# Application of Digital Image Processing and Analysis in Healthcare Based on Medical Palmistry

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**Abstract:--** In this paper, an application of digital image processing and analysis techniques has been discussed, which can be useful in healthcare domain to predict some major diseases for human being. The application is an image processing system, which works on the basis of medical palmistry. The images of human palm form input to the system. Then, system applies digital image processing and analysis techniques on input images to identify certain features in the image. By using knowledge base of medical palmistry it analyzes certain features in image and predicts probable disease.

**Keywords:***Decision Support System for Healthcare based on Medical Palmistry.*

## 1. INTRODUCTION

### 1.1 Image Processing and Analysis (IPAA)

Digital computer can perceive the image by mean of sensors, and analyze it by mean of microprocessor. The techniques used to provide perception to digital computer are called image processing and analysis techniques. An image may be defined as a two-dimensional function, f(x,y), where x and y are *spatial* (*plane*) *coordinates*, and the amplitude of f at any pair of coordinates (x,y) is called the *intensity* or *grey level* of the image at that point. [1]. When x, y and the amplitude values of f are infinite, we call the image an *analog image*. When these values are finite, discrete quantities, we call the image a *digital image*. resources survey and management, Criminology, stronomy, Meteorology, and artillery applications.

### 1.2 Medical Palmistry

Palmistry is a science which observes human palm by different aspects and derives conclusions about nature of the person. Since ancient time, in many civilizations like Indian, Chinese, Persian, Egyptian, Roman and Greek, people were used to get guidance about their present and future by means of palmistry. [3]. It describes attributes of human, like, health, psychology, intelligence, and lifestyle and other related entities. Medical palmistry is one branch of palmistry, which works on identification of probable diseases by observing some symbols in human palms. According to principles of medical palmistry, there are some symbols like Iceland, cross, star, square, grill, spot, and circle. If one or more of them is/are found on specific region of palm, or on specific line of palm, it indicates probability of disease of respective organ of body. Apart of symbols, color and surface of palm and nails, shape of palm and fingers also plays important role in decision making. Some possible symbols are shown in figure 1. [6]

## 2. SOME SYMBOLS IN HUMAN PALM THAT INDICATE CERTAIN DESEASES

Symbols shown in figure 1 indicate specific diseases, based on their position on lines, mounts and fingers [6]. Island:

1. Island on the line of heart denotes heart disease inherited.[3]
2. In additions to these marks there are some other patterns like triangle, cross, and circle. They are more related to nature and psychology of a person rather than physical characteristics.

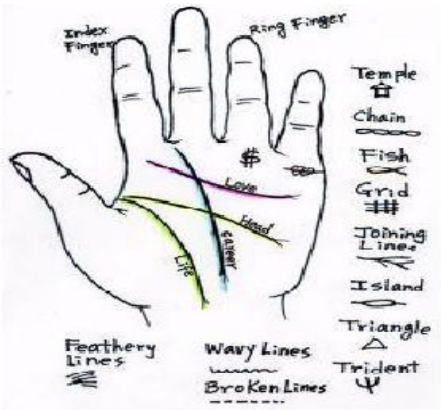


Fig. 1: List of few patterns on Human Palm

## 3. REVIEW OF EXISTING SYSTEMS

The researchers, all over the world are working in this area and developing different web applications for palmistry. In some applications, palm reader, who is a human being, is.

In other type of applications, some web sites show sample images of palm and tell users to compare their own palm with the most suitable one. Predictions are displayed based on the selection of image by user. It is user‟s responsibility to identify the nearest matching image. It is difficult for user to compare the given image with his/her own palms. If user selects wrong image, than he may get wrong prediction, which may be not suitable to him/her.

Using IPAA techniques, a system can be developed to overcome this limitation, and predict the disease based on medical palmistry. For that, we are proposing the Decision Support System for medical palmistry [5].

## 4. THE PROPOSED SYSTEM

The main function of the proposed model is to take as an input, the image of human palm, process it and as an output, predict diseases, using knowledge of medical palmistry. The architecture of the system is shown in figure 2 [5].

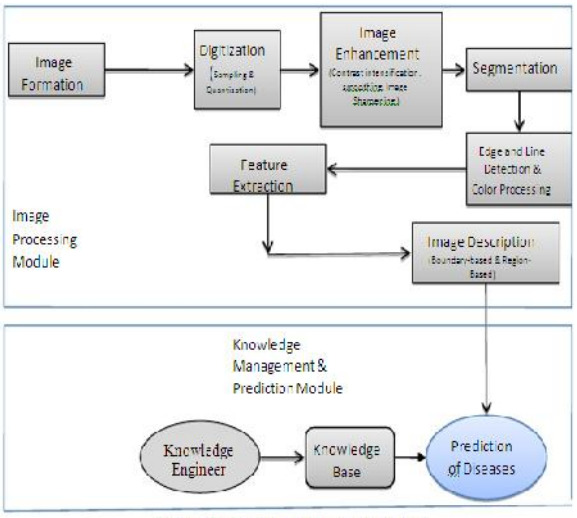


Fig 2: The steps of processing and analysis by the system

As shown in figure 2, the system takes as an input the image of palm, using IPAA techniques, and using knowledgebase of medical palmistry, it identifies the certain symbols in specific part of palm.

## 5. MODULES OF THE SYSTEM

As shown in the figure 3, the system includes Image processing module and knowledge management & prediction module [6]. Image processing module deals with operations on image up to pattern recognition. The knowledge about medical palmistry is fed into the system in second module. In this module, sample patterns (as shown in fig.1) are fed into knowledge base. At last these two modules combine their work products, and system generates final output, that is prediction. Steps specified in each module are as follows.

### 5.1 Image Processing and Analysis Module

#### *5.1.1 Image Formation*

Image formation means conversion of radiant energy emitted from source into 2D image. In this system, digital camera is used for good quality of image. This module forms input to the system.

#### *5.1.2 Digitization*

Since we are using digital camera, we don‟t have to perform digitization techniques like sampling and quantization. The input image itself is in digital form.

#### *5.1.3 Image enhancement*

This step will improve the quality of image by applying enhancement techniques like contrast intensification, noise cleaning and edge sharpening. To determine certain patterns as shown in fig 1, we are performing this step as primary requirement.

#### *5.1.4 Segmentation*

In this step system will divide the spatial domain into „meaningful‟ parts or regions, which are of our interest. Specific patterns will be searched according to these segments. Image can be divided into four quadrants, because all mounts in the palm image can be easily identified [6].

#### *5.1.5 Edge, line detection and color processing*

In this step, palm image is processed for identification of edges and lines, which are usually found in human palm. For example, the heart line, the life line and so on. Color of palm is also identified in this step. Moreover, shape of palm is also decided in this step [6].

### *5.1.6 Feature Extraction*

This step will extract specific features like patterns of star, grille, Iceland, square, and spots from the image [6].

### *5.1.7 Image Description*

This step will identify the pattern and its exact location in the image. The partial algorithm is shown in following section.

**5.2 Knowledge Management & Prediction Module**

Knowledge Engineer will prepare Knowledge Base using knowledge of medical palmistry. Knowledge base is the backbone of the system. Using patterns identified by IPAA module and knowledge base, system predicts the probable diseases of a palm holder. [5] The knowledgebase is created with the help of medical palmistry. The sample design of knowledge base isdiscusse d in APPENDIX – A. The syntax of table name is as follows: <Pattern_type>_<LINE/MOUNT>_<Palm_Type> According to palmistry, there are major lines named life, heart, and head dominating the characteristics of palm.There are also other minor lines in palm. We are interested in the position of identified symbol on one of these lines. Mounts are plateaus at different positions in human palm. The names of mounts are Jupiter, Saturn, Mercury, Sun, Mars, Venus, and Moon. According to palmistry, there are seven types of palms namely elementary, square, speculated, philosophical, conic, psychic, and mixed. Special cases will be considered afterward.

## 6. ALGORITHM TO ISTINGUISH LINES AND SPECIAL SYMBOLS FROM REST OF THE PALM

Precondition: The image of palm should be taken on white background. [RGB value (255,255,255)]

The steps of algorithm are as follows

Segment the image. Remove the portions of fingers and thumb, by changing pixel color values to (255,255,255) Repeat the following steps until RGB value of pixel is (255,255,255). Start getting pixel color values of image from any side. If started from left to right or right to left then scan image vertically. If started from top to bottom or bottom to top, then scan horizontally. Get pixel color value for each pixel. Count number of pixels for each color. Color value is considered same if the difference is (±α, ±β, ±γ) with the previous color value. (This is to limit number of colors we will get. Values of α, β and γ may be case specific.) Color of palm = the color with highest number of pixels. Line or Special symbol = the pixels whose color.

## 7. CONCLUSION

This article focuses on combination of digital image processing and analysis techniques, and concept of medicalpalmistry. Using these concepts a prototype model is designed which predicts diseases that may occur to the human being in future. The proposed system can be very useful to human being to get indication of disease in advance. It can save cost of treatment as well as physical and psychological suffering of the person. Also, an algorithm to distinguish lines and special symbols from rest of the palm is discussed

## 8. REFERENCES

[1] R. C. Gonzalez and R. E. Woods "Digital Image Processing", 2nd edition, Pearson Education, 2004

[2] D. M. Shah "Decision Support system for Image Analysis" in journal of Advanced Research in Computer Engineering, 1(1-2) January-December 2007, pp 51-56.

[3] Cheiro, "Language of The Hand", Manoj Paperbacks, Delhi.

[4] Bhupendra Dholakiya, "Sampurna Hastarekha Shastra", Uzma publication, Ahmedabad.

[5] Hardik Pandit and Dipti Shah, "Decision Support System for Medical Palmistry" - in "Advances in Applied Research", vol.2, July-December 2010, pp 173- 178.

[6] Hardik Pandit and Dipti Shah, "Decision Support System for Healthcare Based on Medical Palmistry", presented in ICISD – 2011, GCET Engineering College, Vallabh Vidyanagar