International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 07 | July 2020 www.irjet.net p-ISSN: 2395-0072

# MELANOMA SKIN CANCER DETECTION USING IMAGE PROCESSING

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**Abstract -** *Human Cancer is one of the most dangerous diseases which is mainly caused by genetic instability of multiple molecular alterations. Among many forms of human cancer, skin cancer is the most common one. To identify skin cancer at an early stage we will study and analyze them through various techniques named as segmentation and feature extraction. Here, we focus malignant melanoma skin cancer, detection. In this, we used our Asymmetry Border Color Diameter rule dermoscopy technology for malignant melanoma skin cancer detection. In this system different step for melanoma skin lesion characterization i.e., first the Image Acquisition Technique, pre-processing, segmentation, define feature for skin feature selection determines lesion characterization, classification methods. In the feature extraction by digital image processing method includes, symmetry detection, Border Detection, color, and diameter detection and also we used Linear Binary Pattern to extract the texture based features. Gray-Level Co-Occurrence Matrix is also used for feature extraction.*

***Key Words:*** Asymmetry Border Color Diameter rule, Gray-Level Co-Occurrence Matrix, Linear Binary Pattern, Feature Extraction, Melanocytes, etc …

## 1. INTRODUCTION

The functionality of skin plays a vital role in the human body since it is the largest organ which covers the muscles, bones and other parts of the body. Once the functionality of skin goes bad it affects the other parts of the body. Skin is the most sensitive part, therefore when it is explored into environmental pollution and other sunlight tends to occur skin cancer. Skin cancer appears to be of two kinds Benign and Melanoma form. Benign it's just moles on the skin which does not penetrate inside, where as Melanoma causes sores on the skin which leads to bleeding and it is named after cells melanocytes which is more hazardous. In United States, more than 700,000 skin lesions are diagnosed annually under estimation of American Cancer Society. According to statistics given by the Apollo and other hospitals it suggests that Melanoma affects the ages ranging from 45-60+. There are technologies that are used to detect skin cancer at the early stages. Skin Cancer detected in early payment can save people's lives and it eliminates the multiplication of cancer cells across the parts of the body. It affects the people within age limits but it is mostly seen in bright skin people.

### 1.1 LITERATURE SURVEY

Poornima et al [1] proposed segmentation, feature extraction and classification process with suitable algorithms. The skin cancer images are first segmented, then from the segmented images features are extracted using Linear Binary Pattern algorithm and classification is done using Support Vector Machine classifier based along the features extracted. The Support Vector Machine training is used for the optimization of a classification cost. The main advantage of Support Vector Machine is that they provide a single framework in which different learning machine architectures can be generated through an appropriate choice of kernel. Statistical and structural risk minimization is the principle used in Support Vector Machine which minimizes the upper bound on the generalization error. The local binary patterns algorithm has its roots in 2Diamension texture evaluation. The basic idea of this algorithm is to review the local structure in an image by comparing each pixel with its neighbourhood. Take a pixel as centre and threshold against its neighbours.

Murugan et al [2] proposed common and deadly type of cancer is Skin cancer. The destructive kind of cancers in skin is melanoma as it can be identified at the initial stage and can be cured fully. In this paper the water shed segmentation method is implemented for segmentation. For the diagnosis of melanoma, the identification of them melanocytes in the area of epidermisisan essential stage. The features extracted are Gray-Level Co-Occurance Matrix, Asymmetry Border Color Diameter rule and shape. The extracted segments are subjected to feature extraction. The extracted features are then used for classification. The classifiers are k-Nearest Neighbour random for stand Support Vector Machine. The Support Vector Machine classifier provided good results for the skin cancer classification.

Pillay et al [3] proposed that automatic diagnosis of skin cancer images is especially difficult in medical image processing. Moreover, proper segmentation is crucial for the segregating of growths from the skin, this can aid in the differentiation between melanoma and benign skin lesions. To address these issues, this research work investigates the widely used Asymmetry Border Color Diameter rule on macroscopic images and the Graph-Cut segmentation technique as it demonstrates capabilities for handling enormously textured, noisy and color images which are present in macroscopic images.

Tambeet al [4] proposed that the preliminary stage of segmentation the presence of darker and brighter areas obtained by variation in illumination leads to misinterpretation of such noises as lesion region. Hence to classify these two regions from each other, correction factor-based algorithms are required as a pre-processing step.

Multi-Scale Retinex (MSR) is used for improving the contrast of images with a numerous number of brightness, i.e., in an image with mix of shadow balanced with highlight provides the same image but makes all the image layers grey, since the ratio of current value to the average R component is substituted in place of each and every pixel.

Farooq et al [5] proposed that technology aided platforms provide reliable tools in almost every field these days. This tool is used to supported by computational power are significant for applications that need sensitive and precise data analysis. One such important application in the medical field is Automatic Lesion Detection System for skin cancer classification. To help physicians and dermatologist's computer aided diagnosis helps to obtain a "second option" for proper diagnosis and treatment of skin cancer. Precise segmentation of the mole along with surrounding area is essential for proper analysis.

Mane et al [6] proposed that in the present day life threatening disease is skin cancer which causes human death. The growth of melanocytic cells causes a skin cancer. Due to the feature of melanocytic cell skin cancer is also known as melanoma. Due to exposure of ultraviolet radiation and genetic factors on skin melanoma appears. So, melanoma lesion appears as black or brown in color. Early detection of melanoma can cure completely. Biopsy is a traditional way for detecting skin cancer.

Alquran et al [7] proposed that efficient treatment is provided if we detect the melanoma early. Recently, it is well known that, melanoma is the most dangerous form of skin cancer among the other types because it's much more likely to spread to other parts of the body if not diagnosed and treated early. The medical image processing or non-invasive medical computer vision plays increasingly significant role in clinical diagnosis of different diseases. This technique provides an automatic image analysis tool for an accurate and fast evaluation of the lesion.

Buzug et al [8] proposed that annually 133,000 people world-wide get sick on malign melanoma, tendency increasing. The purpose of this study is the early diagnosis of malignant skin cancer. At the moment the dermatologists are screening for anomalies at the relevant lesion by examining the skin area with a microscope. To determine changes, another scan has to be taken in a follow up session after a time period of about 15-20 weeks. Today's visual diagnostic decision is based on the pragmatic Asymmetry Border Color Diameter approach. However, there is no adequate and sound non-invasive way to find out, if a skin spot is either malign or benign. If the visual approach corroborates a suspicion of skin cancer, histology is needed to make explicit diagnosis.

Jana et al [9] proposed Dull Razor is a method used to remove hairs from an image using a pre-processing program. It finds hair location and replace hair by near-by pixels. This pre-processing step enables the segmentation process to achieve satisfactory results. Dull Razor does the hair removal operation. It uses a generalized grayscale morphological closing operation to identify the location of hair. In next step, it confirms the presence of hair by verifying the structure of hair pixel as thin and long using a bilinear interpolation. It smooths and finally replace the hair using an adaptive median filter. K-Means clustering is one of the most popular image segmentation algorithms used in literature. In machine learning, k-means is an unsupervised clustering algorithm used to cluster given data in different similar groups.

Ansari1 et al [10] used classifier to classify cancerous image from other skin diseases. For simplicity Support Vector Machine classifier is used here. Support Vector Machine takes set of images and predicts for each input image belongs to which of the two categories of cancer and non-cancer classes. The purpose of Support Vector Machine is to create hyper plane that separates two classes with maximum gap between them. In our proposed system output of image is given as input to Support Vector Machine classifier which takes training data, testing data and grouping information which classifies whether given input image is cancerous or non-cancerous.

## 2. CONCLUSION

Melanoma is a serious and sometimes life-threatening cancer. It can occur in any part of the body that contains melanocytes. The main cause of melanoma is excessive exposure to ultraviolet radiation reaching the skin. Ultra Violet rays from the sun and other sources can damage skin cells, causing the cells to grow abnormally. Early detection of cancer can help the patient to have a proper treatment. The proposed method detects Melanoma skin cancer with proper accuracy. The final output given by the system will help the dermatologist to detect the lesion and its type, accordingly with his knowledge he will examine the patient to draw a final conclusion whether it can be operated or not or any other ways to cure it for e.g. using medicines or ointments, etc. Skin cancer detection system will help dermatologist to diagnose melanoma in early stages.

## ACKNOWLEDGEMENT

The authors would like to thank Dr. Sathish and Dr. Arun from LV hospital for providing us clinical opinions and the dataset, and helping to validate the system. Furthermore, we would like to thank Prof., Dr. Jyothi from Jyothi skin clinic, for her valuable comments during this research.

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