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Skilled Drill of Undernourishment Public through Machine Learning Using CNN Action

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A B S T R A C T

Malnutrition is a complex topic that draws the attention of the world and many researchers. Nutrition is vital for the health of all ages. The Health and nutritional status of children is one of the benchmarks that can indicate the nutritional condition of the wider community because of the pattern of parenting in many communities more priority to toddlers. Malnutrition does not occur suddenly but begins with insufficient weight gain. Changes in toddler weight within a certain time are an early indication of child nutritional circumstances. In this project system will abstract color feature of human nail image for disease prediction. The system is focusing on image recognition on the basis of human nail color analysis. Much disease could be identified by investigating nails of human hand. In this system human nail image is captured using camera. Captured image is uploaded to our system and region of interest from nail area is selected from uploaded image manually. The selected area is then administered further for extracting features of nail such as color of nail. This color feature of nail is matched using simple training data set for disease prediction .In this way the system is useful in prediction in their initial stages.

Keywords:nutrition, nail, image

1. Introduction

In presented system, system analyzes the human nail and gives probable disease for person including healthy case. Here, for disease prediction nail color (average RGB) value used as a nail feature. 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.

This system will extract color feature of human nail image for disease prediction. The system is concentrating on image recognition on the basis of human nail color analysis. Many diseases could be detected by analyzing nails of human hands. In this system human nail image is input from dataset. Uploaded image is given to our system and region of interest from nail area is selected from uploaded image manually. The selected area is then processed for extracting features of nail such as color of nail. Then this color feature of nail is matched using simple matcher algorithm for disease prediction. In this way the system is useful in detection of diseases in their early stages. In literature study here mentioned some of the diseases with its related color change in nails.

In proposed system patient module specifies the Attributes of the Patient that describe and identify the Patient who is the subject of a Study. This Module contains Attributes of the Patient that are needed for construal of the Composite Instances and are common for all Studies performed on the Patient & in admin module we train the image dataset built on medical related backend for analysis and comparison of upcoming patient images. Admin segment allows system superintendent to set up back-end of the system and implement basic system configuration, mainly definition of predefined drop-down fields, definition of classes time schedule, etc. & in treating module Once get the image from patient then proposed CNN algorithm apply the detection process on that image to find out the malnutrition patient or not. Processing follows when data is collected and translated into working material. Usually

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performed by a data scientist or team of data scientists, it is important for data dispensation to be done correctly as not to negatively affect the end artifact or data output.

1.1 The four important layers in CNN are:

- Convolution Layer :
  This is the first step in the process of extracting valuable features from an image. A convolution layer has several filters that perform the convolution operation. Every image is considered as a matrix of pixel values.

- ReLU layer
  ReLU stands for the rectified linear unit. Once the feature maps are extracted, the next step is to move them to a ReLU layer. ReLU performs an element-wise operation and sets all the negative pixels to 0. It introduces non-linearity to the network, and the generated output is a rectified feature map.

- Pooling Layer
  Pooling is a down-sampling operation that reduces the dimensionality of the feature map. The rectified feature map now goes through a pooling layer to generate a pooled feature map. The pooling layer uses various filters to identify different parts of the image like edges, corners, body, feathers, eyes, and beak.

- Fully Connected Layer
  The flattened matrix is fed as input to the fully connected layer to classify the image. After flattening, the flattened feature map is passed through a neural network. This step is made up of the input layer, the fully connected layer, and the output layer. The fully connected layer is similar to the hidden layer in ANNs but in this case it's fully connected. The output layer is where we get the predicted classes.

1.2 Part of Nail

The matrix claw, keratogenous membrane, nail matrix, the tissue upon which the nail lie, the part of the nail bed that extends beneath the nail root and it contains nerves, lymph and blood vessels. The matrix is responsible for production of the cells that become the nail plate. The width and thickness of the nail plate is determined by size, length, and thickness of the matrix, while the shape of the fingertip determines if the nail plate is flat, arched, or hooked. The matrix will endure on grow as long as it gets nutrition and remains in a healthy condition. As new nail plate cells are incubated, they emerge from the matrix round and white will to push older nail plate cells forward; and this way yet older cells become crimed, flat, and translucent, making the pink color of the capillaries in the nail bed below visible.

The lunula is the observable part of the matrix, the whitish crescent-shaped base of the visible nail. The lunula is largest in the thumb and often absent in the little finger. The nail bed is the skin, which under the nail plate. Like all skin, it is consist of two types of tissues: the deeper dermis, the living tissue fixed to the bone which contains capillaries and glands, and the superficial epidermis, the 2 layer just beneath the nail plate which moves forward with the plate.

The epidermis is attached to dermis by a small longitudinal "grooves" known as the matrix crests or crests of nail matrix (cristae matric is unguis).As we age, the plate grows thinner and these ridges become obvious in the plate itself. The nail sinus (sinus unguis) is where the nail root is;i.e. the base of the nail underneath the skin. It originates from the actively growing tissue below, the matrix. The nail plate (corpus unguis) is the hard part of the nail, made of translucent keratin protein. Several layers of dead, compacted cells cause the nail to be strong but flexible. Its (transverse) shape is determined by the form of the underlying bone. In common usage, the word nail often refers to this part only.

The free margin (margo liber) or distal edge is the anterior margin of the nail plate corresponds to the abrasive or cutting edge of the nail. The hyponychial (informally known as the "quick") is the epithelium located beneath the nail plate at the junction between the free edge and the skin of the fingertip. It forms a seal that protects the nail bed. The onychodermal band is the seal between the nail plate and the hyponychium. It is just under the free edge, in that portion of the nail where the nail bed ends and can be recognized in fair-skinned people by its glassy, greyish colour. It is not visible in some individuals while it is highly prominent on others.

1.3 Part of Skin

In assigning health priorities, skin diseases are sometimes thought, as small-time players within the worldwide league of illness compared with diseases that cause significant mortality, such as HIV/AIDS. However, skin problems are the most common diseases generally seen in medical aid settings in tropical areas, and in some regions where transmissible diseases like tinea imbricata are endemic, they become the predominant exposition. Although mortality rates are generally lower than for other conditions, people's needs for effective remedies for skin conditions should be met for a number of important reasons.

First, skin diseases are so common and patients present in such large numbers in medical care settings that ignoring them isn't a viable option. Children, especially, tend to be affected, adding to the burden of disease among an already vulnerable group. Second, morbidity is significant through disfigurement, disability, or symptoms such as intractable itch, as is the reduction in quality of life. Third, the relative economic cost to the families of treating even trivial skin complaints limits the conduction of therapies. Generally, families must meet such costs from an overstretched household budget, and such expenses in turn reduce the capacity to purchase such items as essential food. Lastly, checking the skin for signs of disease is an important concept for a wide range of illnesses, such as leprosy, yet a basic knowledge of the simple features of disease whose presenting signs occur within the skin is usually lacking at the first care level.

The above discussed image processing and deep learning algorithms are used to efficiently classify the diseases. Major advantage of the system is the saving of time and effort involved in feature engineering. CNNs learn features on their own. Hence skin diseases can be diagnosed using CNN and also be classified using the same. Using advanced computational techniques and large dataset, the system can match the results of a dermatologist thus improving the quality standards in the area of medicine and research.

The Proposed methodology is an effective tool which can analyze the people input skin disease to predict skin disease. In this proposed system, hybrid architecture with image processing and machine learning techniques are used to predict type of disease with promising accuracy in a short period of time. The image processing phase invokes preprocessing, segmentation, feature extraction steps. The machine learning phase invokes 3 steps: processing, training and detection steps.

The proposed system is able to detect the skin disease with promising results combining computer vision and machine learning techniques. It can be used to help people from all over the world and can be used in doing some productive work. The tools used are free to use and are available for the user, hence, the system can be deployed free of cost. The application developed is light-weight and can be used in machines with low system specifications. It has also a simple user interface for the convenience of the user. The image processing and machine learning algorithms were successfully implemented.

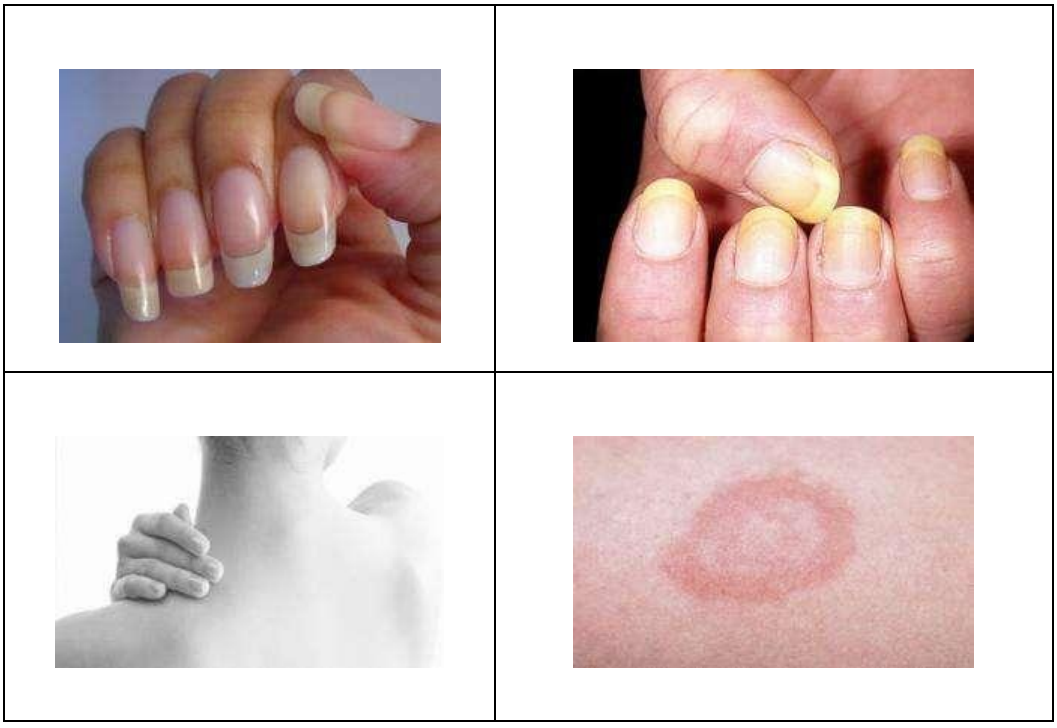

Fig. 1 –Data Sample

2. System Design & Architecture

In this project we have a tendency to square measure elaborating thought of sickness detection of body mistreatment nail image of human fingers and analyzing knowledge from the image of basic of nail color. During this project the procedure of sickness detection may be as follows: The input to the system is a person nail image. The system can method a picture of nail and extract feature of nail that is employed for sickness identification. Here, 1st coaching knowledge is ready mistreatment Machine Learning from nail image of patient specific sickness. A feature extracted from input nail image is compared with coaching knowledge set. During this project we have a tendency to found that color feature of nail image is properly matched with coaching set knowledge.

In this project system will extract color feature of human nail image for disease prediction. The system is focusing on image recognition on the basis of human nail color analysis. Much disease could be identified by analyzing nails of human hand. In this system human nail image is captured using camera. Captured image is uploaded to our system and region of interest from nail area is selected from uploaded image manually. The selected area is then processed further for extracting features of nail such as color of nail .This color feature of nail is matched using simple training data set for disease prediction .In this way the system is useful in prediction in their initial stages.

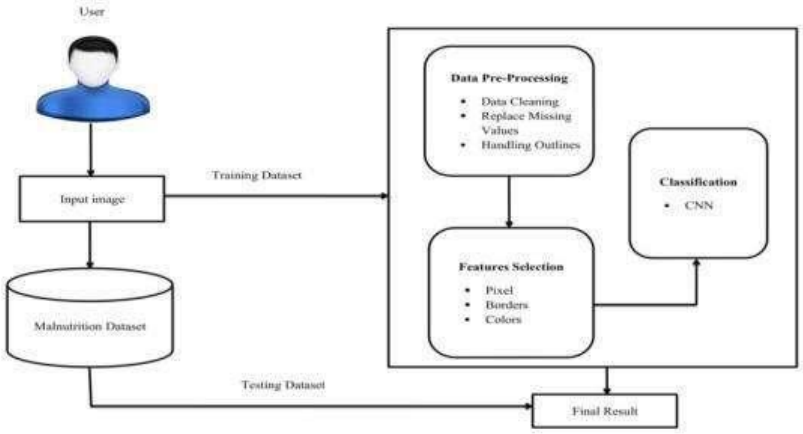

Fig.–Architecture Process

Input Image:-

User take the patient nail or skin image for perform the operation. The input image from the dataset is transformed into an integral image, implying the summation of pixel values in a recognized rectangular piece of image. The input element, having the "image" value in its type attribute, represents a graphical submit button, which is a regular image that when pressed, submits the form it belongs to. A special feature of image buttons is that, when the form is sent through them, the coordinates where the click has occurred are sent with the form too. This can be useful, for example, to allow users to select an area of the image while submitting the form. Nevertheless, authors must be aware that users with visual disabilities or un-supporting browsers may have a hard time trying to submit correctly the form.

Malnutrition Dataset:-

Malnutrition dataset is nothing but database which consist the all information of patient stored in details like that age, diseases, nail image, skin image. It also consist train dataset & testing dataset which perform the different operation like healthy & unhealthy nail image as well as healthy unhealthy skin images. Malnutrition dataset a training set is implemented to build up a model, while a test (or validation) set is to validate the model built. Data points in the training set are excluded from the test (validation) set. Usually, a dataset is divided into a training set, a validation set (some people use 'test set' instead) in each iteration, or divided into a training set, a validation set and a test set in each iteration & In Machine Learning, we basically try to create a model to predict the test data. So, we use the training data to fit the model and testing data to test it. The models generated are to predict the results unknown which are named as the test set. As you pointed out, the dataset is divided into train and test set in order to check accuracies, precisions by training and testing it on it & useful for perform training dataset to calculate summary & final result.

Processing system:-

Processing system build up our prediction algorithm and to adjust the weights on the neural network. Our algorithm tries to tune itself to the quirks of the training data sets. In this phase we usually create multiple algorithms in order to compare their performances during the Cross-Validation Phase. Each type of algorithm has its own parameter options (the number of layers in a Neural Network, the number of trees in a Random Forest, etc.) For each of your algorithms, you must pick one option. That's why you have a training set. In training dataset you have the complete training dataset. You can extract features and train to fit a model and so on. Training set is the one on which we train and fit our model basically to fit the parameters whereas test data is used only to assess performance of model. Training data's output is available to model whereas testing data is the unseen data for which predictions have to be made. A data processing system is a combination of machines, people, and processes that for a set of inputs produces a defined set of outputs. The

inputs and outputs are interpreted as data, facts, information etc. depending on the interpreter's relation to the system. A term commonly used synonymously with data or storage (codes) processing system is information system.

Data pre-processing:-

Data preprocessing is a process of preparing the raw data and making it suitable for a machine learning model. It is the first and crucial step while creating a machine learning model. When creating a machine learning project, it is not always a case that we come across the clean and formatted data. And while doing any operation with data, it is mandatory to clean it and put in a formatted way. So for this, we use data pre-processing task. A real-world data generally contains noises, missing values, and maybe in an unusable format which cannot be directly used for machine learning models. Data preprocessing is required tasks for cleaning the data and making it suitable for a machine learning model which also increases the accuracy and efficiency of a machine learning model. Images come in different shapes and sizes. They also come through different sources. For example, some images are what we call “natural images”, which means they are taken in color, in the real world. Taking all these variations into consideration, we need to perform some pre-processing on any image data. RGB is the most popular encoding format, and most “natural images” we encounter are in RGB. Also, among the first step of data pre-processing is to make the images of the same size. Let’s move on to how we can change the shape and form of images.

3. Result & Discussion

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.

Image is captured by digital camera or mobile .This image is considered as input image this image is in any format like jpeg .For processing first we have to crop that image in proper block to extract it’s features.

Then by extracting it’s features find out it’s RGB value that is Red, Green & Blue plane value with the help of GUI we are creating the buttons are as follows :

- Select Image
- Calculating Parameter
- Classify
- Exit

Data collection is defined as the ongoing systematic collection, analysis, and interpretation of health data necessary for designing, implementing, and evaluating public health prevention programs.

Data collection in healthcare allows health systems to create holistic views of patients, personalize treatments, advance treatment methods, improve communication between doctors and patients, and enhance health outcomes.

Fig. 3–Image Process with 4 Stage

Fig. 4 - Nutrition Prediction

4. Future Scope

- The proposed system scope is widely used to the medical sector.
- This system is use to the any patient to analysis the DISEASE for identify specific disease patient.
- To use the government for analysis the patient health.
- To use the medical camp for exactly disease predication of patient.
- In future this system will enhance with different algorithm and different input parameter categories with other enhance system, and its capacity of the system will increase with different application use.

5. Limitation of Research Work

- Sometimes not give exactly output due to the image processing
- Already all data will train dynamically not added any new diseases.
- We working on limited diseases detection based on skin and nails analysis to predict the malnutrition's of patient.

REFERENCES

D.Thangamani, P.Sudha (2014), "Identification Of Malnutrition With Use Of Supervised Datamining Techniques –Decision Trees And Artificial Neural Networks", "International Journal Of Engineering And Computer Science", ISSN:2319-7242, Volume - 3 Issue -9 September, 2014.

DewiIka Sari & Sari WidyaSihwi(2014), "Ontology Model In Pediatric Nutrition Domain", "International Conference on Information Technology Systems and Innovation (ICITSI) 2014", ISBN: 978-1-4799-6526-7.

A.SaiSabitha, DeeptiMehrotra, AbhayBansal (2014), "Similarity Based Convergence of Learning Knowledge Objects and Delivery Using Agglomerative Clustering", "Journal of Information Technology and Application in Education" Vol. 3 Iss. 1, March 2014.

Ashvini Kale, NishaAuti (2015), "Automated Menu Planning Algorithm for Children: Food Recommendation by Dietary Management System using ID3 for Indian Food Database", "Procedia Computer Science Elsevier B.V. This is an open access article under the CC BY-NC-ND license 2nd International Symposium on Big Data and Cloud Computing (ISBCC'15)", DOI: 10.1016/j.procs.2015.04.

Aruna.S, Sudha.P (2015), "A Survey:"MalnutritionForWomen", "International Journal on Computer Science and Engineering (IJCSE)", ISSN : 0975-3397 Vol. 7 No.8 Jun 2015.

PiyatidaWatcharapasorn and NilubonKurubanjerdjit (2016), "The Surgical Patient Mortality Rate Prediction by machine learning algorithms","2016 13th International Joint Conference on Computer Science and Software Engineering (JCSSE)©2016 IEEE", ISBN: 978-1-5090-2033-1.