



DIAGNOSIS OF DISEASE USING NON-INVASIVE METHOD IN IMAGE PROCESSING

N.K.Sethu

Assistant Professor, Department of Information Technology
Dr.Sivanthi Aditanar College of Engineering, Tiruchendur

ABSTRACT

Digital image Processing plays a role in a medical imaging. Nail diagnosis is one of the methods in Ayurveda, Homeopathy and traditional medicine to predict the diseases. Nails can reflect the present health condition, genetically inheritance information and historical information of drug or alcohol usage for the past month or even a year etc. This paper explores the existing research works related to nail plate and nail matrix as a tool for biometric system, nail fold capillaries to identify the diseases severity levels and affected organs, nail surface as evidence in forensic science to identify the chemical effects, nail samples to identify drug intake and abuse etc. So that, the nail analysed by various imaging types and processing algorithm to recognise the person uniqueness, health condition and its history. This paper also identifies the research challenges and issues.

INTRODUCTION

Medical science has advanced in many ways and different methods for finding disease in human body and one of the various ways to identify disease is through nails of human palm. There are numerous testing ways for the diagnosis of disease which are used by medical practitioners using pathological tests as basics. Mostly these involve taking blood samples which are quite painful and require the patient physically. These tests can take more than 24 hours by the examiner to establish name of the disease, even it requires patient to be present throughout the test.

So it is necessary to propose a pain free and cost effective system that is based on image recognition-colour analysis. In the field of healthcare, study of human nail has its own significance. Many diseases can be diagnosed

by scrutinizing nails in the hand. A human nail also reflects some disease like Diabetes and Jaundice.

The system has an algorithm which will automatically extract nail area and scrutinize this nail part for disease detection based colour of nail by applying digital image processing technique. The proposed system enables the practitioner to diagnose the nature of a disease at the earliest.

OBJECTIVE

- * To design and implement the system which diagnose the disease using the color of the nail.
- * To design the system which diagnose the disease at the early stage.
- * To design the cost effective diagnosis system.
- * To design a system that makes the method of testing the disease simple.

METHODOLOGY

- * To find the abnormalities of the surface of the thumb finger nail in terms of color and textural characteristics.
- * The captured finger thumb nail image illumination is corrected and segmented using contouring techniques.
- * Further, geometrical and color textural features are extracted from the segmented nail region.
- * Finally, the images are indexed using trained SVM classifier.

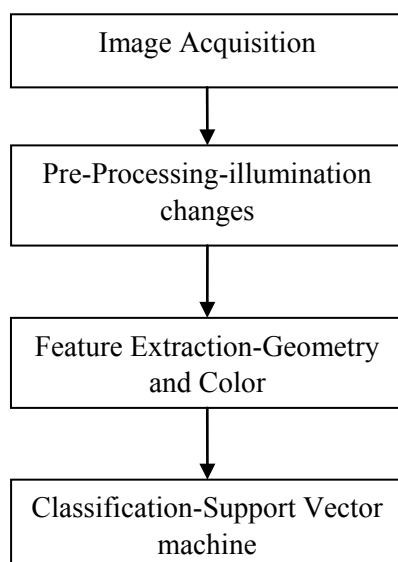


Fig.1 Methodology

ALGORITHM

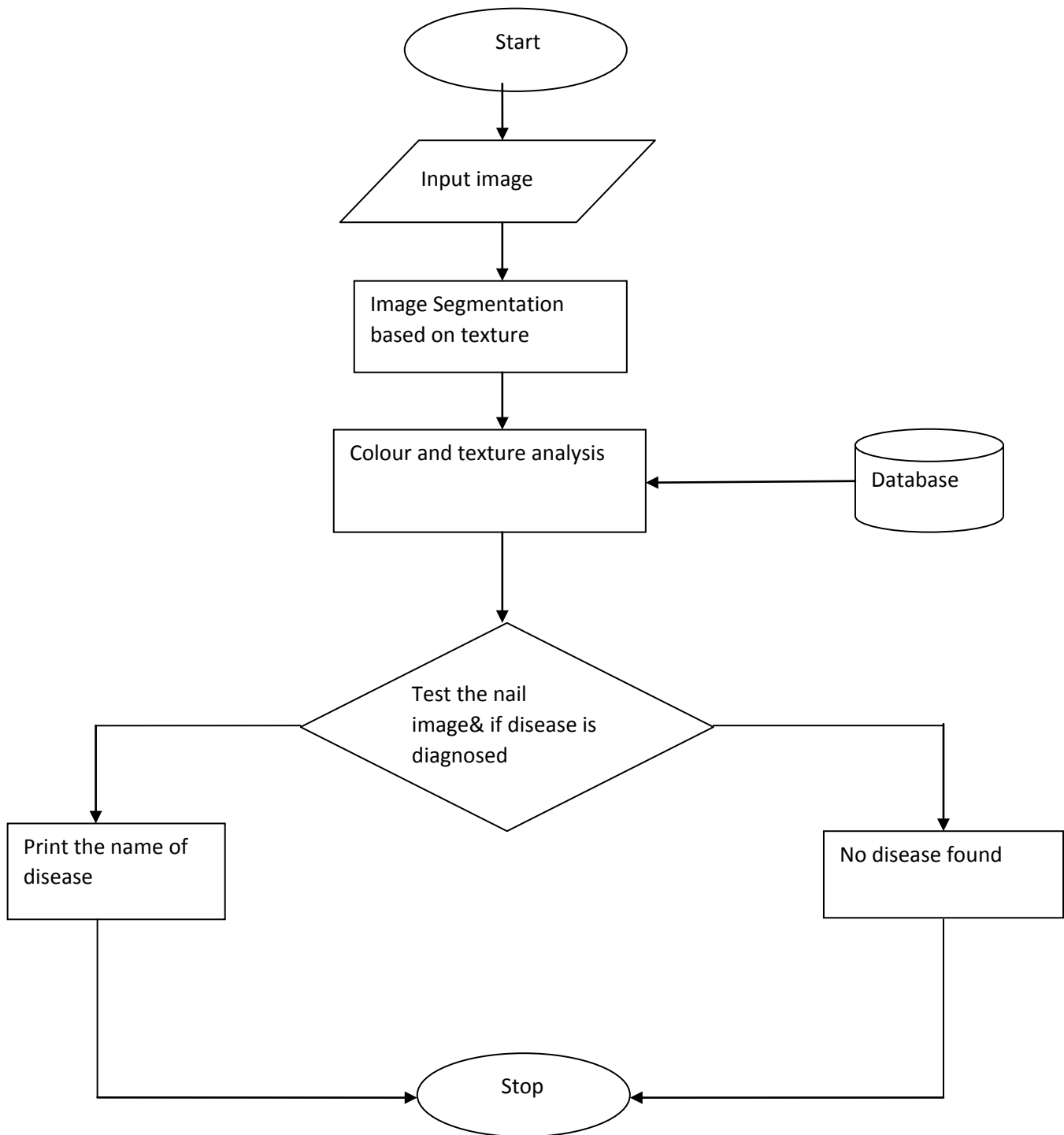
- * **Input to the model:** Scanning the image containing fingers backside of palm region in appropriate brightness.
- * **Extraction of the cropped nail region for the entire palm:** Applying segmentation method on the image to extract the nail region from the entire image.
- * **Analysis of the nail region, color:** The segmented nail image is now being processed on the basis of color and features of nail are compared with the dataset present.
- * **Disease Prediction using Knowledge base:** This will be generated on the basis of analysis and the disease would be predicted if present

PROPOSED SYSTEM

Medical Practitioners have been using nail colour, shape and texture changes for prediction of various diseases because the changes in nail are early symptoms of various diseases. The proposed model will surely help doctors to predict diseases automatically, easily,

cost effectively and with great precision. We all know that for diagnosis of a disease we need to do various tests like blood, urine, LFT, TFT, Urea, CBC, etc. All these tests would cost around Rs.300 – Rs.600. For these tests the patient has to go personally to the Lab. But by using the proposed system, the patient can himself by sitting at home know about the disease he has been diagnosed with. And the proposed system will surely be an aid to Medical Practitioners for the detection of earlier symptoms of various diseases








The input to the proposed system is the backside of the palm on a white background. Then from the palm image using the segmentation process, the Region of Interest (ROI), the nail region is extracted. Then the nail colour, shape and texture are extracted and combined together to form a feature vector which is then compared with the existing database of diseased and normal nail. The proposed system uses Support vector machine (SVM) Classification Method for classification and prediction of diseases.



PRE-CONDITIONS

- * Nails should be clean, having no any color like nail polish or any artificial marks on nails.
- * Image should be taken under conditions like proper sunlight.
- * Image background should be white or black background.
- * Image should be taken without flash and clear.

Diseases based on nail colour and shape

Sr. No.	Nail Type	Image	Possible Diseases
i.	White Nails		i. Jaundice ii. liver trouble iii. Anemia.
ii.	Yellow Nails [13]		i. lung disease ii. diabetes or psoriasis iii. thyroid disease
iii.	Bluish Nails		i. heart problems ii. emphysema
iv.	Pale Nails [13]		i. Anemia Congestive heart failure ii. Liver disease iii. Malnutrition
v.	Dark Lines Beneath the Nail		i. melanoma(dangerous type of) skin cancer
vi.	Beau's Lines		i. systematic disease
vii.	Terry's lines [15]		i. Hepatic failure ii. Cirrhosis iii. Diabetes iv. Mellitus v. Congestive Heart failure vi. Hyperthyroidism.

CONCLUSION

Health is a critical aspect for Human life. Identification of human health conditions and accurately predicting the symptoms of the diseases is useful work for the society. For these a new system is designed based on digital image processing, nail-color analysis. Nail colors are used for the disease detection. It helps in

recognizing disease of the person and minimizes the cost of the diagnosis of diseases. The detection system makes easy for doctors to give correct treatment to patients. The system can be made better with the increased number of image samples. The future scope includes making the refining of the expectant results via the image.

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