Chapter 6

Nakhasys:
An ML–Based Disease Diagnosing Application

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ABSTRACT

It is necessary for human beings to undergo regular health check-ups, which all of us tend to ignore. As a result, late diagnosis of disease usually leads to ineffective treatment. To cater to this problem, the authors have developed a platform called Nakhasys, which is a smart AI-based application developed to diagnose a set of diseases like jaundice, anemia, etc. with the help of analysis of nail segmentation. This is based on the ancient Indian practice of Ayurveda. Initially a dedicated Android application will allow users to click a picture of their nails, which will be sent to the virtual machine hosted in Microsoft Azure cloud. This picture will be validated through Azure Custom Vision API. After successful validation, the same image will be sent to the custom ML model for further detection of the nail color, which will allow the application to predict the possible set of diseases. This diagnosis will alert the individual.

INTRODUCTION

Machine learning (ML) is used to automate the diagnostic modeling. Ml based system can learn from the historical data to identify patterns and make the automated decisions. Complex mathematics may be used in background to handle the huge data as faster as possible by Mente and Marulkar (2017), Gandhat et al. (2016), Madaan

and Goyal (2020), Anjali. (2020) and Fawcett, Linford, and Stulberg (2004). ML can be used as an extra capability of computers as discussed by Ananth (2020). The ML model is used for validation on sample data by Ananth (2020) using null hypothesis as ML uses an iterative learning from data until useful pattern is not found. Kraus & Drass (2020) proposed the algorithm for automatic nail detection in regular color images to reduce the influence of illumination and occlusion. In this method, the Histograms of Oriented Gradients (HOG) used the Support Vector Machine as a classifier. By Kraus & Drass (2020) With time-to-time detection of nails we can treat the disease more effectively as we have to train our AI based application through machine learning and deep learning concepts and with timely detection we can collect more data which helps in better treatment of the disease by Funde and Thepade (2016), Sharma and Tanwar (2020, 2021, 2011), and Pathak et al. (2020).

LITERATURE REVIEW AND EXISTING SYSTEM

This section is used to present the survey or background methods of systems which are based on nail image analysis for different disease detection are given below.

- Hardik and Shah (2012) proposed a method for extracting a section of a known image using color processing and palm image were used for analysis and experimental work. Noriaki et. al. in 2013 used fingernail detection using hand images including pal and distribution density, color continuity has been used to improve accuracy by Mente and Marulkar (2017).
- Sharma and Shrivastava (2015) worked on nail color and texture and segmented images on the basis of texture and further used for analysis on the basis of color and texture.
- In 2016, Gandhat et al. proposed the method for analysis of nail images using Haar Transforms Matrix to generate features. Row mean method has been used to reduce feature vector and then compare a query feature vector stored in template dataset using similarity measures like MSE, absolute difference. And then they find out matching and calculate GAR (Genuine acceptance ratio) and produced result.
- The early stage disease detection system which process nail image has been proposed by Indi and Gunge in 2016 to extract the feature from sample data. The Weka tool has been used for training dataset using patients nail images. Using color detection algorithm and decision tree by C4.5 used for experimental work and achieved 65% results which correctly matched with training data set by Indi and Gunge (2016) and Singal and Arora (2015).

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