
A STUDY ON PRESENCE OF RIDGE DETAILS IN THE POPULATION OF WEST BENGAL

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Abstract: In the era of advancement and scientific technology, when digitalization has taken over the traditional Forensic investigation procedures, yet the conclusion is verified by using the manual methods in some aspects. During the investigation of a crime scene various evidences are recovered in different forms. A few of the evidences which are considered to be perpetual, unique and ubiquitous by nature, i.e. finger prints and palm prints. By this time no similarity has encountered in finger prints even not in monozygotic twins. These finger prints carry tremendous information about an individual/suspect, gender, an approximation of the age numerous Scientists and scholars carried out a lot of research over finger prints and palm prints over distinct populations. This study was carried out on the population of west Bengal in the age group of 18-60 years to calculate out information about an individual on the basis of finger prints. For which the latent finger prints/latent finger prints were studied for the encounterance of finger prints quadrants over any object or surface as a resultant it was found that no finger prints are completely recovered from the objects with partial information.

The world is moving very fast towards the digital world and so the investigation procedures and hence the procedure of processing the scene of a crime have got enhanced enough where the investigation procedure takes a very little time gap to catch hold the suspect. As we already know that the fingerprint is one of the most encountered and the most relevant evidence found in a crime scene. This study is made on the population of west Bengal where the whole palm prints were collected and the study was made to slash down the procedure of matching the whole fingerprint with the suspect to match a particular quadrant of any on the 10 finger. So if the prints are encountered in latent form the development and the study of that print can also be done easily and fast by just determining and then matching the particular quadrant from the particular finger. The study concludes as what percent of people carry particular quadrant of a particular finger. By studying these details, we can successfully conclude that the gender inequity and the personalization can be done which could make the investigation procedure much easier.

Keywords: Fingerprints, Investigation, Significance, Gender, Evidences, Ridge Details.

Introduction: In a last few decades the digitalization and advancement to enhance the technology has taken over the traditional investigation procedure.

A fingerprint in its narrow sense is an impression left by the friction ridges of a human finger. Their patten is permanent and unchangeable on each finger during the whole life time of an individual. The probability that fingerprints of two individual are alike is about 1 in 1.9×10^{15} . According to FBI the accuracy and reliability of scans are correct 99.8% of the time. Minutiae are the few special characteristics present on the surface made up by the fraction of ridges. These minutae are been studied for the individualization purposes. Now a days personal identification has become the necessity for the safety and security of the society. The identification process have changed by the enhancement in the technology. Since, the variation of interpersonal and personal identification arose which left a task in form of question of identification.

The print been left on the scene of crime knowingly or unknowingly by the suspect are used to identify the suspect on the basis of their individual characteristics. Whenever the suspect touches anything on the crime scene, one tends to leave one's print pattern of the friction ridges. Different lifting methods are in present used for the development and lifting purposes and is later been used for the identification purpose. But whenever, we impact our hand against any surface, it is not necessity that all the ridges will be implemented. It is frequently observed that partial information is obtained from the intensified prints and the identity left often in question. In this study we focused on presence of all 4 quadrants of the collected prints for identification of suspect and even about the feminine as well. All the prints were divided into 4 quadrants from the core point of the pattern namely 1, 2, 3, and 4 of all 10 fingers. When we place our hand normally onto a surface in that case it is expected that the all the fingers will touch the surface at almost with all the 4 quadrants.

Methodology: In this study all the 100 samples including male and female were collected from the population of west Bengal of age group 18-65 years. Sample collection procedure was accomplished in the month of June 2017, when the temperature was in between 30°C-37°C. During this study sampling was done in a room temperature when atmospheric moisture is present and the probability for retrieve of latent prints cannot be neglected. All the samples were randomly selected and the consent of the subjects were taken before sampling. The purpose of the study was to identify the percentage of people who has particular quadrants in their prints or not when the palm is placed at normal position. Each finger was divided into four quadrants from the core of the pattern in the prints.

Material: All the latent prints were collected on white A4 sheet and were preserved at room temperature for 7 to 8 hours. All the samples were treated with the help of traditional different battery of powders¹¹. The obtained ridges information was clear and having the identical characteristics of an individual. The lateral prints were collected on white A4 sheet with the help of black fingerprint ink. During this process all the prints were taken with normal positioning the palm. After the sampling all the samples were preserved at room temperature for further examination. The presence of all the quadrants were been analyzed for the information and the percentage view was taken out of how many person may have a particular quadrant in their print if the palm is placed at normal position.

Instrumentation: All the samples were examined with the help of 5X and 10 X hand lens. During the comparison process, stereomicroscope was also used. Photography of the samples was done with the help of a Lenovo K5 note phone 13 megapixel camera. For the statistical calculation (mean, standard deviation, normal distribution of probability) SPSS software was used Inferences were drawn on the basis of an analyzing the t-values obtained from the test. This study demonstrates that there is a significant difference in the epidermal ridge density present in a single print. It shows the similar trend in the both genders fingerprints.

Result and Discussion: After the examination of all the samples a table is created to show consider the 4 different quadrants separated by two perpendicular lines cutting each other at the core, which in turn results the formation of the 4 different quadrants. Hence all 10 fingers are divided into 4 different quadrants and are marked as per the presence and the absence of the ridges in the particular quadrant. The table present below shows the readings and the findings from the collected samples of dermatoglyphics.

Readings:

Male:

Left hand																				
	Thumb				Index				Middle				Ring				Little			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Total	2	50	3	50	50	42	50	42	50	48	50	48	50	50	50	50	49	43	48	43
%	4	100	6	100	100	84	100	84	100	96	100	96	100	100	100	100	98	86	96	86

Right hand																				
	Thumb				Index				Middle				Ring				Little			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Total	50	1	50	1	41	50	41	48	50	50	47	50	50	49	49	48	49	48	47	48
%	100	2	100	2	82	100	82	96	100	100	94	100	100	98	98	96	98	96	94	96

Female:

Left hand																				
	Thumb				Index				Middle				Ring				Little			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Total	1	50	1	50	48	44	47	46	50	47	50	48	48	47	47	50	45	45	47	45
%	2	100	2	100	96	88	94	92	100	94	100	96	96	94	94	100	90	90	94	90

Right hand																				
	Thumb				Index				Middle				Ring				Little			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Total	50	1	50	0	45	47	49	47	47	49	46	50	49	47	48	50	43	49	44	46
%	100	2	100	0	90	94	98	94	94	98	92	100	98	94	96	100	86	98	88	92

Conclusion: According to the present study we finally form up a percentage which says that for males there is 100% chance of showing 2nd and 4th quadrant in the left hand's thumb and 1st and 3rd in the right hand's thumb. 4% population showed the presence of 1st quadrant in thumb, 6% population showed the presence of 3rd quadrant in thumb, for index male showed 100% presence of 1st and 3rd quadrants whereas 6% population showed the absence of 2nd and 4th quadrant, in middle finger 1st and 3rd quadrants were present in the whole population whereas 4% population showed the absence of the 2nd and 4th quadrants, 100% of all the quadrants were present in the ring finger, for little finger 2% for 1st quadrant, 14% for 2nd quadrant, 4% for the 3rd and 14% for the 4th quadrant showed the absence, in the left hand.

2% population showed the presence of 2nd quadrant in thumb, 2% population showed the presence of 4th quadrant in thumb, for index showed 18% absence of 1st quadrant, 100% presence of 2nd quadrants whereas 18% population showed the absence of 3rd quadrant, 4% showed the absence of 4th quadrant, in middle finger 1st, 2nd and 3rd quadrants were present in the whole population whereas 6% population showed the absence of the 3rd quadrant, in ring finger 100% of 1st quadrant is present, 2% population showed the absence of 2nd and 3rd quadrants, whereas 4% population showed the absence of 4th quadrant, for little finger 2% for 1st quadrant, 4% for 2nd quadrant, 6% for the 3rd and 4% for the 4th quadrant showed the absence, in the right hand.

This study was made on the population of West Bengal which is to prove that if a full palm print is present on the crime scene then we can just reduce the number of examination that needs to be held on the suspect just by looking at any particular finger and what percentage of it is present on the crime scene.

It's a very rare case to find the full thumbprint i.e. all the four quadrants, in a full palm print, and so it will help up in processing the scene much easily.

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