

**Palm-print patterns in population of Diwaniyah City**

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**Abstract:-**

The palmprint is one of the most reliable physiological characteristic that can be used to distinguish between individuals. palmprints from 250 individuals have been classified using principle lines by a novel algorithm from our results the database containing 250 palmprints ,the distributions of categories ( 1-6). The proportions of these six categories(1-6) in our database containing 250 palmprint are 0%, 0.4%, 2.4%, 23.2%,70.8%3.2% respectively. And classified the common type which was category 5 to five categories (A-E).The proportion of these five categories are 0%,2.89%,39.88%,37.57%,19.65% respectively.

**Introduction :-**

Studies of palmprints patterns have two goals. First goal is to discover distinction concrete human patterns from patterns all other people. To find common group's sings is the second goal (2). All too often when we teach genetics we limit ourselves to the "tried and true" single gene traits and "shy away" from more complex forms of genetic inheritance. After all, it is difficult enough to explain Mendelian Laws without the added complexity of quantitative variation. Ironically, understanding the relationship between genetic information and phenotypic expression at the organismal level has more to do with the interaction of many genes than it does to any one gene in isolation. Dermal ridges are an example of a trait that shows quantitative variation, is inherited, and is easily analyzed in the teaching laboratory. Further, sophisticated mathematical treatments need not be applied to teach the relationship between polygenic inheritance and expression.(10,18).

Various avenues have been explored to provide a solution and biometric-based identification is proved to be an accurate and efficient answer to the problem. Biometrics has been an emerging field of research in the recent years and is devoted to identification of individuals using physical traits, such as those based on iris or retinal scanning, face recognition, fingerprints, or voices (12,20).

Palmprint is preferred compared to other methods such as fingerprint or iris because it is distinctive, easily captured by low resolution devices as well as contains additional features such as principal lines. With the help of palm geometry, a highly accurate biometric system can be designed.(11).

We classify palmprints by taking into account their most visible and stable features, i.e. the principal lines. Most palmprints show three principal lines: heart line, head line and life line In this paper, we describe how these principal lines may be extracted according to their characteristics, which allows us then to classify palmprints into six categories by the number of principal lines and the number of their intersections(27).

Palmprint is a popular one human feature used in biometric technology because of its uniqueness and stableness. It also provides rich feature information that can be used to analyze to identify individual human.(13).

Biometric technology is one that plays an important role in human identification and verification system by using biological or behavioral characteristic which can be used for automated recognition(15).

### **Inheritance**

All the physical traits genetically controlled and are passed on from generation to generation governed by the laws of inheritance propounded of Mendel and the features of dermatoglyphics are no exception. The literature published is replete with the same. The emphasis is given to the patterns on the configurational areas, Main Line-C, palmar creases etc. One of the most important investigations by the author titled inheritance of palmar configurations areas published in journal Zeitschrift für Mophologie and Anthropologie in 1969 have given a very intensive and extensive account of the mode of inheritance in all the configurational areas of the palm(16).

Creases provide important clues of the early fetal development and thus may be of practical value in clinical medicine(25). As palm creases are helpful in discovering anthropologic characteristics and diagnosing several diseases, including chromosomal aberrations, palm creases have been analyzed qualitatively (1, 3,5) and quantitatively (6). Research in recent decades has found that at least 50 diseases have palmprint associations. They include single gene genetic disease, multi-gene genetic disease, chromosome disease etc.(29)

Both primary genetic determination and development secondary to flexion function have been suggested as the mechanisms underlying the crease development. The evidence offered has been mostly indirect, related to the timing of the onset of the fetal hand movement and the crease aberrations in malformed hands and fingers(17) The aim of this study to determined the common type of these six categories in Diwaniyah society

### **Materials and methods:**

Population samples Dermatoglyphics samples were collected from Diwaniyah city. The sample size is 250. All individuals in the study are 5–50 years old, healthy, and not related to each other. Then taken palmprints as the following:

1-An alternative method is to use three-quarter inch clear plastic tape for fingerprints and 4-inch wide clear plastic tape for palm prints. Graphite powder (available from many chemical supply companies) is rubbed over the area to be printed and the tape is gently pressed against the surface. When the tape is peeled off an image of the print will be transferred to the tape which can then be pressed onto a sheet of paper. The 4-inch tape, known as Book-Lock, can be obtained in 20-yard. Then scan them.

2-Some of images were captured online using a CCD-camera-based device 5 images per palm .The images are 320 x 240 with eight bits per pixel

Proposed Second-Stage Classification Algorithm

A-Definition and notations of key lines and key points:

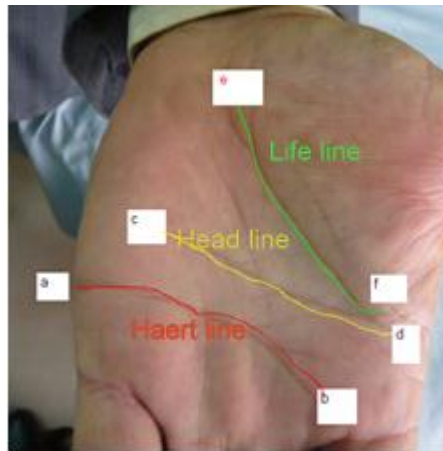
In this report we are concerning with three main lines on the palm namely life line, heart line and head line according to Fang (11).

Line ab represents the heart line

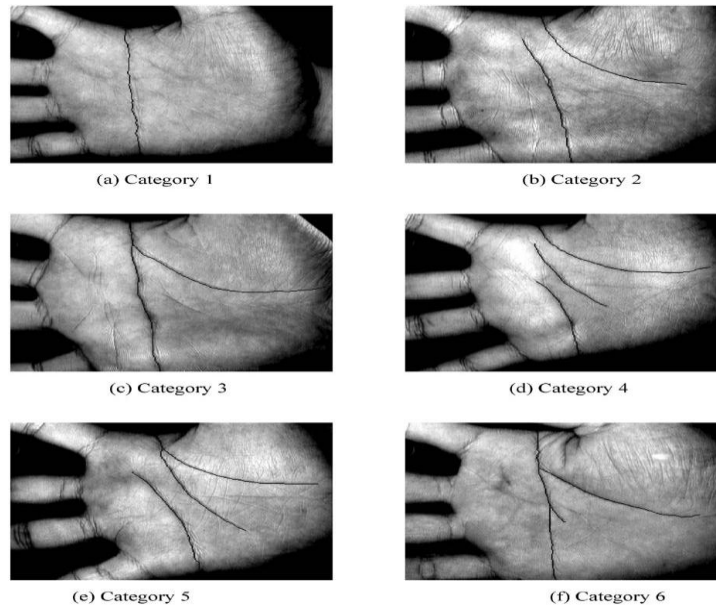
a is start of heart line

b is end of heart line  
Line cd represents the head line  
c is start of head line  
d is end of head line  
Line ef represents the life line  
e is end of life line  
f is start of life line

Wu et al [27] proposed the classification of palmprints using principle lines. The algorithm has the ability to classify low-resolution palmprints into six categories according to the number of principal lines and the number of their



**Fig 1: Principal Lines intersections**



**Fig 2: Examples of each palmprint category (27)**

**B. Construction of boundaries:**

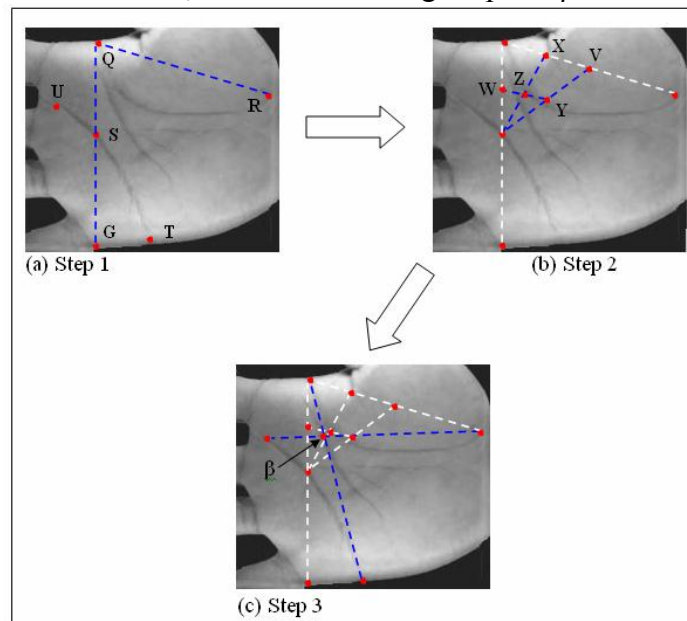
As mentioned earlier, Category 5 is subdivided into 5 categories A, B, C, D and E, depending on where the intersection point  $\beta$  falls in. The definition of the location of  $\beta$  is demonstrated in Fig.3. The sub-categories A, B, C, D and E, are defined in Table 1 Based on the proposed algorithm, the task of locating the boundaries can be divided into four steps:

Step 1: Locate points G, Q, R, T and U.(G is the point on the last finger)(Q is the intersection of heart line and head line) (R is the end of the life line) Plot out the lines GQ and QR locate point S (S is the intersection of GQ with heart line as shown in Fig.3 (a))

Step 2: Calculate, midpoint V of QR, midpoint X of QV, midpoint W of QS, midpoint Y of SV, intersection point Z of SX with WY as shown in Fig. 3(b).

Step 3: Calculate, intersection point  $\beta$  of TQ with RU as shown in Fig.3(c).

Step 4: Calculate the gradients and constant C for lines of equation for WY, SX, WX, XY, SY and SW. Using substitution method, find out which region point  $\beta$  lies in.



**Fig 3: Steps of sub-classification**

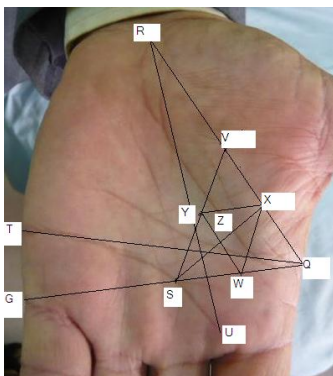


Fig 4 Key points notation

Table 1:Definitions Of Boundary Of Each Sub-Category

Category	Falls in
A	XYZ
B	WXZ
C	SWZ
D	SYZ
E	Not in A, B, C or D

**Results and discussion:**

Our palmprints algorithm was tested on a database 250 palmprints. In this database 0% samples belong to category 1, 0.4% to category 2, 2.4% to category 3, 23.2%to category 4, 70.8% to category 5, 3.2% to category 6.This distribution of each category in our palmprints database is listed in table (2).This results same for (27,11,13) When he was classified palmprints. Category 5 the highest percentage from other categories.

Table 2 Distribution of each category in our database.

Category number	1	2	3	4	5	6
Number of palmprints	0	1	6	58	177	8
Percent%	0%	0.4%	2.4%	23.2%	70.8%	3.2%

Among all the samples belong to category 5 is subdivided into 5 categories A, B, C, D and E, 0% of them belong to category A,2.89% of them to category B , 39.88% of them to category C , 37.57% of them to category D, 19.65% of them to category E ,Table (3).The category C and D was the highest percentage then E and B was the lowest .while fang study was the highest percentage of category D, then B, E,C and A respectively (11). In the field of physical anthropology, palm creases are used less than fingerprints and palmprints because the methods of analyzing palm creases are not very objective (8,26).

**Table 3 Distribution of each subcategory in 5 category**

Sub category name	A	B	C	D	E	Sum
Number of palmprints	0	5	69	65	34	177
Percent%	0%	2.89%	39.88%	37.57%	19.65%	100%

Other studies observed that palm creases have additional features that might indicate the possibility of chromosomal aberrations. For example, simian creases are frequent and the T-DoT of simian creases is high in Down syndrome [trisomy 21] (6,4). Palm creases are also useful for diagnosing intrauterine toxin exposure (5), fetal alcoholic syndrome (14), mental retardation (7), neoplasia (19,9) and other diseases. For enhancing the diagnostic value of palm creases, the methods of analyzing palm creases should be objective.

In China and southeast country of Asia was proposed to recognize one of special structures in palmprint which is a key process in automated palm diagnosis system which imply a number of diseases(28).

It can be concluded that the algorithm (Wu *et al*'s classification method )(27) is successful and can be concluded that palmprint matching system .This result demonstrated that patterns of principles line was the polygenic model in which one assumes that each gene ((adds))in some small way to the total observed variability. But what is being (added) clearly , aphenotypic expression which requires a multitude of tissue types , all simultaneously growing and changing as development proceeds , is at odds with a simplistic image of genes being somehow (additive)).

### **Conclusion:**

To sum up, having understood the basics of palmprint the prime importance has been of investigate the implication, application and the utility of this valueable knowledge. Many of the investigators have pulled up their energies in comparing the frequencies of various patterns among different communities and population to establish their relative ethnic position in the fabric of the society. The other most important parameter of palmprint is the inheritance. All the physical featuers of the human body including the palmprints are inherited as per the laws propounded by Mendel. The features of palmprints are most important in the medico legal cases of disputes of paternity. It has a very crucial role in the diagnosis of monozygotic and dizygotic twins. The features of dermatoglyphics also express the correlation in many somatic, physiological, neurological and cytological afflictions and syndromes.

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## أنماط طبعة راحة اليد في مدينة الديوانية

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### الخلاصة:-

طبعة راحة اليد هي من أكثر الصفات الفسيولوجية الموثقة التي تستعمل للتمييز بين الأفراد. أخذت طبعات راحة اليد ل ٢٥٠ فرد وصنفت باستعمال الخطوط الرئيسية باستخدام الخوارزمية المبتكرة ومن نتائجنا لقاعدة البيانات ل ٢٥٠ طبعة، صنفت الطبعات إلى ست أصناف (٦-١). وكانت النسب المئوية للأصناف الستة (٦-١) في قاعدة بياناتنا ل ٢٥٠ طبعة هي ٠.٤،% ٢.٤،% ٢٣.٢،% ٧٠.٨،% ٣.٢،% على التوالي. وصنف النوع الشائع وهو الصنف الخامس إلى خمسة أصناف (A-E) وكانت النسب المئوية لتلك الأصناف هي ٠.٢٨٩،% ٣٩.٨٨،% ٣٧.٥٧،% ١٩.٦٥،% على التوالي.