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Detection of Skin Cancer Using Convolutional Neural Network

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Abstract - *Malignancy membrane cancer detection at an early stage to be present-day crucial for an effectual treatment. Recently, it is well known that, the supreme dangerous form of skin cancer among the other types of skin cancer is malignant because it's considerable more likely to spread to other fragments of the body if not established and salted early. The non-invasive medical computer vision or medical image processing plays increasingly significant role in the clinical finding of different diseases. Such procedures provide an automatic doppelgänger analysis implement for a truthful and fast evaluation of the laceration. The steps involved in this homework are collecting dermoscopy image database, preprocessing, segmentation using thresholding, statistical feature extraction using Gray Level Co-occurrence Conditions (GLCM), Asymmetry, Border, Color, Diameter, (ABCD) etc., mouth collection using Primary component breakdown (PCA), calculating total Dermoscopy Score, and then classification using CNN (Convolutional Neural Networks) Algorithm. Results show that the accomplished classification truth is 92.5%.*

Key Words: **Melanoma skin cancer, Image processing, Features, Principal component analysis, Gray Level Co-occurrence Conditions, Convolutional Neural Networks.**

1. INTRODUCTION

Skin malignant is a deadly disease. Skin has three basic layers. Membrane cancer begins in the remotest layer, which is made up of first sheet squamous cells, second layer basal cells, and innermost or third deposit melanocytes cell. Squamous cell and basal jail cell are now and then called non-melanoma malignancies. Non-melanoma skin malignant permanently responds to behavior and rarely spreads to other skin fleshy tissue. Malignant is more dangerous than furthermost other types of skin cancer. Unknown it is not distinguished at inauguration stage, it is hurriedly invading bordering tissues, and spread on the technique to other parts of the body. Prescribed diagnosis method to skin malignant detection is Biopsy method. A surgery is a method to remove a piece of material or a sample of cells from persevering body, so that it can be analyzed in a laboratory. It is rough method. Biopsy Process is time-consuming for persevering as well as doctor because this one takes a lot of time for testing. Biopsy be located done by take away skin tissues (skin cells) and that sample undergoes series of laboratory testing. There is a possibility of spreading of disease into supplementary part of body. It is more risky. Deportment in mind all the personal belongings mentioned above, so Skin cancer detection consuming CNN is proposed. This methodology uses a digital image processing technique, and CNN for classification.

2. PROPOSED SYSTEM

We will expenditure some techniques are indispensable to the commission of medical image mining, skin Field Segmentation, Data Processing, Article Extraction, Cataloging using the neural network. Changed learning experiments were completed on two different data sets, fashioned by means of feature mixture, and CNN proficient with changed parameters; the domino effect be located compared and reported.

3. EXISTING SYSTEM

Medical numbers mining is one of the major issues fashionable this modern world. Medical difficulties be located often at each one anthropological being. Cancer is one of the most treacherous diseases an anthropological can ever have. Skin cancer is one of them. Skin cancer is an infection that take place due to the uncontrolled jail cell development in tissues of the skin. It is very challenging to detect it in its early stages in place of its symptoms look as if only in the advanced stages.

4. SYSTEM ARCHITECTURE

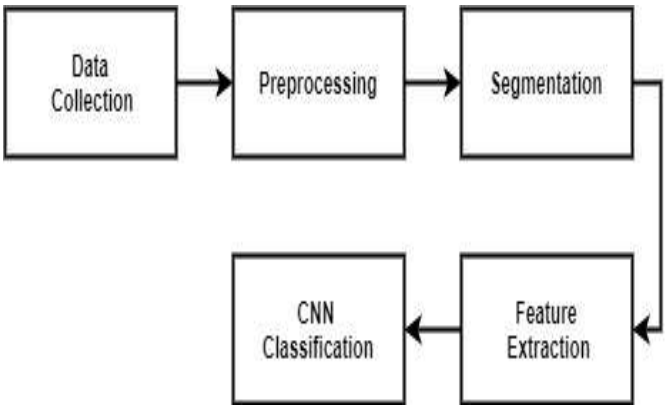


Fig -1 System Architecture

4.1 Data Collection

Data collection is a method of gathering, and measuring information for predict future trends to make more effective decisions. Data collection is used increased productivity and profits, better decisions, more accurate and reliable.

4.2 Processing Techniques

Preprocessing is the technique that converting raw data into an understandable format. In that noise remove, edge detection, thresholding the image and binary to gray conversion. In preprocessing reduce complexity to make simplicity of that image In this process, convert the image such as RGB to Gray and RGB to HSI are done and RGB, Gray and HSI color model is used as an input images for feature extraction module.

4.3 Segmentation

Segmentation is the process divide into multiple segments. Segmentation techniques are thresholding method, edge detection based techniques, clustering based techniques, watershed based techniques, etc. Segmentation plays an important role in image processing it separation of a large image into several parts. Segmentation process depend on various features like color or texture that is contained in the image.

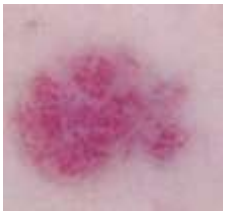
4.4 Feature Extraction

Feature Extraction is the most important step which can be used to analyze and explore the image properly. It is a process reduce the number of features and creating new features from existing ones in dataset. The feature extraction is based on the ABCD rule, the ABCD stands for Asymmetry, Border structure, Color variation, and Diameter of that image. At last step use CNN model and detect the skin cancer.

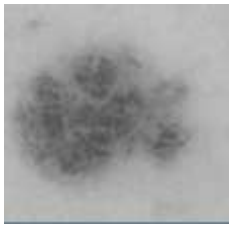
4.5 Classification

Classification algorithms typically employ two phases of processing: training and testing data. Image classification is a set of target classes (objects to identify in images), and train a model to recognize them using labeled. Convolutional Neural Networks (CNN or ConvNet) is used for image recognition and classification.

The thresholding method is used in this paper. First the original image is converted to grayscale, then the threshold method is applied, show in the following images.



(a) Original Image



(b) Grayscale Image

(c) Threshold Image

5. CONVOLUTIONAL NEURAL NETWORK (CNN) ALGORITHM

Convolutional Neural Networks (CNN or ConvNet) is used for image recognition and classification. This is the supervised learning method and unpredictable feed forward neural systems. Convolutional Neural Networks can directly learn the relationship between the raw pixel data and the class labels through end to end learning. The architecture of hidden layers in a CNN algorithm is different. The neurons in a layer is not connected to all neurons of the preceding layer; rather, they are connected to only a small number of neurons. This model was trained with large amount of data. This technology has the potential to improve the classification accuracy of conventional clinical images.

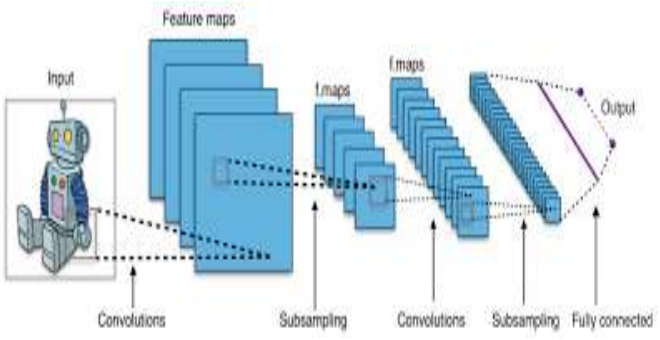


Fig -2: CNN Algorithm

Each pixel contains 8 bits (1 byte).The network does not learn colors. Since computers understand only 1's and 0's, the colors' numerical values are represented to the network in binary terms. The Convolution Operation elements are input image, feature detector and feature map. Feature map are use the reducing the size of input image.

Convolutional Neural Networks have following layers:

1. Convolution
2. ReLU Layer
3. Pooling
4. Fully Connected

6. CONCLUSION

In this development, different segments of image processing be located applied on skin Nodules. From this different image handing out performances, the incoherent filter will provide the competent denoising. Segmentation completed by marker based watershed algorithm, gives various state of image. GLCM is used to extract the different features of image too which takes less time for generating the result. These results are passed over and done with CNN Classifier, which pigeon-holes the nodules as benign or malignant. CNN classifier arrange for 92.5% accuracy.

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