of Forensic Evidence in Indian Murder Trials*, 2 INDIAN J.L. & LEGAL RSCH. 1 (2021).

⁴ Erin Murphy, *The New Forensics: Criminal Justice, False Certainty, and the Second Generation of Scientific Evidence*, 95 CALIF. L. REV. 721 (2007).

crime scene. Fingerprints left on metal or glass surfaces are caused by the combination of grease and moisture on the finger.⁵ The peaks of the skin's friction ridges can be used to transfer ink or other substances to a smooth surface, such paper, in order to intentionally imprint a full fingerprint. Although fingerprint cards also usually record parts of the lower joint areas of the fingers, fingerprint records normally contain impressions from the pad on the final joint of fingers and thumbs.

The foundation of dactylography, or the fingerprint system, is the analysis of the patterns of epidermal ridges in the hand's palms.⁶ We can apply this technique to the foot soles as well. Suspects, victims, and other people who came into contact with the surface can all be identified using finger prints that were taken from the crime scene or on items that were there.

II. FINGERPRINTING IN INVESTIGATION OF CRIMINAL JUSTICE

The following provision empowers the investigating officer to investigate the crime

Section 3 of the Identification of Prisoners Act, 1920 It enables the investigating officers to obtain the fingerprints of the individual found guilty of an offence carrying a year-long sentence or more. Furthermore, in accordance with Section 118 of the CrPC, the investigating officer is also authorised to get the fingerprints and photo of the person found guilty of the offence when the individual provides security in exchange for good behaviour.

Section 4 of the Identification of the Prisoners Act, 1920⁷ The investigating officer has the authority to take the fingerprints of an individual who has not been found guilty even if they are being investigated for a crime that carries a year or longer sentence.

Section 512 of Cr. P. C. on the order of the First-Class Magistrate the investigating Officer can take fingerprints of a person who is arrested for investigation.

Section 613 of the Act which says that if a person who refuses to act (refusal to give fingerprints) on the order of the investigating officer or the Court then can be punished under Section 186 of the IPC. In *Shakariya v. State of Rajasthan*, it was observed in this case that the authority to take the fingerprints is given to police under Section 4 and 5 of the Identification of the Prisoners Act, 1920 and there is no need to take the permission of the Magistrate for the

⁵ Forensic Examination of Forged Documents, <https://articles.manupatra.com/article-details/Forensic-Examination-Of-Forged-Documents> (last visited Jun 8, 2022).

⁶ Saumitra Basu, *Forensic Science and Scientific Measures for Criminal Identification in British India*, 54 INDIAN JOURNAL OF HISTORY OF SCIENCE (2019), http://insa.nic.in/writereaddata/UploadedFiles/IJHS/Vol54_2_2019__Art06.pdf (last visited May 3, 2024).

⁷ Identification of Prisoners Act, 1920, Act No. 33 of 1920 (1920).

same.⁸

Section 45 of Indian Evidence Act, 1872 - Following are the requirements of this section:

1. The foremost requirement of the expert opinion is that a matter is of such a nature that it is beyond the know-how of a lay man.
2. The matter involves such medical issue or science which is outside the knowledge of the Court.
3. The person giving an opinion must have specialization in that very field.
4. The evidence must be based on reliable principles.
5. The opinion of the expert is not circumstantial but corroborative that means that the opinion is not conclusive and it is advisory in nature.

III. ROLE OF FINGERPRINTS IN CRIMINAL JUSTICE

The ability of fingerprints to provide important evidence that can identify suspects and connect them to a crime scene makes them vital to the investigation of crimes. Fingerprints have the following applications in criminal solving:

1. **Linking Suspects to a Crime Scene-** Fingerprints are frequently left on surfaces, including doors and windows, that people contact. To find out if a fingerprint obtained at a crime scene matches any suspects, it can be compared to a database of known fingerprints. Finding a match could provide solid proof connecting the suspect to the scene of the crime.
2. **Establishing Identity-** Fingerprints can be a conclusive way to identify a suspect in situations where they deny any involvement in the crime. Investigators can ascertain whether a suspect was present at a crime scene by matching the suspect's fingerprints to those that were discovered there.
3. **Building a Timeline-** Investigators can create a timeline of events preceding a crime with the aid of fingerprints. Investigators can ascertain how and when objects were touched by examining the orientation and placement of fingerprints on them. This can provide light on suspect behaviour and assist in determining the chronology of events before a criminal act.
4. **Identifying Unknown Suspects-** Fingerprints can yield useful leads even in the absence of suspects. Investigating officer may be able to identify an unknown suspect

⁸ The Code of Criminal Procedure, 1973, Act No. 2 of 1974 (1974).

by matching fingerprints collected at a crime scene to a database of known felons. This may assist in concentrating the inquiry and result in an arrest.

5. **Exonerating Innocent Suspects-** Additionally, fingerprints can be utilised to clear innocent persons. Investigators are able to exclude those who might have been falsely implicated if a fingerprint obtained at a crime scene does not match any identifiable suspects. This can aid in preventing the wrongful conviction of innocent persons.

In general, fingerprints are a very useful tool for criminal solving. They can offer vital information that can be used to establish a chronology of events, identify suspects, and connect them to a crime scene. Investigators can solve even the most complicated cases by extracting important information from fingerprints using cutting-edge technology and analysis methods.⁹

IV. FINGERPRINT AND CRIMINAL JUSTICE

Fingerprinting assists in identifying innocent people as well as convict the guilty. Carefully examining fingerprints can reveal significant anomalies and inconsistencies, which could free people who have been falsely accused. Advances in fingerprint analysis technology have led to several incidents of people being acquitted of erroneous convictions; this emphasises the vital role fingerprinting plays in assuring that justice is done.¹⁰

Additionally, fingerprinting acts as an indicator to potential criminals. The fact that they can be identified by their fingerprints serves as a potent deterrent for those who might otherwise consider committing crimes.¹¹ This preventive measure promotes safety and security for all citizens by helping to maintain law and order in society. Here are some well-known criminal instances where the criminal court system was solved thanks in large part to fingerprint evidence:¹²

The Lindbergh Kidnapping Case: In 1932, The renowned aviator Charles Lindbergh's son was kidnapped and killed. The child's bedroom window on the second floor was accessed by a ladder, and a ransom note was discovered there as well. His fingerprints were discovered on the ransom note, leading to the identification and arrest of a suspect.

The Mad Bomber Case: From 1940 to 1956, A series of bombings that targeted public areas

⁹ Santhosh Chandrappa Siddappa & Anupam Datta, "A Study Pattern of Medico-Legal Cases Treated at a Tertiary Care Hospital in Central Karnataka," 2 IND. JOUR. OF FORE. AND COMM. MED. 193 (2015).

¹⁰ Jagat Singh Chandpuri & Vivek Kumar, *Scientific Evidence and Its Applicability in Criminal Proceedings: Issues and Challenges*, 4 Issue 1 INT'L J.L. MGMT. & HUMAN. 364 (2021).

¹¹ Journey of DNA Evidence in Legal Arena: An Insight on Its Legal perspective: Journal of Forensic Science and Medicine, https://journals.lww.com/jfsm/fulltext/2016/02020/Journey_of_DNA_Evidence_in_Legal_Arena_An_Insight.7.aspx (last visited May 3, 2024).

¹² Thomas, K. V. (2021). The Role of Science & Technology in Law-Enforcement. *The Indian Police Journal*, 35.

devastated New York City. A number of the explosives included fingerprints, which the police used as forensic evidence to identify and apprehend George Metesky, also known as "the Mad Bomber."

The Sam Sheppard Case: In 1954,¹³ The U.S. Supreme Court declared in 1966 that Sam Sheppard had been denied due process, overturning the conviction that he had killed his wife. Sheppard was exonerated of the crime in 2000 after DNA testing proved his innocence, but fingerprint evidence was crucial to his first conviction and subsequent exoneration.

The D.C. Sniper Case: In 2002,¹⁴ In the Washington, D.C. area, there were many shooter attacks that resulted in ten fatalities and three injuries. After a fingerprint on a revolver connected the suspects, John Allen Muhammad and Lee Boyd Malvo, to the crimes, the authorities were able to locate and apprehend them. These incidents highlight the vital role fingerprints can play in investigating crimes and apprehending offenders.

In Ammini v. State of Kerala,¹⁵ in the house of the deceased, the fingerprints were discovered on glasses. These fingerprints were compared and evaluated by the expert with the accused. However, the Trial Court did not consider this to be a significant piece of evidence because it was unclear and there was uncertainty as to whether the photos were of the original prints. The Trial Court's opinion was chastised by the High Court, and the Supreme Court decided to use the fingerprint evidence to prove the accused's guilt.

In Balakrishna Das Agarwal v. Radha Devi,¹⁶ the court stated that the forensic scientist is fundamentally a witness for the court, not for the prosecution or defence, and that an expert is a person who provides an opinion based on experience, expertise, and training.

Bhaluka Behra v. State case,¹⁷ mentions that the weight and importance given to an opinion by an expert is a different thing. A fingerprint is in reality an unforgeable signature. So, the evidence of the fingerprint expert is also given considerable weight.

Even in Pathumma v. Veerasha case,¹⁸ The Kerala High Court ruled that fingerprints cannot be shared by two people. Individual fingerprints are distinct from each other; no two fingers leave the same imprint. And if there are no differences, we can assume that the same person made them all.

¹³ *Sheppard v. Maxwell*: 384 U.S. 333 (1966)

¹⁴ Amy Howe, *Argument analysis: "D.C. sniper" case could hinge on Kavanaugh*, SCOTUS blog (Oct. 16, 2019, 4:28 PM), <https://www.scotusblog.com/2019/10/argument-analysis-d-c-sniper-case-could-hinge-on-kavanaugh/>

¹⁵ *Ammini and Ors. v State of Kerala*. Citation: (1998) 2 SCC 301

¹⁶ *Balakrishna Das Agarwal v. Radha Devi*: AIR 1989 All 133.

¹⁷ *Bhaluka Behra v. State*: AIR 1957 Ori 172, 1957 Cri. LJ 902.

¹⁸ *Pathumma v. Veerasha*: 1988(1) K.L.T. 798.

In James v. State of Kerala,¹⁹ Photographs were taken of the finger and foot impressions that were collected at the crime site. However, these photos appeared somewhat unclean and blurry. The Kerala High Court, however, stated that even though the fingerprints are smudged and fuzzy, the court must determine whether or not they are a trustworthy source of evidence.

In State v. Karugope,²⁰ it was mentioned by Patna High Court that opinion of fingerprint expert is accepted and is regarded as sufficient piece of evidence for the conviction of the accused.

V. CHALLENGES AND FUTURE PROSPECTS

Even while fingerprinting is still an essential technique for managing the criminal justice system, there are certain difficulties with it. The spread of biometric technology and worries about data security and privacy make it necessary to carefully analyse and control the use of fingerprint databases.²¹ To keep abreast of changing criminal techniques, forensic science must continue to innovate and be invested in due to the growing sophistication of criminals.

In the future, finger printing's role in the criminal justice system's administration is likely to change further. Technological developments in artificial intelligence and machine learning have the potential to considerably improve fingerprint analysis's precision and effectiveness. Additionally, in order to handle new issues and maximise the effectiveness of fingerprinting in the fight against crime, forensic scientists, law enforcement organisations, and legislators must collaborate across academic boundaries.²² The fact that contemporary fingerprint procedures necessitate certain training and knowledge to employ successfully presents one of the difficulties in applying them in criminal investigations. To provide accurate results and appropriate data interpretation, the utilisation of modern technology such as chemical enhancement,²³ laser imaging, and 3D imaging software necessitates specialised knowledge and training.

The fact that contemporary fingerprint procedures are not infallible and may result in false positives or false negatives presents another difficulty. For instance,²⁴ fingerprints may be deformed or partially concealed, making them harder to identify, or they may be difficult to record altogether on some surfaces.

¹⁹ James v. State of Kerala: 1994 (1) K.L.J.871.

²⁰ State v. Karugope: A.I.R. 1954 Pat. 131.

²¹ MATTHEW FANETTI ET AL., FORENSIC CHILD PSYCHOLOGY: WORKING IN THE COURTS AND CLINIC (2014).

²² "Investigation of the History of Fingerprinting, Advancements in the Fi" by Kristen Malloy, https://egrove.olemiss.edu/hon_thesis/1392/ (last visited May 3, 2024).

²³ Ihsan Al-Saimary, *Histopathology of Malassezia*, STUDIES IN MYCOLOGY (2019).

²⁴ Amir Teicher, *Kristine Bonnevie's Theories on the Genetics of Fingerprints, and Their Application in Germany*, 92 STUDIES IN HISTORY AND PHILOSOPHY OF SCIENCE 162 (2022).

Concerns regarding civil liberties and privacy have also been brought up by the use of contemporary fingerprint technology, especially in light of the development of automatic fingerprint identification systems (AFIS) and the growing usage of biometric data in law enforcement. The possibility of incorrect identification or other mistakes, as well as the misuse or abuse of this data, have all drawn criticism.

All things considered, while contemporary fingerprint techniques offer many benefits for investigating crimes, their usage must be carefully weighed against privacy issues, the requirement for appropriate training, and the interpretation of results. For more than a century, fingerprint analysis has been a part of Indian criminal investigations. Indeed, among the first nations in the world to acknowledge the significance of fingerprints in forensic science was India.²⁵ With the founding of the Fingerprint Bureau in Calcutta (now Kolkata) in 1897, the usage of fingerprints became official in India.²⁶ Fingerprint analysis is still a valuable technique for Indian law enforcement today.

The National Crime Records Bureau (NCRB) maintains a national database of fingerprints, which is used to help identify suspects and solve crimes. The bureau also provides training and support to law enforcement agencies across the country in the use of fingerprint analysis and other forensic techniques.

India has been pushing to modernise fingerprint analysis in recent years.²⁷ The government has made investments in cutting-edge machinery and technology, including Live Scan and Automated Fingerprint Identification Systems (AFIS), which can take clear digital fingerprint photos. 1. Roberts, P. (2017). *Expert Evidence and Scientific Proof in Criminal Trial*, Routledge. ISBN 978-1351567398. The process of identifying suspects and solving crimes can be sped up with the use of these technology.²⁸ All things considered, fingerprint analysis continues to be a significant component of forensic science in India, and the government is making efforts to guarantee that law enforcement organisations have access to the newest equipment and training necessary to employ this technique successfully in criminal investigations.

VI. CONCLUSION

²⁵ DAVID LAZER, *DNA AND THE CRIMINAL JUSTICE SYSTEM: THE TECHNOLOGY OF JUSTICE* (2004).

²⁶ *Handbook of Fingerprint Recognition* | SpringerLink, <https://link.springer.com/book/10.1007/978-3-030-83624-5> (last visited May 3, 2024).

²⁷ Sodhi, G. S., & Kaur, J. (2018). The forgotten Indian pioneers of fingerprint science: Fallout of colonialism. *Indian Journal of History of Science*, 53(4), T184-T190.

²⁸ Sood, A., & Kashyap, S., Administration of Criminal Justice and Role of Forensics in India: A Study. *International Journal of Innovative Research and Advanced Studies*, 5(4), 69-73. 2018).

The science of fingerprinting dates back more than a century. One of the main benefits of fingerprints is their ability to quickly and easily establish someone's identity, which facilitates investigations. It has been said that the fingerprint evidence is a trustworthy piece of evidence. Furthermore, they are unchanging and everlasting. The courts must wait to make a decision until after deliberation or consultation with an expert. The expert's justifications should be carefully considered by the court before accepting fingerprints. These expert views assist the court in reaching a final determination about the facts. These opinions guide the courts and to decide the issues; ultimately the court has to use his own legal mind in relation to the issues involved. Over the years fingerprints have played a crucial role in identifying the accused and awarding them with punishments.

In conclusion, because of their distinctiveness and capacity to yield important evidence, fingerprints are an essential instrument in the investigation of criminal cases. They can assist in identifying suspects, connecting them to a crime scene, and creating a chronology of the incidents that preceded a crime. The use of fingerprints in crime scene investigation is not without its limitations, though, as there are challenges in gathering useable prints, the risk of false positives or negatives, and the potential for evidence contamination or manipulation. However, detectives can get beyond these restrictions and utilise fingerprints to help solve even the most complicated cases with the right training and methods.

The field of fingerprint research has a bright future thanks to ongoing technological and methodological developments. Among the most intriguing advancements in the application of nanotechnology to enhance fingerprint recognition. In order to improve fingerprint detection and visualisation, scientists are creating new materials and techniques that may result in analysis that is more precise and effective. The analysis of fingerprints using machine learning and artificial intelligence (AI) is another emerging field. The accuracy and speed of fingerprint analysis may be increased by using AI to find patterns and correlations that human analysts might not see right away. Another area with great promise is the development of portable and handheld fingerprint scanners. These gadgets can swiftly and accurately take fingerprint photos, which facilitates law enforcement's ability to identify suspects on the spot. All things considered, fingerprint research appears to have a promising future as long as technology and analysis methods continue to progress and increase analysis speed and accuracy. Like with any technology, it's crucial to weigh the advantages of fingerprint analysis against privacy issues and the requirement to uphold civil freedoms. However, fingerprints are a distinct and priceless type of evidence that has been utilised for ages in identification. As new techniques and technologies have been developed over time, the science of fingerprint analysis and

classification has advanced, making it easier and more accurate to match and identify people based solely on their fingerprints.
