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APPLICATION OF LAW OF INDIVIDUALITY IN DERMATOGLYPHICS – A STUDY OF FINGERPRINTS.

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The study of unique lines and patterns on the palms, fingers, soles and toes of an individual is known as Dermatoglyphics. The word Dermatoglyphics was coined by **Cummins and Midlo in 1926**. **"Derma" means skin and "glyphic" means carvings.** These lines are used traditionally for the foretelling of a person but they have a very important role to play in the Identification of an Individual especially in criminal identification. Hand is being described as " the organ of all organs" (Aristotle) The lines and patterns have been deciphered by traditional palmists to predict the future and in forensics the same lines and patters are used as a definitive tool for identification of criminals , this is because their importance lies in their Individuality. These patterns are individually unique, permanent and remain unchanged from **cradle to grave** The primary ridge formation is responsible for the dermatoglyphic pattern. Ridges are the areas which decompose last after a person dies. These naturally occurring patterns are unique to an individual and remain unchanged from birth until death. These patterns once developed are unaffected by the environment, and this explains their unique role, as a marker for individual identification. The fingerprints are **not even similar in monozygotic twins**. Today the study of the hand has crossed its traditional realms and is being widely used as an adjunct in Forensics. Every individual possesses distinct features of ridges and their pattern in fingers, palms and soles. The ridge patterns are stable throughout life and are not modified by environmental factors. The patterns are unique to each individual. Due to these qualities it plays a very important role in the personal identification, crime detection, twin diagnosis, etc. Hence this study is conducted to know the application of law Individuality in individual identification through dermatoglyphics.

Key Words: Fingerprint, Crime, Ridges, Forensics, Derma.

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INTRODUCTION:

Fingerprints are the impression of the pattern formed by the papillary or epidermal ridge of fingerprints. The ridge pattern of the finger appears 12 to 16 weeks of the intrauterine life and formation is completed by 24 weeks. The birth of a fine pattern of ridges is seen on the skin of the bulbs of fingers and thumbs parts of the palms and the soles of the feet. Fingerprint forms evidence and plays an important role in the field of a scientific criminal investigation. At present the most successful means of identifying a person is by that of fingerprint patterns.

History of fingerprints

The history of finger prints is a very ancient one and nothing can be said with certainty regarding its origin. Archaeologists have discovered impressions put on prehistoric pottery, which have been made as a mystic or symbolic rite, and not because it was then known that the impressions would one day be utilized for the purpose of identification.

About three thousand years ago, some square clay pieces were found in the grave of the world renowned King of Egypt Tutam Khume, which had a sort of finger print engravings on them. As far as known King Shendan Khan (year 210:246 B.C.) was the first ruler who used square clay

Pieces having engravings on them like finger prints as an official currency. The carvings on the walls of a Neolithic passage grave on the island of Gavrinis, near Brittany, are described as evidence for ancient knowledge of finger printing. Carvings resembling the finger print patterns are also found at another Neolithic passage grave at Newgrange, in County Meath, Ireland.

The earliest use of finger prints were made thousands of years ago in China and Japan. Kamagusu Minakata in the year 1894, drew attention to the old Japanese custom of nail stamping the legal documents by making a mark of ink using the thumb and the nail. In case of contracts the blood stamp was also used. This was a print of ring finger in blood.

Types of fingerprint patterns

1. Arches: Arches are the simplest type of fingerprints formed by ridges that enter on one side of theprint and exit on the other. No deltas are present.
About 5% of world population have arch patterns.

a) Plain arch b)Tented arch:

2. Loop: Loops must have delta and one or more ridges that enter and leave on the same side. These patterns are named for their positions related to the radius and ulna bones. About 60:65 % Of the world's population have loop patterns.

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a) Radial loop b) Ulnar loop:

3. Whorl

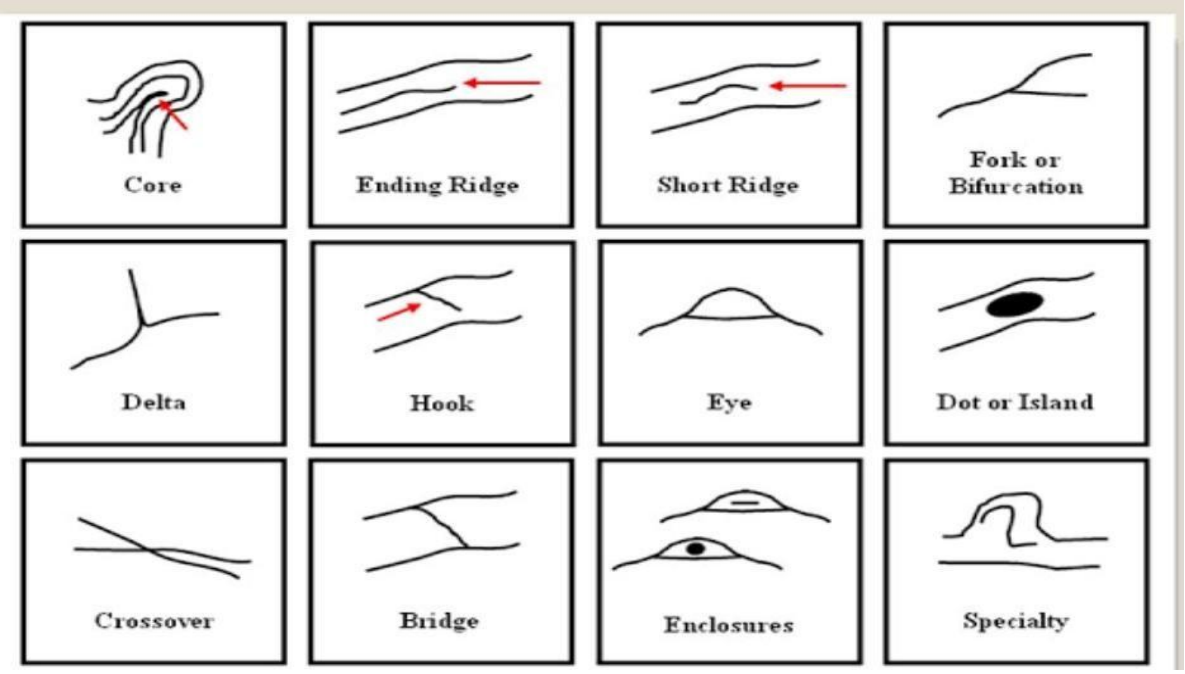
Whorls have at least one ridges that makes or tends to make a complete circuit. They also have at least two deltas, about 30 to 35% of the world's population have whorls pattern.

4. Composite :Types of Composite Pattern

a) Central pocket loop :
b) Twinned loop :

c) Lateral pocket loop:
d) Accidental loop:

Ridge characteristics



Ridge counting

A. Counting of ridges in Loops

Ridge counting is necessary for various purposes, especially in the classification of fingerprints. Before counting the ridges in loop patterns first the delta and the core are to be determined accurately. the core and delta are excluded from the Ridge counts. The Ridge or portions that are all coming in between the delta and the core are only to be counted. The count is made by drawing an imaginary straight thin line from the delta to the core. However, the ridges for Ridge fragments that pass through the imaginary line from the delta to the core are counted., in case, the imaginary line passes through the bifurcation the counts are taken as a two.

Principles:

1. Individuality: Individuality means that it unique in nature. It means "no two finger prints are ever identical unless they are made by the same finger" the texture of the surface of the paper or interferences from the extraneous matters introduced some differences.

The LAW OF INDIVIDUALITY is of a fundamental importance in forensic sciences. Anything and everything involved in a Crime, has an individuality. If the same is established : it connects the Crime and the Criminal.

2. Permanence

Permanence is another fundamental rule of finger print science. Finger prints remain unchanged throughout the life span of an individual . It means that finger prints are permanent from womb to tomb. During the fourth calendar month of pregnancy period, the ridges on the finger tips are already developed. The ridges begin to grow as the baby advances in age and the ridges finally cover the entire finger. As a result of this, the ridges on finger tips enlarge but the arrangements and the alignment of friction ridges do not change in any manner even when they enlarge.

3. Universality

Every fingerprint Invariably has two basic quality. That is, that is. Individuality and permanence. This is quite universal in nature. Even if search is made among millions of people. Also the individuality and permanence are found with all the persons as no two fingerprints are ever identical. This is an universally established fact.

4. Simplicity of Recording

Recording the Fingerprints of accused, arrested and suspected persons go with simple procedures. It requires only few articles. Like free:inked stripe or a glass slab. Rubber roller, ink and fingerprint slip etc. The inked fingers are pressed against the paper and can be recorded within the few minutes.

5. Simplicity of Classification

The process of finger print classification is not complicated but rather a simple method. Each person's finger prints are classified systematically i.e. keeping them in order in the cabinet where a unique correspondence between the persons and the classification formula is followed. So that, any particular print can be obtained from a large collections of prints with minimum labour.

REVIEW OF LITERATURE

1. According to **Mehta Amit A** and **Mehta Anjulikha's** study of fingerprint patterns among medical students in the Vidarbha region. According to them the dermatoglyphic print remains ubiquitous throughout and forms the most reliable criteria of identification.

2. According to **Pompy Hazarika** and **David a Russell** School of Chemistry University of East Anglia Norwich Norfolk UK, they researched the topic of advances in fingerprint analysis. According to them fingerprints can provide significantly more information about an

individual and advances in fingerprint technology Gnp magnetic particles Ms quantum dots that can simultaneously provide chemical information regarding the drugs ingested and the explosive and the drugs handled by a person as well as the identity of that individual

3. According to **Nitin Kaushal** and **Poornima Kaushal** a study on human identification and fingerprints. that fingerprint has provided over time to be the most rapid reliable and cost:effective means by which to identify unknown disease individuals, especially in a mass disaster setting the recovered prints can be manually compared with known antemortem records work searched through an automated fingerprint system in order to verify or establish identity.

4. According to **Krishna Prasad Aithal** a conceptual study on image enhancement techniques for fingerprint images. fingerprints are the prominent and widely acceptable biometric features compared to face speech iris and other types of biometrics most fingerprints recognition systems result in poor matching due to impurity and noisy images showing there is a high necessity and scope for image processing and enhancement techniques in order to improve the quality of fingerprint image and to obtain high accuracy in the matching process.

5. According to **John s building** a surgeon with the United States Army "Just as each individual is in some respects peculiar and unique so that even the minute ridges and furrows at the end of his forefinger differ from that all other forefinger and it's sufficient to identify them that was mentioned in the book of forensic science identification of fingerprints C K Johari author.

METHODOLOGY

Aim of the study: To Identify individuals through fingerprint and find the percentage of various patterns of the sample.

Universe of the study: Rani Channamma University, Belagavi campus students

Objectives:

1. To identify the fingerprint patterns of the individuals.
2. To study the ridge characteristics.
3. To identify individual through Fingerprint
4. To study the percentage of different patterns present in a taken sample.

Sample size:

For identification of fingerprint patterns and ridge characters each fingerprint is considered as one sample, which amounts to 200 samples of 40 members, where each member contributes 5 fingerprints for the study between the age of 21 to 26.

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Sample type: Non probability purposive sampling is used to identify and collect the sample

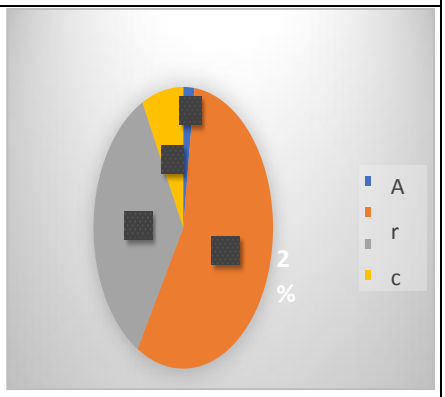
Purposive sampling: It is type of non random sampling, where the data from sample for the particular information data is collected.

Types of research: A. Mixed research (Qualitative and Quantitative)

Method of data collection and analysis:

Primary data: Primary data is collected by using thumb impressions of respondents between the age of 21 to 26 by ink method. The data is collected and analyzed by a microscopic magnifying glass and photo scan method.

Tools of data collection: Fingerprint slips technomax black inkless inkpad, magnifying glass**.**

Sl.No	Type of Pattern	Total no of Patterns	**Percentage of Pattern**	Graphical representation
1	**Arch**	**4**	**2**	
2	**Loop**	**113**	**56**	
3	**Whorl**	**68**	**34**	
4	**Composite**	**15**	**8**	
TOTAL		**200**	**100**	

Statistical analysis: Table ,Graph, pie chart for the clarification of the statistical data**.**

RESULT AND DISCUSSION

Comparision of Questioned sample finger print and sample finger print of Thumb , Index, Middle, Ring and the Little finger is made and the results drawn.

Common ridge characters in all patterns:

- Bifurcation present.
- Short ridge present.

Also out of 200 samples 113 were identified as loops, which amount to 56% of the overall samples considered in this study. 68 samples out of 200 were found to be whorls, which amounts to 34% of the overall samples considered in this study. Composites that were identified in the study were 15 out of 200, which lead to 8% in the overall samples.

FINDINGS:

Certainly based on the provided data here are the key findings regarding study the Law ofindividuality through fingerprint.

- Total number of Arch patterns found in this study was 4.Which amount to 2% of overallsample.
- Total number of Loop patterns found in this study was 113.Which amount to 56% ofoverall sample.
- Total number of whorl patterns found in this study was 68.Which amount to 34% ofoverall sample.
- Total number of Composite patterns found in this study was 15.Which amount to 8% ofoverall sample.
- Common ridge characters present in all patterns are:

a) Bifurcation
b) Short ridge
c) Core
d) Delta

- Specific ridge characters found in patterns are :

a) Circle ridge present.
b) Bridge present.
c) Creases present.

SUGGESTION:

- To get an accurate representation of the finger print pattern of data the size of the samplemay increase.
- Anyone can do future research or study.

CONCLUSION:

The study conducted on the Law of Individuality through fingerprint analysis has yielded significant findings that shed light on the distribution of various fingerprint patterns and the presence of common and specific ridge characteristics. This research serves as an important contribution to the field of forensic science and fingerprint analysis.

One of the key findings of this study is the distribution of fingerprint patterns. The most prevalent pattern observed was the Loop pattern, accounting for 56% of the overall sample. This is followed by the Whorl pattern, which represents 34% of the sample. The Arch pattern, on the other hand, was found to be the least common, constituting only 2% of the total patterns.

Composite patterns, a less frequently encountered type, made up 8% of the overall sample. This distribution provides valuable insights into the prevalence of different fingerprint patterns within the studied population. Furthermore, the identification of common ridge

characteristics across all patterns is a significant discovery. These characteristics include bifurcation, short ridge, core, and delta. These common features serve as crucial points of reference in fingerprint analysis, allowing for more accurate and reliable identification.

Additionally, the presence of specific ridge characteristics such as circle ridges and bridges further enhances the uniqueness and individuality of fingerprints. These specific features add another layer of distinctiveness to each fingerprint, reinforcing the principle that no two fingerprints are identical.In conclusion, the findings of this research underscore the importance of fingerprint analysis in forensic investigations and the determination of individual identity. The prevalence of Loop and Whorl patterns, along with the discovery of common and specific ridge characteristics, strengthens the reliability and accuracy of fingerprint identification techniques. These findings not only contribute to the scientific understanding of fingerprint patterns but also have practical implications for law enforcement agencies, forensic experts, and criminal investigations.Fingerprint analysis remains a cornerstone of forensic science, and this study reinforces its significance as a powerful tool for establishing individuality. The research findings presented here can be used to further refine fingerprint identification methods and improve their effectiveness in solving crimes, identifying suspects, and ensuring justice is served. As technology continues to advance, fingerprint analysis will remain a vital component of the forensic toolkit, thanks to studies like this one that deepen our understanding of its principles andapplication

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