



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 6, June 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.512**



9940 572 462



6381 907 438



ijirset@gmail.com



www.ijirset.com



# Automatic Detection and Classification of Skin Cancer using Machine Learning

**K. Pradeep, V. Chezian, L. Saravanan, Mr. S. Balasubramanian**

U.G. Student, Department of Electronics and Communication Engineering, Meenakshi Sundararajan Engineering College, Kodambakkam, Chennai, Tamil Nadu, India

U.G. Student, Department of Electronics and Communication Engineering, Meenakshi Sundararajan Engineering College, Kodambakkam, Chennai, Tamil Nadu, India

U.G. Student, Department of Electronics and Communication Engineering, Meenakshi Sundararajan Engineering College, Kodambakkam, Chennai, Tamil Nadu, India

Associate Professor, Department of Electronics and Communication Engineering, Meenakshi Sundararajan Engineering College, Kodambakkam, Chennai, Tamil Nadu, India

**ABSTRACT:** Human Cancer is one of the most dangerous diseases which are mainly caused by genetic instability of multiple molecular alterations. Among many forms of human cancer, skin cancer is the most common one. Early detection of malignant melanoma skin cancer is crucial for treating the disease and saving lives. Many computerized techniques have been reported in the literature to diagnose and classify the disease with satisfactory skin cancer detection performance. However, reducing the false detection rate is still challenging and preoccupying because false positives trigger the alarm and require intervention by an expert pathologist for further examination and screening. In this paper, an automatic skin cancer diagnosis system that combines texture features and ABCD rule dermoscopy technology for malignant melanoma skin cancer detection. In this system different step for melanoma skin cancer characterization (i.e.) first the Image Acquisition Technique, pre-processing, segmentation, define feature for skin Feature Selection determines lesion characterization, classification methods. Here we proposed the Statistical Region Merging method for skin lesion segmentation and Random Forest to classify the non-melanoma or melanoma stage.

## I. INTRODUCTION

Malignant melanoma is one of the most aggressive form of skin cancer and its incidence has been rapidly increasing over the last few decades, causing the majority of deaths related to skin cancer. Fortunately, if melanoma skin cancer is detected at its early stages, it can be curative for the patient. However, distinguishing melanoma in its early stages from other pigmented skin lesions is still challenging. Many techniques have been used to predict and classify melanoma skin cancer. Image processing tools for skin cancer detection usually require pre-processing operations for enhancing images and segmenting the regions of interest to extract efficient features. Dermoscopic and standard images captured from skin usually have some noisy artifacts such as applied oil and hair and this should be removed prior to segmentation.

Paper is organized as follows: Section II describes the various previous works of the authors. The principle and working methodology of our proposed system is explained in Section III. Section IV presents experimental results and the images during testing. Finally, Section V presents conclusion.

## II. RELATED WORK

1) Non-invasive real-time auto-mated skin lesion analysis system for melanoma early detection and prevention

AUTHORS: Abuzagheh, O., Barkana, B. D., & Faezipour, M. (2015).

2) Improving a bag of words approach for skin cancer detection in dermoscopic images

AUTHORS: Alfed, N., Khelifi, F., & Bouridane, A. (2016).

3) Epiluminescence microscopy for the diagnosis of doubtful melanocytic skin lesions



AUTHORS: Argenziano, G., Fabbrocini, G., Carli, P., Giorgi, V. D., Sammarco, E., & Delfino, M. (1998).

In existing systems, histogram thresholding techniques are used to segment the image. For feature extraction local binary pattern, shape features are used and FNN classifier is implemented to classification.

### III. METHODOLOGY

- The skin cancer images are collected from public database.
- Pre-processing is an important step in the image analysis process. The task of pre-processing is to eliminate the irrelevant details in image and enhance the image quality. Median filter is used for remove the noise and bottomhat transform is proposed for remove the unwanted hair in skin cancer region.
- Segmentation is the third step that segments the lesion area of the skin images. Statistical Region Merging is used for segmenting the skin images. A threshold method is used for segmented region and from this, an lesion region is predicted.
- Further, GLCM based texture features and ABCD rule are used for extracting the optimal features.
- Finally, random forest machine learning model is proposed for classify the skin cancer into non melanoma or melanoma.

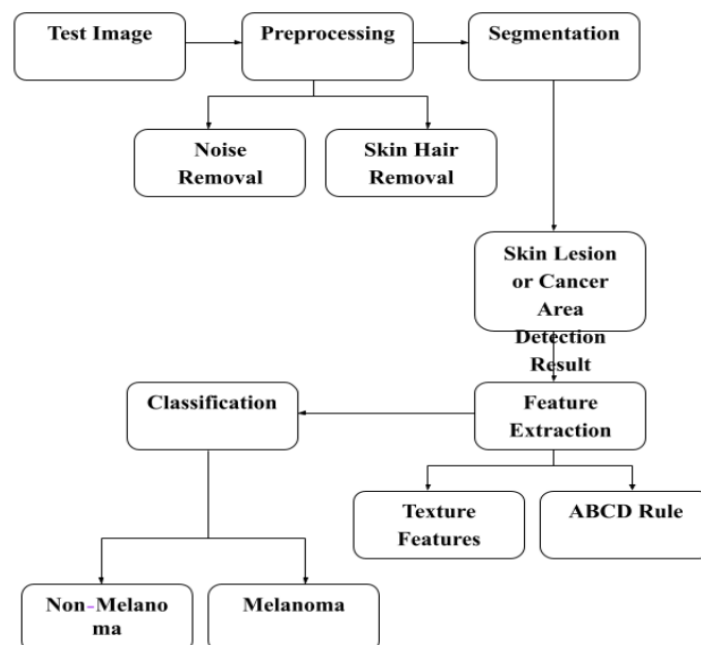
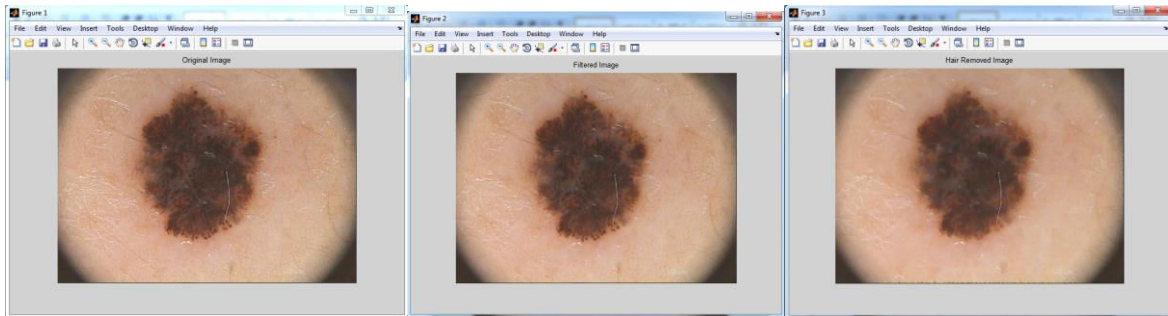


Figure 1: Design architecture



#### IV. EXPERIMENTAL RESULTS

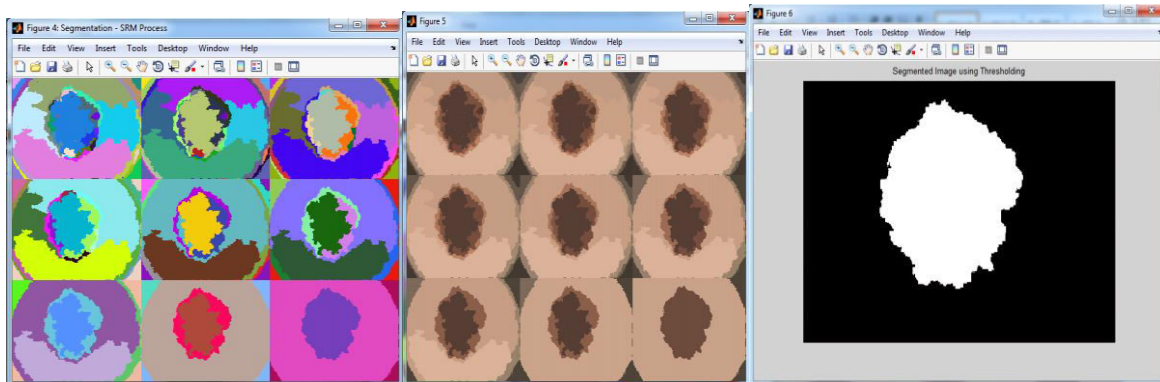
The outputs of the proposed system are as follows:



**Figure 2:** Original image

**Figure 3:** Filtered image

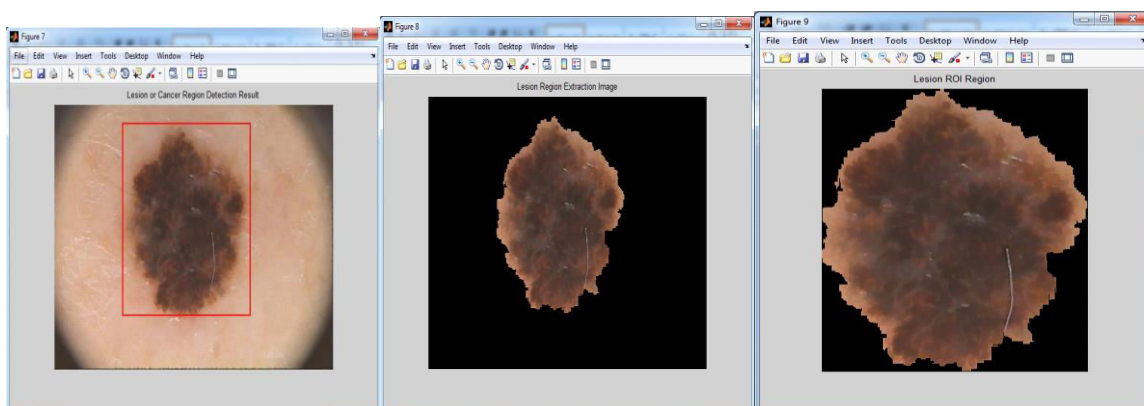
**Figure 4:** Hair removed image



**Figure 5:** Segmentation- SRM process

**Figure 6:** Segmentation process

**Figure 7:** Segmented image using threshold



**Figure 8:** Lesion or cancer region detected result

**Figure 9:** Lesion region extraction image

**Figure 10:** Lesion ROI region



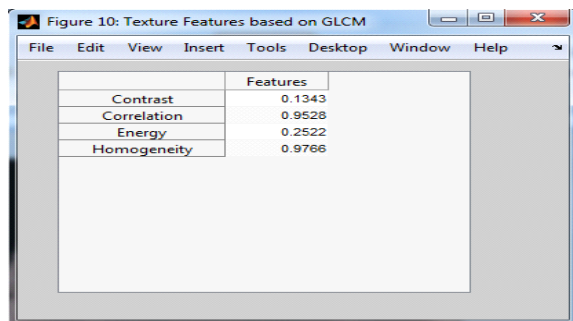


Figure 11: Texture features

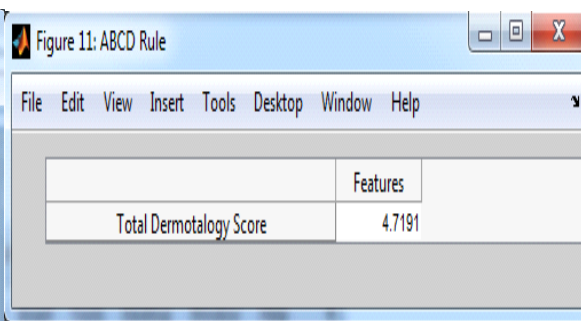


Figure 12: ABCD rule

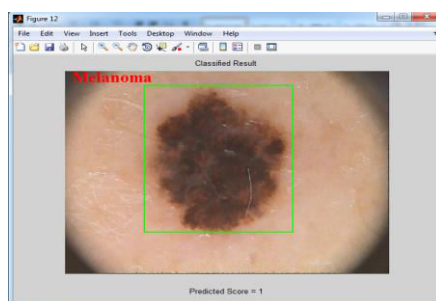


Figure 13: Classified result

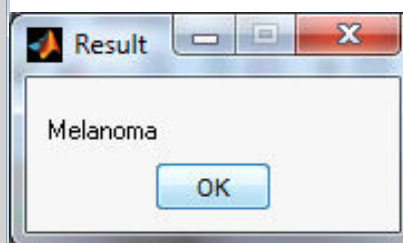


Figure 14: Result

## V. CONCLUSION

In this paper, a melanoma skin cancer detection system has been presented. Textural and ABCD rule features are proposed for describing skin cancer lesions efficiently. At first, the input image is pre-processed using the median filter and bottom hat transform. Furthermore, segmentation and feature extraction are performed from pre-processed image. Segmentation is done by using Statistical Region Merging. The extracted features (i.e.) texture features by GLCM and ABCD rule are classified corresponding to the category using the random forest. The performance analysis shows that the proposed system offers higher accuracy than the existing technique.

## REFERENCES

- [1] Abuzagheh, O., Barkana, B. D., &Faezipour, M. (2015). Non-invasive real-time auto- mated skin lesion analysis system for melanoma early detection and prevention. IEEE Journal of Translational Engineering in Health and Medicine, 3, 1–12.
- [2] Alfed, N., Khelifi, F., &Bouridane, A. (2016). Improving a bag of words approach for skin cancer detection in dermoscopic images. In Proc. IEEE international confer- ence on decision and information technologies (CoDIT) (pp. 228–232). Saint Ju- lian's, Malta.
- [3] Argenziano, G., Fabbrocini, G., Carli, P., Giorgi, V. D., Sammarco, E., & Delfino, M. (1998). Epiluminescence microscopy for the diagnosis of doubtful melanocytic skin lesions: Comparison of the ABCD rule of dermatoscopy and a new 7-point checklist based on pattern analysis. Archives of Dermatology, 134 (12), 1563–1570.





**Impact Factor:  
7.512**



# **INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH**

**IN SCIENCE | ENGINEERING | TECHNOLOGY**

**9940 572 462 6381 907 438 ijirset@gmail.com**



**www.ijirset.com**

Scan to save the contact details