CHAPTER – I

INTRODUCTION

Fingerprints are defined as the patterns found on the finger tips which are formed with ridges and furrows. Fingerprints are one form of biometrics, a science that uses people's physical characteristics to identify them. Fingerprints are ideal for this purpose because they are inexpensive to collect and analyse, and they never change, even as people age.[1]

Although hands and feet have many ridged areas that could be used for identification fingerprints become a popular form of biometrics because they are easy to sort and classify. They are also accessible. Fingerprints are natural unique pattern formed by friction on epidermal ridges and furrows, which appears on pad of fingers and thumbs. Though these epidermal ridges are found on fingers, palms and soles, they are popularly called as just fingerprints. They have never been observed repeating in any human being in history of dactylography. Fingerprint is also called dactylograms.

A person's fingerprint are formed based on two things the genetics from parents and condition of foetus in mother's womb. The patterns we can often tell that two people are related because they have several similar physical traits, such as facial features or hair color. This is because children receive half of their DNA (genetic blueprints) from each parent. Fingerprints are used to identify people because each person's fingerprints are unique, but people can have similar fingerprint patterns. Whether fingerprint patterns are random or influenced by genetics.

Edward Henry recognized that fingerprints could be described as having three basic patterns arches, loops and whorls. The combination of any of these three pattern is termed as composite. This pattern is found only in fewer number among all known patterns. These shapes and contours were later sub-divided into eight basic patterns and are used by the FBI till today.

These occur in about 5% of the encountered fingerprints. The ridges of the finger run continuously from one side of the finger to the other and make no backward turn. Normally, there is no delta in an arch pattern but if it exists, there must be no re-curving ridge that intervenes between the core and delta points

There are two sub-types of arch patterns

In this pattern a consistency of flow can be observed. It starts on one side of the finger and the ridge then slightly cascades upward. This almost resembles a wave out on the ocean and then the arch continues its journey along the finger to the other side. The plain arch pattern is the simplest of the fingerprints to discern

Fig – 1(plain arch)

The similarity between this pattern and the plain arch is that it starts on one side of the finger and flows out to the other side in a similar pattern. However, the difference is that the tented arch lies in the ridges in the centre and is not continuous like the plain arch. They have significant up thrusts in the ridges near the middle that arrange themselves on both sides of an axis. The adjoining ridges converge towards this axis and thus appear to form tents

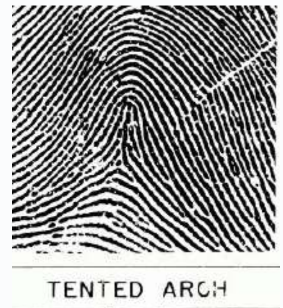

Fig – 2(tented arch)

These can be seen in almost 60 to 70% of the fingerprints that are encountered. The ridges make a backward turn in loops but they do not twist. This backward turn or loop is distinguished by how the loop flows on the hand and not by how the loop flows on the card where the imprint is taken. This imprint on the fingerprint is similar to the reverse image that we see when we look at ourselves in the mirror. A loop pattern has only one delta.

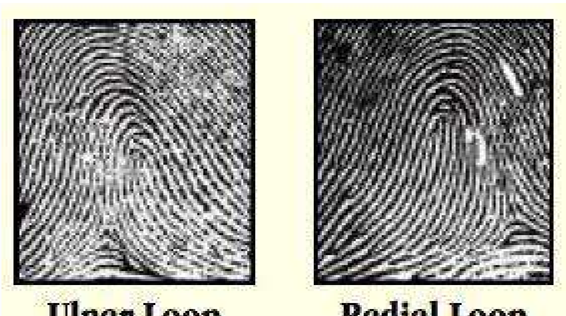

Fig – 3(radial loop and ulnar loop)

There are three sub-categories of loops

These loops are named after a bone in the forearm known as radius that joins the hand on the same side as the thumb. The flow of these loops runs in the direction of the radius bone i.e. the downward slope of the radial loop is from the little finger towards the thumb of the hand. These loops are not very common and most of the times will be found on the index fingers.

These are named after a bone in the forearm called ulna. This bone is on the same side as the little finger and the flow of this pattern runs from the thumb towards the little finger of the hand.

This pattern consists of two distinct and separate loop formations. It has two distinct and separate shoulders for each core, two deltas and one or more ridges that make a complete circuit. There is at least one re-curving ridge within the inner pattern area between the two loop formations that gets touched or cut when an imaginary line is drawn

Fig – 4(double loop)

These can be found in about 25 to 35% of the fingerprints that are encountered. Some of the ridges in a whorl make a turn through at least one circuit. Therefore any pattern that contains two or more deltas will be a whorl.

There are three sub-groups of whorls

The ridges in these whorls make a turn of one complete circuit with two deltas and are therefore circular or spiral in shape. This is the simplest form of whorl and also the most common.

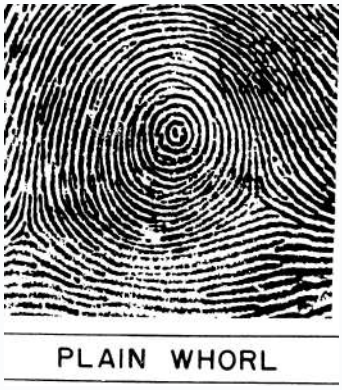

Fig – 5(plain whorl)

These whorls consist of at least one re-curving ridge or an obstruction at right angles to the line of flow with two deltas and if an imaginary line is drawn in between then no re-curving ridge within the pattern area will be touched or cut. These whorl ridges make one complete circuit and may be oval, circular, spiral or any variant of a circle.

Fig – 6 (central pocket loop whorl)

The composition of the pattern in accidental whorl is derived from two distinct types of patterns that have at least two deltas. Therefore whorls containing ridges that match the characteristics of a particular whorl sub-grouping are referred to as accidental whorls.[2]

Fig – 7(accidental whorl)

It contain at least two different patterns. This kind of pattern is found only in fewer numbers among all known pattern.

A person's fingerprints are based on the patterns of skin ridges (called dermatoglyphs) on the pads of the fingers. These ridges are also present on the toes, the palms of the hands, and the soles of the feet. Although the basic whorl, arch, and loop patterns may be similar, the details of the patterns are specific to each individual.

Dermatoglyphs develop before birth and remain the same throughout life. The ridges begin to develop during the third month of fetal development, and they are fully formed by the sixth month. The function of these ridges is not entirely clear, but they likely increase sensitivity to touch.

The basic size, shape, and spacing of dermatoglyphs appear to be influenced by genetic factors. Studies suggest that multiple genes are involved, so the inheritance pattern is not straightforward. Genes that control the development of the various layers of skin, as well as the muscles, fat, and blood vessels underneath the skin, may all play a role in determining the pattern of ridges. The finer details of the patterns of skin ridges are influenced by other factors during fetal development, including the environment inside the womb. These developmental factors cause each person's dermatoglyphs to be different from everyone else's. Even identical twins, who have the same DNA, have different fingerprints.[3]

Fingerprints are now universally recognized as an infallible means of personal identification and as a valuable aid to the investigating officers in the detection and prosecution of crime and identification of criminals. They afford the best, positive and infallible clues which connect the culprit with the crime scene. The fingerprint as evidence is important because of the followings:

The characteristic features of a fingerprint as so unique that they are not exactly repeated in any other fingerprint or part of one. These features enable personal identification with the help of fingerprints.

Fingerprints are now universally recognized as an infallible means of personal identification as well as valuable aid to the investigating officers in the detection and prosecution of crime and identification of criminals. They afford the best, positive and infallible clues which connect the culprit with the crime.

Almost everyone is born with finger and all fingers without exception have ridges. A fingerprint will remain unchanged throughout the life of an individual. Even if the external skin is damaged due to some reason, the ridges will reappear when the damage is re-repaired. Surgical attempt can never alter the ridges.

Although, the scope for the classification of fingerprints is large, but it is so simple that can be done by any police personnel with little trainings. Record of millions of persons can be kept and retrieved easily with the help of a computer.
fingerprints can be used in all sort of ways

Providing biometric security

Identifying amnesia victim and unknown deceased

Conducting background checks

Fingerprints are especially important in the criminal justice realm. Investigators and analysers can compare unknown prints collected from a crime scene to the known prints of victims, witnesses and potential suspects to assist in criminal cases. For example,

- In addition, fingerprints can link a perpetrator to other unsolved crimes if investigators have reason to compare them, or if prints from an unsolved crime turn up as a match during database search. sometimes these unknown prints linking multiple crimes can helps investigators piece together enough information to zero in one the culprit.
- In the absence of DNA, fingerprints are used by the criminal justice system to verify a convicted offender's identity and track their previous arrests and conviction, criminal tendency, known associates and other useful information. Officers of court can also used a records to help make a decisions regarding a criminal's sentence, probation, parole, or pardon.

Every aspects of the growth and development of a single cell into a fully formed human is initiated genetic blue print. The capacity to form friction ridges is inherent within the developing embryo. The patterns that these ridges form, however, are limited by nature and are defined by the fingerprint community as whorls, loops, arches and composites. Although genetic may direct when and where ridges will form by providing blueprint by proteins nature provide the boundaries of patterning through physical mechanism.

Proteins direct cellular activity by facilitating biochemical process within the cell the processes depend not only protein derived from the gene but also on the many other non protein components on the cell such as sugars, lipids, hormones, inorganic compounds inorganic elements, and minerals. Additionally, the physical environment around the within cell including surface tension, electrical charge and viscosity, contributes to the way the cell functions.

Genetic information directs cellular function, serves as a link between generations, and influences an individual's appearance. Some aspects of appearance are similar for each individual of that species. However within that species, for each aspect's of an individual's appearance, many gene genes and external factors affect the final outcome of individual's appearance. The gene involved with a specific attribute produce the appropriate proteins, which in turn react with each other and with the many non genetic components of the cell in complex biochemical pathway during the growth and development of the foetus these biochemical pathways proceed under the omnipresent influence of external factors.

Although DNA is crucial for providing the blueprint for the development of particular model, there are so many steps between the genes of the DNA encoded protein and the

final product that even two individual who originated from which the DNA would produce two completely unique models.

Perhaps Jamison best describes the interplay between genies and the environment in friction ridge skin.

Since dermatoglyphic formation cannot be derived salely from either genetic or environmental factors. It must result from an interaction of the two types of factors. This interaction is probabiliy far from being simple and it most likely involves a multiple step reciprocal positive feedback relationship in which either a genetically or an environmentally based factor causes a change in the uterine environment, leading to a genetic response.

The ultimate example of the role of the environment in friction ridge formation is monozygotic twins, who share identical genetic information and very similar intrauterine environments, but on many occasions have very different patterns. The role of genetics is currently understood by the indication that several main gene, in conjunction with a number of modifying genes, may be responsible for volar patterning, but it is well established that friction ridge patterning is also affected by the environment.

Like many traits, genetics influences pattern formation in directly by contributing to the timing of the onset of friction ridge skin, the timing of the onset of volar pad regression, the growth rate of the foetus. Stresses across small areas of skin are not inherited, but rather they represent one of many environmental factors that influence pattern formation

Until recently, most researches in the field of genetics and physical anthropology have the wide rage of patterns found on the palms demonstrates the complex nature of factors that affect ridge alignment. Patterning and ridge counts are indirectly inherited and are not affected by only one developmental factor. However, ridge flow and ridge count are both affected by tension across the surface of growing foetal skin.

Correlation coefficient formulas are used to find how strong a relationship is between data. The formulas return a value between -1 and 1, where: 1 indicates a strong positive relationship. -1 indicates a strong negative relationship.

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

Fig – 8(formula for correlation)

CHAPTER – II

LITERATURE REVIEW

The Inheritance of Fingerprint Patterns

HERMAN M. SLATIS, etal (1986) the fingerprint patterns of 571 individuals of an Israeli community, who formerly lived in the town of Habban in South Yemen and in Beida in Yemen, 150 km to the west of Habban, were studied. These "Habbanites" form an isolate, since there were no Jewish communities nearby and no known interbreeding with the local Moslems. The isolate migrated en masse to Israel in 1950 and settled in its own village. The demography, blood and serum groups, anthropometry, and data on fingerprints have been reported Of the 571 Habbanites whose fingerprints were studied, nine were incomplete for one or more fingers. Blood groups were determined for each individual. When blood typing inconsistencies were found, the affected relationship was not utilized.

A few men have two wives in polygamous marriages contracted when they lived in Yemen, and some women have children by a second husband after the death of their first. Pedigrees are usually traceable to the grandparents of the oldest living family members, but the interrelationships are not known for that generation. To develop additional evidence on the inheritance of fingerprint patterns, fingerprints of both parents and one or more children from a non-Habbanite sample of 86 families were used as controls.

Analysis of the fingerprints of 571 members of the Habbanite isolate suggest inherited patterns and pattern sequences. A genetic theory has been developed; it assumes that the basic fingerprint pattern sequence is all ulnar loops and that a variety of genes cause deviations from this pattern sequence. Genes that have been proposed include:
(1) A semidominant gene for whorls on the thumbs
(2) A semidominant gene for whorls on the ring fingers which acts like the gene for whorls on the thumbs
(3) A dominant gene for arches on the thumbs and often on other fingers
(4) One or more dominant genes for arches on the fingers
(5) A dominant gene for whorls on all fingers except for an ulnar loop on the middle finger
(6) A dominant gene for radial loops on the index fingers, frequently associated with an arch on the middle fingers
(7) A recessive gene for radial loops on the ring and little fingers. These genes may act independently or may show epistasis.[4]

Inheritance of finger pattern types in MZ and DZ twins

B Karmakar, etal (2008) Digital patterns of a sample on twins were analyzed to estimate the resemblance between monozygotic (MZ) and dizygotic (DZ) twins and to evaluate the mode of inheritance by the use of maximum likelihood based variance decomposition analysis. MZ twin resemblance of finger pattern types appears to be more pronounced than in DZ twins, which suggests the presence of genetic factors in the forming of fingertip patterns. The most parsimonious model shows twin resemblance in count of all three basic finger patterns on 10 fingers. It has significant dominant genetic variance component across all fingers. In the general model, the dominant genetic variance component proportion is similar for all fingertips (about 60%) and the sibling environmental variance is significantly nonzero, but the proportion between additive and dominant variance components was different. Application of genetic model fitting technique of segregation analyses clearly shows mode of inheritance. A dominant genetic variance component or a specific genetic system modifies the phenotypic expression of the fingertip patterns. The present study provided evidence of strong genetic component in finger pattern types and seems more informative compared to the earlier traditional method of correlation analysis.[11]

CHAPTER – III

AIM AND OBJECTIVE

Aim:-

To establish whether the inheritance can be determined through fingerprint patterns.

Objective:-

- To determine biological heritability of an individual with their parents through fingerprint patterns.

CHAPTER – IV

MATERIALS AND METHODOLOGY

Materials

1) OHP(Overhead Projector) sheet
2) White Fingerprint powder
3) Brush
4) Cellophane tape
5) Consent form

Methodology

The consent form got signed from each person. The hands of an individual were cleaned using piece of cloth in order to avoid the presence of any foreign particles and water and applied a white powder by using brush. The excess powder has been removed using brush and each fingerprint has been lifted by using cellophane tape. The lifted fingerprints were pasted in OHP sheet. Each sheet was marked with the details of family number and family member and by using the formula of correlation the relation between mothers and offspring was determined.

CHAPTER – V

OBSERVATION

In the below mentioned table,
The whorl pattern is indicated as “W”
The ulnar loop is indicated as “UL”
The radial loop is indicated as “RL”
The plain arch and tented arch is indicated as “A”
The composite pattern is indicated as “C”

Table – 1(recorded fingerprint pattern)																
Sr. No	Family Member	observed Patterns										number of patterns				
		RT	RI	RM	RR	RL	LT	LI	LM	LR	LL	W	UL	RL	A	C
1	Father	UL	W	UL	UL	UL	UL	W	UL	UL	W	3	7	-	-	-
	Mother	UL	UL	UL	W	UL	W	W	UL	UL	UL	3	7	-	-	-
	Offspring(M)	W	A	UL	W	UL	UL	UL	UL	UL	W	3	6	-	1	-
	Offspring(F)	UL	W	UL	UL	W	UL	UL	UL	UL	UL	2	8	-	-	-
2	Father	W	W	UL	UL	W	UL	UL	UL	UL	W	4	6	-	-	-
	Mother	W	UL	UL	A	UL	UL	W	UL	UL	UL	2	7	-	1	-
	Offspring(F)	UL	UL	UL	UL	UL	UL	W	RL	W	W	3	6	1	-	-
3	Father	UL	UL	UL	UL	W	W	W	UL	UL	UL	3	7	-	-	-
	Mother	UL	W	UL	UL	UL	W	UL	UL	UL	W	3	7	-	-	-
	Offspring(M)	RL	W	W	UL	UL	UL	W	W	W	UL	5	4	1	-	-
4	Father	UL	UL	UL	UL	W	UL	W	UL	UL	W	3	7	-	-	-
	Mother	W	A	W	UL	UL	UL	W	UL	UL	UL	3	6	-	1	-
	Offspring(F)	W	UL	UL	W	UL	W	W	UL	UL	UL	4	6	-	-	-
	Offspring(M)	W	UL	W	UL	RL	UL	W	W	UL	A	4	4	1	1	-
5	Father	W	UL	UL	UL	W	UL	UL	UL	C	W	3	6	-	-	1
	Mother	W	UL	W	UL	UL	UL	UL	W	RL	UL	3	6	1	-	-
	Offspring(F)	UL	W	UL	W	UL	W	UL	UL	UL	UL	3	7	-	-	-
6	Father	UL	UL	UL	W	W	W	W	UL	UL	UL	4	6	-	-	-
	Mother	W	UL	W	UL	UL	RL	UL	W	UL	W	4	5	1	-	-
	Offspring(F)	UL	UL	UL	W	W	RL	UL	UL	UL	RL	2	6	2	-	-
7	Father	W	W	W	W	UL	W	W	W	W	UL	8	2	-	-	-
	Mother	W	W	UL	UL	UL	UL	UL	UL	UL	W	3	7	-	-	-
	Offspring(M)	UL	UL	UL	W	W	W	UL	UL	UL	UL	3	7	-	-	-
	Offspring(M)	UL	UL	UL	W	UL	UL	W	UL	UL	UL	2	8	-	-	-
8	Father	UL	UL	UL	UL	W	W	RL	RL	UL	W	3	5	2	-	-
	Mother	W	W	UL	UL	UL	W	UL	UL	W	W	5	5	-	-	-
	Offspring(F)	W	UL	UL	W	W	UL	UL	UL	UL	W	4	6	-	-	-

Sl No	Family Member	Observed Patterns										percentage				
		RT	RI	RM	RR	RL	LT	LI	LM	LR	LL	W	UL	RL	A	C
9	Father	UL	UL	UL	W	W	W	UL	UL	UL	UL	3	7	-	-	-
	Mother	W	UL	UL	W	UL	UL	A	UL	UL	W	3	6	-	1	-
	Offspring(M)	W	UL	UL	W	W	UL	UL	UL	UL	W	4	6	-	-	-
10	Father	UL	UL	W	UL	W	W	W	UL	UL	UL	4	6	-	-	-
	Mother	W	W	UL	UL	UL	W	UL	UL	UL	UL	3	7	-	-	-
	Offspring(F)	A	W	UL	UL	UL	W	UL	UL	W	UL	3	6	-	1	-
11	Father	UL	UL	UL	UL	UL	UL	W	W	UL	W	3	7	-	-	-
	Mother	W	UL	W	UL	UL	W	W	UL	UL	UL	4	6	-	-	-
	Offspring(M)	UL	UL	W	UL	W	UL	W	W	W	UL	5	5	-	-	-
	Offspring(F)	W	UL	UL	RL	C	UL	W	UL	C	W	3	4	1	-	2
12	Father	W	W	UL	UL	RL	W	A	UL	UL	RL	3	4	2	1	-
	Mother	W	UL	W	UL	UL	W	W	UL	UL	UL	4	6	-	-	-
	Offspring(M)	UL	UL	UL	W	W	W	UL	UL	UL	W	4	6	-	-	-
13	Father	W	A	W	UL	UL	UL	W	UL	UL	UL	3	6	-	1	-
	Mother	W	UL	UL	W	UL	W	W	UL	UL	UL	4	6	-	-	-
	Offspring(F)	W	UL	W	UL	RL	UL	W	W	UL	A	4	4	1	1	-
14	Father	UL	UL	W	W	RL	UL	W	W	UL	A	4	4	1	1	-
	Mother	UL	UL	W	UL	W	UL	W	W	W	UL	5	5	-	-	-
	Offspring(F)	W	UL	UL	W	UL	W	W	UL	UL	UL	4	6	-	-	-
	Offspring(M)	W	UL	W	UL	RL	UL	W	W	UL	A	4	4	1	1	-
15	Father	W	UL	UL	UL	UL	RL	RL	UL	W	W	3	5	2	-	-
	Mother	UL	UL	W	UL	UL	UL	UL	UL	A	W	2	7	-	1	-
	Offspring(F)	W	W	UL	UL	UL	UL	UL	UL	UL	W	3	7	-	-	-
16	Father	UL	UL	W	W	RL	UL	W	W	UL	A	4	4	1	1	-
	Mother	UL	UL	W	UL	W	UL	W	W	W	UL	5	5	-	-	-
	Offspring(F)	A	UL	UL	A	UL	W	W	UL	UL	UL	2	6	-	2	-
	Offspring(M)	W	UL	W	UL	RL	UL	W	UL	UL	A	3	5	1	1	-
17	Father	UL	W	W	W	W	UL	UL	UL	W	W	6	4	-	-	-
	Mother	UL	W	W	UL	UL	UL	UL	UL	W	A	3	6	-	1	-
	Offspring(M)	A	RL	W	W	W	UL	RL	W	UL	UL	4	3	2	1	-

Sl No	Family Member	Observed Patterns										percentage				
		RT	RI	RM	RR	RL	LT	LI	LM	LR	LL	W	UL	RL	A	C
18	Father	W	UL	UL	UL	W	UL	W	A	UL	W	4	5	-	1	-
	Mother	UL	UL	UL	RL	A	UL	UL	UL	UL	W	1	7	1	1	-
	Offspring(M)	UL	UL	UL	W	UL	UL	UL	UL	W	UL	2	8	-	-	-
	Offspring(M)	W	UL	W	W	W	UL	UL	W	W	UL	6	4	-	-	-
19	Father	UL	W	UL	UL	UL	UL	UL	UL	UL	UL	1	9	-	-	-
	Mother	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	-	10	-	-	-
	Offspring(M)	UL	UL	UL	W	UL	UL	UL	UL	W	UL	2	8	-	-	-
	Offspring(M)	W	UL	UL	W	W	UL	UL	W	W	UL	5	5	-	-	-
20	Father	UL	W	UL	UL	UL	UL	A	UL	UL	UL	1	8	-	1	-
	Mother	UL	W	UL	UL	UL	UL	C	UL	UL	UL	1	8	-	-	1
	Offspring(M)	UL	W	UL	UL	UL	UL	UL	UL	UL	UL	1	9	-	-	-
21	Father	W	UL	UL	W	W	W	UL	UL	W	W	6	4	-	-	-
	Mother	W	W	W	W	UL	W	W	UL	W	W	8	2	-	-	-
	Offspring(M)	UL	W	UL	W	UL	W	UL	UL	W	UL	4	6	-	-	-
22	Father	W	UL	UL	UL	UL	W	UL	A	UL	UL	2	7	-	1	-
	Mother	W	UL	W	UL	W	W	UL	UL	W	UL	5	5	-	-	-
	Offspring(M)	W	A	UL	UL	UL	UL	UL	UL	UL	UL	1	8	-	1	-
23	Father	UL	UL	UL	W	UL	UL	W	W	UL	W	4	6	-	-	-
	Mother	UL	UL	UL	W	W	UL	UL	UL	RL	W	3	6	1	-	-
	Offspring(F)	UL	UL	UL	UL	UL	UL	W	UL	UL	W	2	8	-	-	-
24	Father	UL	W	W	W	W	UL	W	W	W	UL	7	3	-	-	-
	Mother	UL	UL	UL	UL	UL	UL	UL	UL	W	UL	1	9	-	-	-
	Offspring(F)	UL	W	UL	W	UL	UL	W	W	W	UL	5	5	-	-	-
25	Father	UL	UL	W	W	UL	UL	UL	UL	UL	W	3	7	-	-	-
	Mother	UL	W	UL	UL	UL	UL	UL	UL	UL	UL	1	9	-	-	-
	Offspring(M)	UL	RL	UL	UL	UL	UL	UL	UL	UL	UL	-	9	1	-	-
	Offspring(F)	W	RL	UL	UL	UL	UL	UL	UL	UL	UL	1	8	1	-	-

Sl No	Family Member	Observed					Patterns					Percentage				
		RT	RI	RM	RR	RL	LT	LI	LM	LR	LL	W	UL	RL	A	C
26	Father	W	UL	UL	UL	UL	UL	RL	UL	UL	UL	1	8	1	-	-
	Mother	UL	UL	UL	UL	UL	UL	RL	RL	UL	UL	-	8	2	-	-
	Offspring(F)	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	-	1	-	-	-
	Offspring(F)	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	-	1	-	-	-
27	Father	A	A	UL	UL	A	UL	A	A	UL	UL	-	5	-	5	-
	Mother	W	UL	UL	UL	UL	W	UL	UL	W	UL	3	7	-	-	-
	Offspring(M)	UL	UL	UL	RL	UL	UL	UL	UL	UL	UL	-	9	1	-	-
28	Father	UL	UL	UL	RL	UL	UL	UL	UL	UL	UL	-	9	1	-	-
	Mother	W	UL	UL	UL	UL	W	W	UL	UL	UL	3	7	-	-	-
	Offspring(M)	W	RL	UL	UL	UL	UL	UL	UL	UL	UL	1	8	1	-	-
29	Father	UL	RL	UL	UL	UL	UL	A	UL	UL	UL	-	8	1	1	-
	Mother	UL	W	UL	UL	UL	UL	UL	UL	UL	UL	1	9	-	-	-
	Offspring(F)	UL	C	UL	UL	UL	UL	UL	UL	UL	UL	-	9	-	-	1
30	Father	W	W	A	W	UL	UL	UL	UL	C	UL	3	5	-	1	1
	Mother	RL	W	UL	W	UL	RL	W	UL	UL	W	4	4	2	-	-
	Offspring(M)	UL	W	UL	W	W	UL	UL	UL	W	UL	4	6	-	-	-

Table – 2(Table of Correlation of fingerprint pattern with mother and offspring)

S.No	Patterns in Mother	Patters in offspring	Rxy
		Offspring -1	
Family - 1	3-W	3-W	0.999466
	7-L	6-L	
	0	1-A	
		Offspring -2	
	3-W	2-W	1
	7-L	8-L	
Family - 2	2-W	3-W	0.959625
	7-L	7-L	
	1-A	0	
Family - 3	3-W	5-W	0
	7-L	5-L	
		Offspring -1	
Family - 4	3-W	4-W	0.953821
	6-L	6-L	
	1-A	0	
		Offspring -2	
	3-W	4-W	0.922613
	6-L	5-L	
	1-A	1-A	

Family -5	3-W	3-W	1
	7-L	7-L	
Family - 6	4-W	2-W	1
	6-L	8-L	
		Offspring -1	
Family - 7	3-W	3-W	1
	7-L	7-L	
		Offspring -2	
	3-W	2-W	1
	7-L	8-L	
Family - 8	5-W	4-W	0
	5-L	6-L	
Family - 9	3-W	4-W	0.953821
	6-L	6-L	
	1-A	0	
Family - 10	3-W	3-W	0.999466
	7-L	6-L	
	0	1-A	
		Offspring -1	

Family - 11	4-W	5-W	0
	6-L	5-L	
		Offspring -2	
	4-W	3-W	0.928571
	6-L	5-L	
	0	2-C	
Family - 12	4-W	4-W	1
	6-L	6-L	
Family - 13	4-W	4-W	0.995871
	6-L	5-L	
	0	1-A	
		Offspring -1	
Family - 14	5-W	4-W	0
	5-L	6-L	
		Offspring -2	
	5-W	4-W	0.970725
	5-L	5-L	
	0	1-A	
Family - 15	2-W	3-W	0.959625
	7-L	7-L	
	1-A	0	
		Offspring -1	

Family - 16	5-W	2-W	0.5
	5-L	6-L	
	0	2-A	
		Offspring -2	
	5-W	3-W	0.802955
	5-L	6-L	
	0	1-A	
Family - 17	3-W	4-W	0.922613
	6-L	5-L	
	1-A	1-A	
		Offspring -1	
Family - 18	1-W	2-W	0.970
	8-L	8-L	
	1-A	0	
		Offspring -2	
	1-W	6-W	0.1889
	8-L	4-L	
	1-A	0	
Family - 19	0	2-W	1
	10-L	8-L	
	0	5-W	0

	10-L	5-L	
Family - 20	1-W	1-W	0.9948
	8-L	9-L	
	1-C	0	
Family - 21	8-W	4-W	-1
	2-L	6-L	
Family - 22	5-W	1-W	0.5
	5-L	8-L	
	0	1-A	
Family - 23	3-W	2-W	1
	7-L	8-L	
Family - 24	1-W	5-W	0
	9-L	5-L	
		Offspring -1	
Family - 25	1-W	0	1
	9-L	10-L	
		Offspring -2	
	1-W	1-W	1
	9-L	9-L	
		Offspring -1	

Family - 26	8-W	0	-1
	2-L	10-L	
		Offspring -2	
	8-W	0	-1
	2-L	10-L	
Family - 27	3-W	0	1
	7-L	10-L	
Family - 28	3-W	1-W	1
	7-L	9-L	
Family - 29	1-W	0	0.9794
	9-L	9-L	
	0	1-C	
Family - 30	4-W	4-W	1
	6-L	6-L	

CHAPTER – VI

RESULTS AND CONCLUSION

RESULTS

The analysis of inheritance of fingerprint pattern sequence leads to a general description of the factors governing the determination of the individual fingerprint patterns. The most common fingerprint pattern found is ulnar loop and whorl. The arch, radial loop and composite are rare.

The few individuals are having the one of the patterns from their parents in few fingers.
By considering the correlation between mother and offspring 75% of patterns are showing very high positive correlation, 3.3% of patterns are showing high correlation, 6.6% of patterns are showing moderate correlation and 20% of patterns are showing negligible correlation.

CONCLUSION

Based on patterns present in fingerprints it is difficult to determine the inheritance of an individual among their family member.

The important factors for formation of an individual fingerprint is based on foetus condition in mother's womb and gene from their parents so in order to determine the inheritance it is important to find out the gene which is responsible for formation of different type of pattern.

CHAPTER – VII

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