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Malnutrition Analysis Using Skin and Nails Images Based on Machine Learning

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ABSTRACT: In this project we are elaborating concept of disease detection of human body using nail image of human fingers and analyzing data from the image of basic of nail color. In this project the procedure of disease detection is as follows: The input to the system is a person nail image. The system will process an image of nail and extract feature of nail which is used for disease diagnosis. Here, first training data is prepared using Machine Learning from nail image of patient of specific disease. A feature extracted from input nail image is compared with training data set. In this project we found that color feature of nail image are correctly matched with training set data.

KEYWORDS: Skin Disease and Nail Disease Detection, Machine Learning, Malnutrition, Disease Detection.

I. INTRODUCTION

Malnutrition Inadequate nutrition leads to poor health. Bland diets (sometimes called thin-sliced diets) are described as those that fail to provide an adequate intake of nutrients or on which they contribute to malnutrition. Because of the mix of nutrients that it contains, the composition may be calories, protein, sugars, fat, or minerals; even contains vitamins and minerals. When nutrients are missing, it is called undernourishment; when nutrients are there, it is called overdose. Most commonly malnutrition is used to mean a lack of calories, calcium, or micronutrients. Lack of diet early in pregnancy or before the two-year mark can have long-or short-term effects on children's health and brain growth. (undernourishment, shortness or chronic hunger, can result in) coarse, stunted growth, dry and emaciated skin, bloated and swollen thighs, and distended abdominal Since they don't eat well, malnourished people are most commonly ill and often cold. Symptoms are associated with specific micronutrient deficiencies.

Image processing may be a technique for converting an image into digital form and for performing an action. The final 5 types of images are called Image 5 Formats, that is, flexible image formats, specific graphic interchange formats, switchable image formats, and row images. 16 million different colours are likely to be perceived; while the visual acuity of the human eye limits it to almost the same number of distinct individuals. So, when you apply fingernail polish to a process using PC might be more accurate than looking at it with the naked eye. To observers with relatively high resolution, nearby frequencies, it can appear as though humans have blurry vision. However, PC vision may perceive detail per aspect appropriately. Pathology looks at a lot of areas that are more sophisticated and methodical, patients should be offered in the scheme, because the process is mechanical. The nail writing will be helpful to the patient so they don't have to have to be in the flesh, because if the doctor isn't selling their appointment then their nail will provide the answers.

It can tell how sick the person is by the patient's skin colour. It's specialised on human fingernail colour analysis. Several diseases, by looking at the fingernails, can be determined. where a picture of a person is recorded in the system To upload a captured image, a selected area of interest is found from the nail in space in the file and manually entered into the region box. In other words, the room for deciding on nail colour choices is then handled more finely in order to derive colour possibilities from nails. The mauve nail-like colouring is perfect for making statements about disease



prediction is to be used by students who are really sympathetic to others in their community. To a certain extent, the method helps their progression in the early stages.

II. LITERATURE SURVEY

[1] Cynthia Hayat, Barena Abian, "The Modeling of Artificial Neural Network of Early Diagnosis for Malnutrition with Backpropagation Method", 2018, this research consisted of 2 phases, which were training phase in which it generated ANN weight by using feed-forward of activation function, and testing phase in which the result of the previous stage was tested to obtain output.

[2] Bambang Lareno, Liliana Swastina, Husnul Maad Junaidi, "IT Application to Mapping The Potential of Malnutrition Problems", 2018, this paper focus to find a model of IT application that can be used for mapping the potential of malnutrition problems and the rate of utilization of posyandu. The result, the cross-platform information model developed is a web-based core system, with a mobile application-based support system.

[3] Anutosh Maitra, Rambhau Eknath Rote, Nataraj Kuntagod, "Managing Child Malnutrition via Digital Enablement: Insights from a Field Trial", 2017, in this paper that malnutrition management requires an integrated digital approach – that not only looks at making data available, but also establishing relationships between various program indicators, overlaying that with socio-economic conditions of the region and family demographics.

[4] Sri Winiarti, Sri Kusumadewi, Izzati Muhimmah, Herman Yuliansyah, "Determining The Nutrition of Patient Based on Food Packaging Product Using Fuzzy C Means Algorithm", 2017, the result of the decision will give 3 clusters on nutritional status is good nutrition, malnutrition and better nutrition. Mobile apps are used as a reminder of the nutritional value or ingredients contained in the packaging of food products while consuming food. The result of system testing for application of FCM algorithm in this mobile application obtained validation of 80%.

[5] Archana Ajith, Vrinda Goel, "Digital Dermatology Skin Disease Detection Model using Image Processing", 2017, This paper proposes a skin disease detection method based on image processing techniques. This method is mobile based and hence very accessible even in remote areas and it is completely noninvasive to patient's skin. The patient provides an image of the infected area of the skin as an input to the prototype.

[6] Kyamelia Roy, Sheli Sinha Chaudhuri, "Skin Disease detection based on different Segmentation Techniques", 2019, The outer integument of the human body is skin. The skin pigmentation of human beings varies from person to person and human skin type can be dry, oily, or combination. Such a variety in the human skin provides a diversified habitat for bacteria and other microorganisms. Melanocytes in the human skin, produces melanin which can absorb harmful ultraviolet radiation from sunlight which can damage the skin and result in skin cancer.

[7] Sambit BAKHSHI, "Deep convolutional neural network for face skin diseases identification", 2019, In this paper, author propose an automated facial skin disease method using a pre-trained deep convolutional neural network (CNN). In the beginning, the images are regenerated using some pre-processing image techniques in order to augment the size of our database, collected from different sources and resized to fit the network. These images are then used for training and validation purposes.

[8] Tanzina Afroz Rimi, "Derm-NN: Skin Diseases Detection Using Convolutional Neural Network", 2020, This paper is a sandwich between picture handling strategies and machine learning. Where picture preparation has produced the picture which is being utilized by CNN to arrange the classes. The preparation information comprises five classes of the skin gives that have been talked about above. We have 73% precision by actualizing our framework on the dermnet dataset of 500 pictures of various diseases. This will end up being an incredible achievement if the further enhancements are finished utilizing a bigger measure of the dataset.

[9] Shih-Hsiung Lee, Chu-Sing Yang, "An Image Preprocessing Method for Fingernail Segmentation in Microscopy Image", 2019, this paper proposes an image preprocessing method, trying to segment different parts of nail: lunula and nail plate. In the data of poor image quality, the lunula may not be presented clearly. In order to maintain the nail image

quality, this paper uses microscope to capture nail image. Besides lunula and nail plate, the nail details, such as free edge, cross striation and longitudinal striation, can be seen clearly in the image captured by microscope.

[10] Laura Safira, BudhiIrawan, CasiSetianingsih, K-Nearest Neighbour Classification and Feature Extraction GLCM for Identification of Terry’s Nail, 2019, The dataset in this study is taken from Google and also some of the paper that discusses the nail abnormalities. Nail pictures obtained are different from any source. Therefore, the image should be cut just one finger. Because when detecting terry’s nail, the disorder usually occurs in all the nails. So we can use one finger. The photos of a nail that has been doing the extraction characteristics using GLCM then will be done using KNN classification. In this case the class will be divided into two classes, healthy and Terry's.

[11] Hongfeng Li a, Yini Pan b ,Jie Zhao c , Li Zhang d, “Skin disease diagnosis with deep learning: A review”, 2021, In this paper, author present a review on deep learning methods and their applications in skin disease diagnosis. We first present a brief introduction to skin diseases and image acquisition methods in dermatology, and list several publicly available skin datasets. Then, we introduce the conception of deep learning, and review popular deep learning architectures and popular frameworks facilitating the implementation of deep learning algorithms.

III. PROPOSED SYSTEM

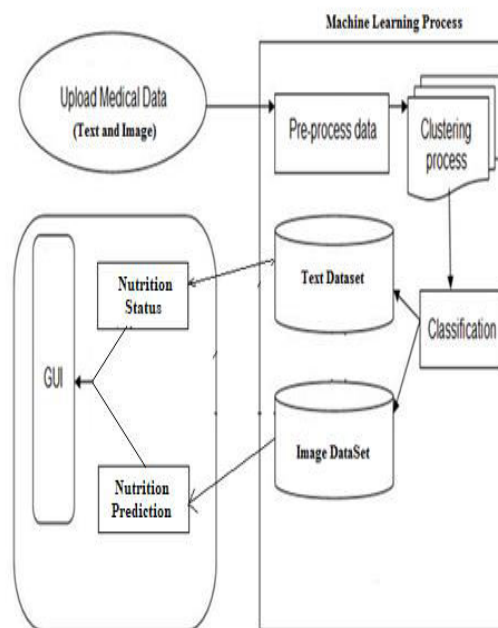


Fig 1. Block diagram

The main application of this system is to government to minimize malnutrition percentage.

Patient module:

Upload malnutrition image in this module by patient to check the diseases. Here patient will get the Patient health is critical or not menace disease without any doctor suggestion.

Admin module:

Here admin train the image dataset based on medical related backend for analysis and comparison of upcoming patient images.

Processing module:

Once get the image from patient then proposed algorithm apply the detection process on that image to find out the malnutrition patient or not.

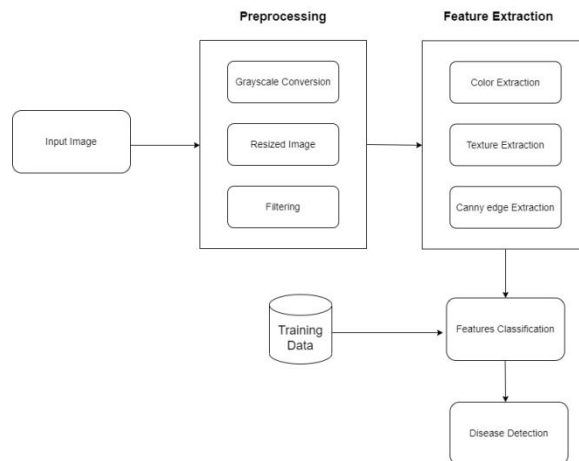


Fig 2. System Architecture

Algorithm:

Convolution Neural Network(CNN) Algorithm:

The structure of CNN algorithm includes two layers. First is the extraction layer of features in which each neuron's input is directly connected to its previous layer's local receptive fields and local features are extracted. The spatial relationship between it and other features will be shown once those local features are extracted. The other layer is feature_map layer; Every feature map in this layer is a plane, the weight of the neurons in one plane are same. The feature plan's structure make use of the function called sigmoid. This function known as activation function of the CNN, which makes the feature map have shift in difference. In the CNN each convolution layer is come after a computing layer and it's usage is to find the local average as well as the second extract; this extraction of two feature is unique structure which decreases the resolution.

- Step 1: Select the dataset.
- Step 2: Perform feature selection using information gain and ranking
- Step 3: Apply Classification algorithm CNN
- Step 4: Calculate each Feature fx value of input layer
- Step 5: Calculate bias class of each feature
- Step 6: The feature map is produced and it goes to forward pass input layer
- Step 7: Calculate the convolution cores in a feature pattern
- Step 8: Produce sub sample layer and feature value.
- Step 9: Input deviation of the kth neuron in output layer is Back propagated.
- Step 10: Finally give the selected feature and classification results.

IV. CONCLUSION

In presented system, system analyzes the human nail and gives probable disease for person including healthy case. This model gives more accurate results than human eye like subjectivity and resolution power. This may give more accurate result for identifying human health condition using machine learning algorithm.



V. ACKNOWLEDGEMENT

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