IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 3, June 2025
Impact Factor: 7.67

An Interpretable Skin Cancer (Melonoma) Detection Using Deep Learning for a Smart Healthcare System

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Abstract: *This study presents the first systematic review of the state-of-the-art research on classifying skin lesions with CNNs. We limit our review to skin lesion classifiers. In particular, methods that apply a CNN only for segmentation or for the classification of dermoscopic patterns are not considered here. Furthermore, this study discusses why the comparability of the presented procedures is very difficult and which challenges must be addressed in the future.*

Keywords: CNNs

I. INTRODUCTION

Aim: -

- Our main aim is to develop a method for identifying melanoma enabling accurate assessments of patient's health. Skin cancer, such as melanoma can be extremely dangerous if not detected and treated early.
- Detecting skin cancer accurately and promptly to greatly increase the chances of survival.

Objective: -

- This project will help in finding out melanoma easily. To build deep learning models to classify cell images and detect skin cancer.
- This study presents the first systematic review of the state-of-the-art research on classifying skin lesions with CNNs. We limit our review to skin lesion classifiers. In particular, methods that apply a CNN only for segmentation or for the classification of dermoscopic patterns are not considered here. Furthermore, this study discusses why the comparability of the presented procedures is very difficult and which challenges must be addressed in the future.

Innovative concept: -

Smartphone-based Detection

- Mobile Applications: Creating smartphone apps that allow users to take pictures of skin lesions and receive preliminary assessments using AI models.
- Tele-dermatology: Enabling remote consultations and diagnosis through mobile platforms, increasing accessibility, especially in underserved areas

Synthetic Data Generation

- Data Augmentation: Employing advanced augmentation techniques to simulate a wide range of variations in skin lesions.

Multi-Modal Data Integration

- Combining Data Sources: Integrating dermoscopic images with other patient data such as genetic information, clinical history, and patient demographics to improve diagnostic accuracy.
- Hybrid Models: Creating models that combine image-based analysis with textual and numerical data analysis.

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Benefits: -

Early Detection and Diagnosis

- Improved Survival Rates: Early detection of melanoma can significantly increase survival rates, as treatment is more effective in the early stages.
- Less Invasive Treatments: Early-stage melanomas can often be treated with less invasive procedures, reducing the need for extensive surgeries or aggressive therapies.

Enhanced Accuracy and Reliability

- Reduced Misdiagnosis: Advanced AI models can reduce the rate of false positives and false negatives, leading to more accurate diagnoses.
- Consistency: AI systems provide consistent results, minimizing variability in diagnoses that can occur between different dermatologists

Cost-Effectiveness

- Reduced Healthcare Costs: Early detection and less invasive treatments can lower overall healthcare costs by reducing the need for expensive late-stage cancer treatments.
- Efficient Resource Utilization: Automated systems free up healthcare professionals to focus on more complex cases, optimizing resource allocation.

Existing work: -

- This project may be a method for the detection of Melanoma carcinoma using the Image as processing tools.
- In this input the system is skin lesion image then applying in image processing¬ techniques, it analyses conclude about the presence of carcinoma .
- The Lesion is Image to analysis tools checks as varied Melanoma in parameters, Color,¬ Area perimeter, diameter to texture, size to shape analysis for image segmentation and the feature stages. The extracted feature parameters that are wont to classify image as Non Melanoma and also Melanoma cancer lesion.

Innovative Concepts: -

- This project may be a method for the detection of Melanoma carcinoma using Image processing tools.
- In this input the system is that skin lesion image then applying image processing techniques, it analyses conclude about the presence carcinoma .
- In Lession to Image analysis tools checks in the varied Melanoma parameters, Color, Area perimeter, diameter etc texture, size and shape analysis for image segmentation and the feature stages.
- The extracted to feature parameters wont of classify the image as Non Melanoma and Melanoma cancer lesion. Through poll we are getting to collect patient after treatment.

II. CONCLUSION

In the proposed system, Image Pre-Processing, Image Segmentation and Image Classification steps are performed for categorizing skin lesion images into melanoma or benign. Data augmentation technique is used in Convolutional Neural Network for increasing the number of images which leads to better performance of proposed method. Experimental results show an accuracy of CNN algorithm developed with data augmentation is higher than the CNN algorithm created without data augmentation. The proposed method detects melanoma faster than the biopsy method. The proposed method can be extended to identify different types of skin related diseases. In this project we also designed for the reference of doctors and a feedback form which is used to know the experience of the patients.

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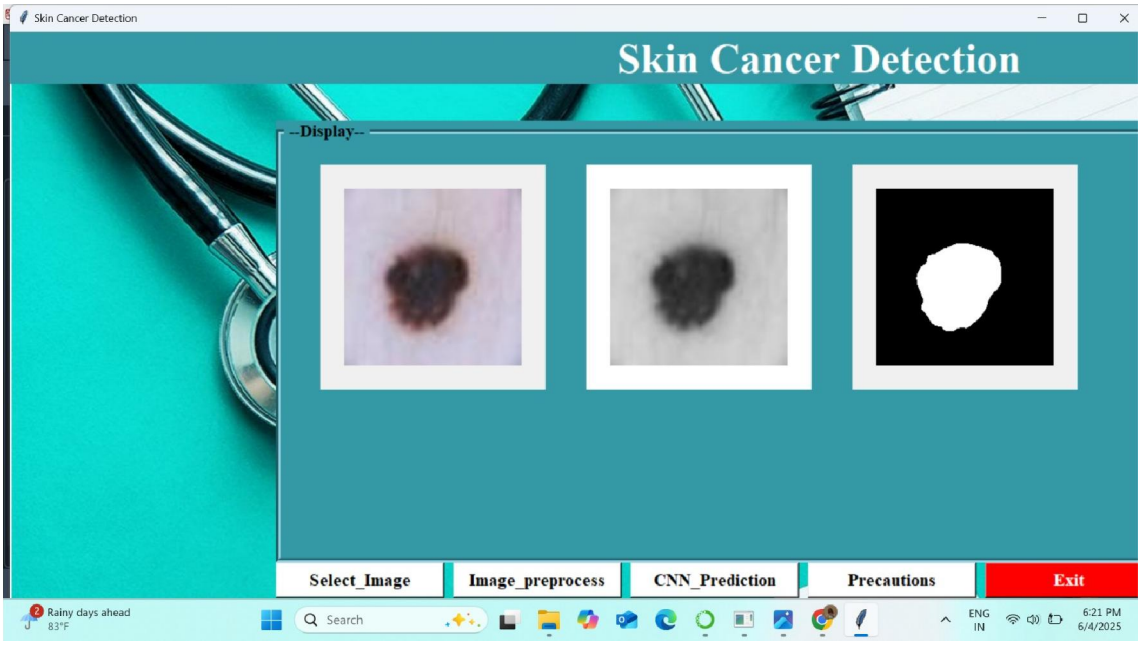
RESULT



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