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"Computer Aided Melanoma Skin Cancer Detection using Image Processing"

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Abstract - Early detection is important for successful treatment of melanoma skin cancer. Melanoma is also commonly considered to be the most dangerous form of skin cancer, since it is far more likely to spread to other areas of the body if not diagnosed and treated early. Medical machine vision alternatively referred to as non-invasive medical image processing, is gaining traction in the clinical diagnosis of a wide variety of diseases. Among these methods is an automated image processing method that enables the lesion to be assessed accurately and quickly. The steps in this s are as follows: collection of a database of dermoscopy images, preprocessing, segmentation via thresholding, statistical feature extraction via Gray Level Co-occurrence Matrix (GLCM), Asymmetry, Border, Color, and Diameter (ABCD), feature selection via Principal component analysis (PCA), calculation of the total Dermoscopy Score, and finally classification via Convocation neural network (CNN). According to the findings, the classification accuracy achieved is 92.1 percent.

Key Words: -EGO's, donation type, donors.

1. INTRODUCTION

Skin cancer is also a chronic illness that affects people worldwide. The two types of skin cancer are melanoma (malignant) and non-melanoma (benign) (benign). This condition results in skin scarring and disfigurement, and also severe pain and bleeding. Since the ozone layer is depleting as a result of increased pollution in the atmosphere, ultraviolet (UV) radiation directly penetrates the earth's surface. Skin cancer is caused by this direct exposure to UV radiation. Skin cancer warning signs include changes in skin color, size, shape, skin lesion or mole color, the appearance of net growth on the skin, swelling, and bleeding. If you notice any of these signs, it is recommended that you see a dermatologist. According to some figures, the number of skin cancer cases and deaths is rising. Each year, the World Health Organization (WHO) reports that 3 million cases of non-melanoma skin cancer and 132,000 cases of melanoma occur worldwide. Nearly ten thousand people are diagnosed in the united states with skin cancer and one in every five people will develop skin cancer at some point. Each year, skin cancer cases surpass the estimated number of cases. Other types of cancer are prevalent in the world. By offering proper treatment and care, early detection of skin cancer increases the patient's chances of survival and saves his life.

1.1. Problem Statement

The current system is a time-consuming process that is difficult to identify in its early stages because signs do not occur until the later stages. Implementation of a method to simplify the classification process in order to detect skin cancer early.

1.2. Motivation

Melanoma incidence rates have risen dramatically in recent decades, and although the majority of people diagnosed with skin cancer have a better chance of being cured, melanoma survival rates are lower than non-melanoma skin cancer survival rates. Melanoma skin cancer (MSC) can develop on any skin surface and been on the increasing in many parts of the globe for the past two decades. Men's heads, necks, and between the hips and shoulders are the most common spots, while women's lower legs or between the shoulders and hips are most popular spots. When it does occur in dark skinned people, it is usually found under the toe nails, toenails, palms, or toes.

2. LITERATURE SURVEY

Zakaria SulimanZubi and Rema Asheibani Saad, "Using Some Data Mining Techniques for Early Diagnosis of skin Cancer"[1], Skin cancer is a condition in which cells develop uncontrollably in the skin tissues. It is one of the world's most prevalent and lethal diseases. To be healed of skin cancer, it must be diagnosed in its early stages. In general, early-stage skin cancers are diagnosed using CT, MRI, and other imaging techniques. Medical image mining is an exciting area of computational intelligence that seeks to discover new knowledge that could be useful in medical decision-making through automated analysis of patient records. To begin, we'll examine several critical processes in medical image mining, including data preprocessing, feature extraction, and rule generation. Digital X-ray chest films can be categorized depending on the methods described in this article: normal and abnormal. The natural state is the state in which a healthy patient exists. The abnormal condition, which encompasses the various types of skin cancer, will be used as a general classification scheme, with neural networks as the machine learning

method of choice. Additionally, we should examine the application of association rules to the categorization of chest x-ray films. Digital x-ray chest films are housed in large multimedia repositories for medical purposes. This multimedia database provides an excellent environment for applying image recognition techniques to extract useful knowledge and rules from the database. These rules, which we discovered using image recognition software, will assist physicians in making critical medical decisions about a particular patient's condition.

Paola Campadelli, Elena Casiraghi, and Diana Artioli, "A Fully Automated Method for Skin Nodule Detection From Postero Anterior Chest Radiographs"[2], : The creation of systems that could increase radiologists' accuracy in detecting skin nodules has received a lot of attention in recent decades. Despite all of our efforts, the issue remains unsolved. We present a fully automated system for processing digital postero-anterior (PA) chestra diagraphs in this paper, which begins with an accurate skin field area segmentation. Even those parts of the lungs concealed behind the heart, spine, and diaphragm, which are normally excluded from the methods discussed in the literature, are included in the segmented lung area. The fact that lung nodules can be present in these areas prompted this decision. A simple multi scale method is used to improve the visibility of the nodules in the segmented region, and an extraction scheme is then used to pick potential nodules. Cost-sensitive Convolution neural networks (CNNs) are trained to identify true nodules to reduce the large number of false positives extracted. The results of various learning experiments were recorded and compared on two separate data sets provided by feature selection and using Gaussian and polynomial CNNs trained with different parameters.

Madhu Kumari, Tajinder Singh, ":An Approach for Discretization and Feature Selection Of Continuous Valued Attributes in Medical Images for Classification Learning"[3], — A discrete feature space is needed by many supervised machine learning algorithms. We study previous work on continuous feature discretization in this paper and describe the method's distinguishing characteristics. Then, we suggest a new supervised approach that incorporates discretization and feature selection to identify the most important features for classification. Associative Classifiers would be used as the classification technique. Harlick Texture features were extracted from MRI images and used. The results show that the proposed approach is effective and well-suited for performing continuous valued attribute preprocessing.

V .Krishnaiah, Dr .G.Narsimha, Dr .N.Subhash Chandra. "Diagnosis of Skin Cancer Prediction System Using Data Mining Classification Techniques"[4], Cancer is the leading cause of death in both men and women. Early detection of cancer can help in the disease's complete cure. As a result, the market for techniques for early detection of cancer nodule incidence is increasing. Lung cancer is often misdiagnosed. Early detection of lung cancer saves many lives; failure to do so may result in more severe complications, which may result in death prematurely. The cure rate and prognosis of this disease are highly dependent on early detection and diagnosis. A diagnosis error is one of the most frequently occurring forms of medical malpractice worldwide. Data mining and knowledge discovery are widely used in business and research. Data mining methods can aid in the exploration of valuable knowledge in the healthcare system. We examine how classification-based data mining techniques such as Rule-based, Decision Tree, Naive Bayes, and Artificial Neural Networks can be applied to large datasets of healthcare data in this article. The healthcare industry collects massive amounts of data, which are unfortunately not "mined" for proprietary information.

Alper ARIK, Mesut GOLCUK, Elif Mine Karslıgil, "Deep Learning Based Skin Cancer Diagnosis"[5], Melanoma is the most aggressive and deadly form of skin cancer. The importance of early detection in disease cure can't be overstated. Due to the scarcity of human expertise, automated disease detection systems have the potential to save lives, minimize unwanted intervention, and save money. To achieve this goal, we propose a framework in this paper that utilizes recent deep learning methods to identify skin lesions for melanoma detection.

3. SYSTEM ANALYSIS

3.1 SYSTEM ARCHITECTURE

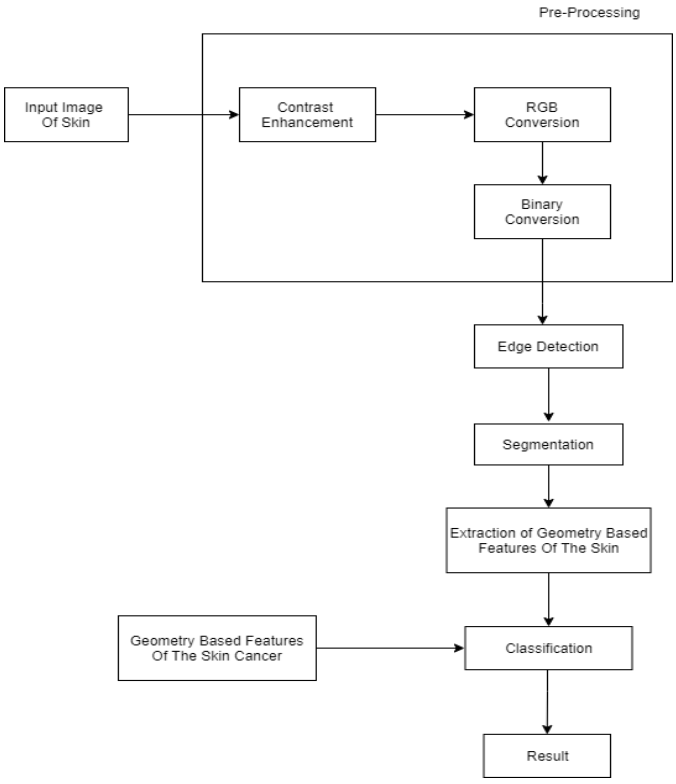


Fig. System Architecture

As shown in above fig, first The computer is fed photographs of skin cancer disease as data. However, since these images are not in a machine-readable format, my computer reads each pixel value and converts it to a three-channel RGB (red, blue, and green) image. For instance, if an image is described as B x A x 3, it contains B rows and A columns. To implement the cnn algorithm, the images will be passed through several layers, including a convolution layer, a pooling layer, an activation layer, and a fully connected layer. This step performs several operations on the image, including segmentation, feature extraction, and classification, and at the conclusion, it will be capable of detecting skin cancer from the image.

3.2 Module

• Preprocessing:

Pre-processing is used to enhance image data by removing undesirable distortions and improving certain image features needed for subsequent processing. Pre-processing is a concept that refers to operations on photos at a most fundamental level of abstraction, for both input and output being intensity images.

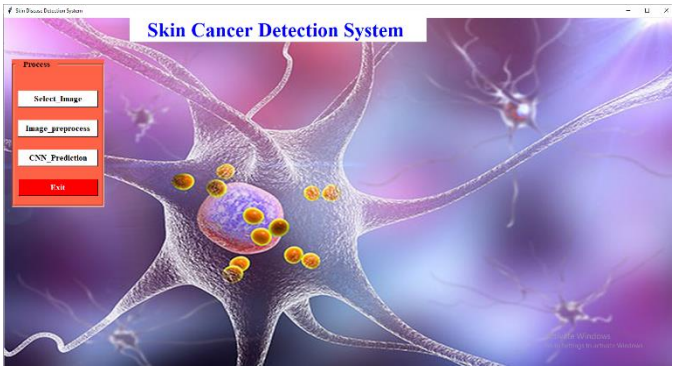
• Feature Extraction:

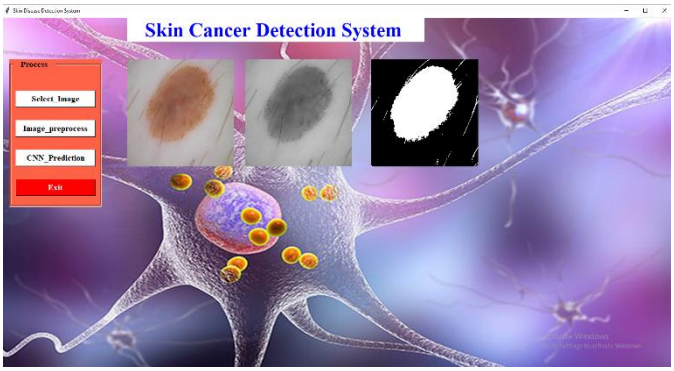
Feature extraction is a step in the dimensionality reduction process, which divides and reduces a large collection of raw data into smaller classes. As a result, processing would be simpler. The fact that these massive data sets have a large number of variables is the most important feature. To process these variables, a large amount of computational power is needed. As a result, feature extraction aids in the extraction of the best feature from large data sets by selecting and combining variables into features, effectively reducing the amount of data. These features are simple to use while still accurately and uniquely describing the actual data collection.

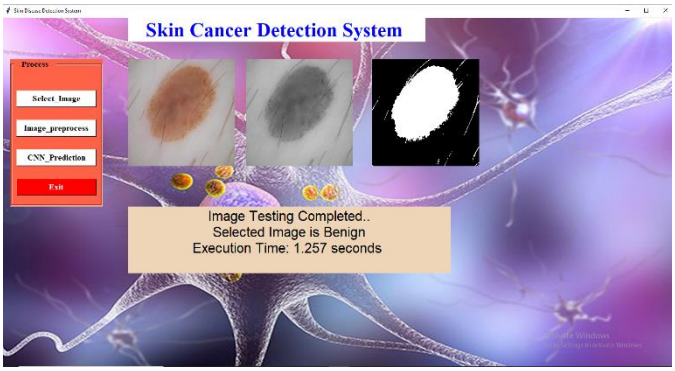
• Classification:

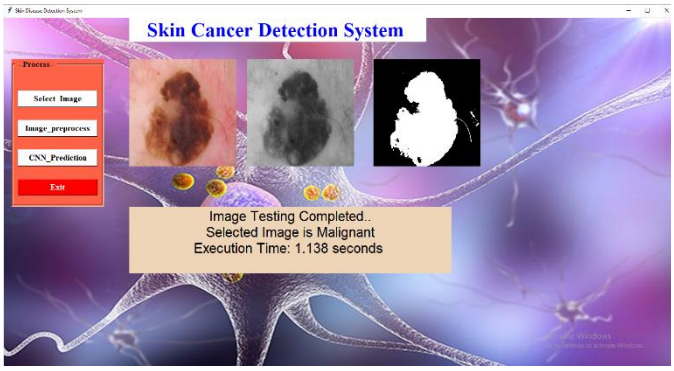
Classification of images involves extracting features from them in order to define patterns within a dataset. Using an ANN for image classification will be highly computationally costly due to the increase in trainable parameters. Accepting an input image and then describing its class is the primary objective of image classification.

4. RESULT









5. CONCLUSIONS

In this experiment, various stages of image processing were applied to skin nodules. The fuzzy filter can effectively cancel out the noise generated by these various image processing techniques. The image is segmented using a watershed algorithm based on markers, resulting

in distinct regions of the image. GLCM is used to rapidly and efficiently extract various features from an image. This knowledge is loaded into the CNN Classifier, which decides the benign or malignant nature of the nodules. The CNN classifier has an accuracy rate of 92.5 percent.

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