# MINOR PROJECT SYNOPSIS

# DISEASE DETECTION USING IMAGE PROCESSING

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**SUBMITTED BY: SUBMITTED TO:**

**POOJA SHARMA (14102255) MRS. BHAWNA GUPTA**

**VENICE VARSHNEY (14102229)**

**SUMMARY**

This synopsis discusses a model of nail color analysis for prediction of diseases using digital image processing. The model is a prototype which observes the color of nails of human palm on the basis of the principles of medical science, and predicts probable diseases, if any. Medical practitioners often observe nails of human palms to get assistance in prediction of diseases. The proposed model does the same job without any human intervention. The model gives more accurate results than human vision, because it overcomes the limitations of human eye like subjectivity and resolution power. As on now, the model is limited to identification of six different colors of nails. In future it can be enhanced for more colors to predict more diseases.

**INTRODUCTION**

1. Input to the model: Finger is scanned with the help of a scanner/camera and this input is passed into the MATLAB code for processing through –

* imread – this command is used to read an image of forms like gif, jpeg, bmp, png and many more from the desired file destination and bring it for processing in MATLAB.
* imshow- this command is used to display the image.

1. Extraction of the finger from the background: The obtained input image is rotated and cropped if required and a common background is set using tools like-

* imrotate
* imresize
* imcrop
* imfill

1. Extraction of the nail region from the cropped image by using commands like-

* Regionprops
* Boundingbox

1. Analysis of nail region for color using-

* impixel
* improfile- improfile retrieves the intensity values of pixels along a line or a multiline path

1. Disease prediction using knowledge base: We match the pixel of nail color for each RGB component with the known RGB colors for each disease and predict the disease and its extent using basic comparator operations.
2. Passing predicted disease into Java code: Java uses certain API’s and libraries to take input from MATLAB and use it in its classes by using Java-Matlab API ,frames of awt package, etc.

**FURTHER IMPROVEMENTS:**

As the world is turning digital and automated, our project can be made more user friendly by the much talked of ‘Internet of Things’. If time permits, we intend to do the process of capturing the image, passing it into MATLAB code via a database connection or Bluetooth and receiving the predicted disease on our mobile screen with the links of required websites for further details, through an Android Application.

**REAL LIFE ASPECTS**

Digital Image Processing has very wide applications and almost all of the technical fields are impacted by it. Some of the major fields where it is widely used are image sharpening and restoration, remote sensing, color processing, video processing, virtual mouse and much more. Even in medical fields it is used in gamma ray imaging, x-ray imaging, ultra-violent imaging, medical scans.

The need of developing a disease detection system is to analyze nails for accurate prediction of disease as human eye have subjectivity for colors. Since computer observes only RGB color value of pixel, it would be unique on all machines. If nearby pixels are having any difference color, computer vision would resolve each and every pixel accurately. Doctors can use this model to have assistance in disease identification. Also other users can also get advantage of this model as a type of routine checkup.

**RESULTS**

Usually, pink nails are indicators of good health. But, certain color of nails indicates certain diseases, for example:

* A faded pink color of the nails can be an indicator of anemia, heart failure, malnutrition, and liver disease.
* Conditions of white nail with dark edges can be a sign of serious problems with the liver, such as hepatitis.
* The yellow color indicates a fungus infection. If the infection is worse, the nail becomes thicker and brittle. Sometimes, yellow nails indicate a serious condition such as thyroid disease, lung, diabetes, or psoriasis.
* Lack of oxygen can cause the nails turn blue. However, infection of the lungs such as pneumonia or heart abnormalities may also be the cause.
* Corrugated nails surface is the early signs of psoriasis or arthritis, and is usually accompanied by a waning of nail color. Nail conditions that change color to red brown are also commonly encountered.
* If longitudinal black stripe is found in the middle of the nail. That could be an early symptom of melanoma, the most severe type of skin cancer.

The results of such analysis can be useful in the medical field and other branches of science such as biometrics in which fingernail analysis is treated as transient biometrics that can be used once and changes over a period of time making it secure as well as useful.

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