iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.52129

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Skin Lesions Detection using Deep Learning Techniques

S Sivakama Sundari[1], Dr. Sampath AK[2], Dr. M. Islabudeen[3]
[1] *M. Tech Artificial Intelligence, Department of CSE, School of Engineering, Presidency University, Bangalore*
[2] *Associate Professor CSE, School of Engineering, Presidency University, Bangalore*
[3] *Associate Professor CSE, School of Engineering, Presidency University, Bangalore*

Abstract: ***The main category of cancer is skin cancer, which is manifested by certain skin diseases. They have been constrained into various typologies stationed on morphological features, color, structure, and texture. Due to certain factors, the study equips analysis efforts to advance algorithms with greater closeness and tensility in detecting early-stage melanoma. As per the ACS report, melanoma is one of the recurrent cancers in the world. In 2017, around 87,110 new cases were diagnosed in the United States alone. Dermoscope images contain imperfections such as shadows, artifacts, and noise that degrade image essence. To overthrow these objection, deep learning neural networks have been used to detect skin cancer by tampering images. In the proposed work, automatic classification of skin lesions is proposed. Image classification, object detection etc are some of the computer vision tasks in deep CNN which have driven DCNNs to be reliable on several substitute assumptions, tiling its way for new exploration areas. CNN attained performance equivalent to all experts tested, achieving an exact competence equivalent to dermatologists treating skin cancer. In this article, we attempt to improve the Deep Convolutional Neural Networks example using the ImageNet dataset with HAM10000, fortuitously classifying seven categories of skin lesions.***
HAM10000 is a dataset of 10000 dermoscope images. Layers are fine-tuned applying separate approach such as InceptionV3, InceptionResNet, DenseNet and VGG-16. Over previous years, the power of deep learning-based approaches has enhanced fiercely and their work come out to outperform common image processing approach on classification tasks. However, these categories of machine learning-based accession have important drawbacks. Training requires thousands of annotated images for each class. The idea is to use deep learning algorithms and available dataset assets to bear models with higher accuracy and best results.
Keywords: Skin Cancer, Dermatoscope, Deep Convolutional Neural Networks, Computer Vision, Transfer Learning, HAM10000, InceptionV3, InceptionResNet, DenseNet, VGG-16.

I. INTRODUCTION

A convoluted subject like dermatology has become one of the most abrupt and difficult professions to diagnose due to the complexity of the subjects covered. Dermatologists say it's common for patients to undergo extended tests to determine which type of skin disease they have. The period fluctuate from doctor to doctor based on their practice. Cancer is a deadly complaint that gives rise due to difference in DNA cells that develop or escalate all through the body, damaging the body's organs. These cells are commonly called cancer cells or malignant cells or tumor cells. On the report of GLOBOCAN statistics, 19.3M new cancer patients and nearly 10M cancer demises are projected to be reported in 2020. Studies show that about 24% of the community consults a family doctor for skin problems within a year. Medical figure analysis takes part as a major role in the detection of cancer aberration in various body parts. Therefore, it is concluded that utmost cutaneous complications can be fully recovered if treatment is started early. Early find and medication of cancer is critical to achieving a complete cure and prolonging life. Skin disease markedly reduced the patient's quality of life. Recent research inclination sight cancers with high deaths or existence rates can be approximately brought down through early examination and exposure of cancer using ML and DL methodologies. The vogue of skin illness is growing and speedy detection is critical for better results. Many efforts has been made to propose obsolete medicines in diverse parts of the world, exclusively in less developed countries. What most people are negligent of the types and stages of skin conditions that occur on a regular basis. Some skin diseases come out months after the onset of the disease, allowing the case to thrive and advance due to the general public's lack of medical understanding. Dermatologists might have difficulty identifying the problem and might have to perform expensive lab tests to clinch the type and phase of the disease. Pharmaceutical technologies has advanced so far that laser and photo-based devices can expose skin disorders instantaneously and accurately. However, the cost of alike diagnoses is currently limited and steep for most people.

The suggested study authorize mechanisms to detect discrete forms of these diseases. User-provided skin disease images are considered by a system that performs feature extraction utilising a CNN algorithm and determine plight using a Softmax image classifier. This approach was recognized to be correct 95% of the time in a proof study on 6 different skin conditions. In the latest years, deep CNNs have reached fame for techniques such as feature learning and image classification. In agreement, a considerable no. of ImageNet reports, traditional object classification approach based on DCNN beat individuals in classifying objects. Some advisers have verified pre-trained networks instead of working with DCNN from scratch which is immense beyond labelled input data. CNN alone is one of the most competent strategies for modeling complicated strategies and displaying pattern matching in large statistical packages alongside image pattern matching. Some of the papers regulated a stable base for framework and modifying new ML/DL algorithms or fixing ongoing ones.

II. RELATED SURVEYS

Many groundwork papers planted on ML and DL approach have been considered in the reports to anticipate the hazard of distinct group of cancer. Personnels have pre-owned classic datasets in their work to forecast cancer. Many personnel have started proposing IP-situated algorithms to diagnose numerous skin disorders, including cancer. In this section, we review a few perspectives described in the literature.

Vaishnavee and Amshakala [1] addressed complications of brain tumor segmentation using PSVM and SOM methods. Histogram equalization was achieved during the pre-processing phase. Average, number, severity, and deviation of incidents have been put in place as four attributes that need to be additionally classified.

Rajat Mehrotra et al. [2] recommended an AI-based DL algorithm for classifying brain tumors to detect disparate types of brain tumors. Classify MRI images of brain cancer into benign and malignant types using a DL-based pretrained CNN architecture.

A combination technique using CNNs and SVMs was developed by M.O. Kairan dish, etc. [3] For the classification based on MRI brain imaging. The mix of CNN and SVM ML techniques were handed down for classification which has significantly improved brain tumor detection.

Sankes et al. [4] recommended a unique CNN tamped using two convolutional layers and two max pool layers and a final fully connected layer. The primary goal was early detection of skin cancer in order to commence efficient hospitalization and reduce mortality. ISIC dataset containing 2719 images were used.

Gulati et al. [5] used pre-trained system in two disparate ways. One as a TL prototype and the alternative as a feature extractor. PH2 dataset was used that consists of 200 images, of which 160 belong to the benign and 40 malignant category. The above network requires inputs of contrasting sizes. Therefore, the essential pre-processing was performed.

Rahi et al. [6] advised a CNN system using the Keras Sequential API and correlated the results collected with pre-trained architecture. HAM10000 dataset was used that holds 10,015 images were used.

Nasr-Esfahani et al. [7] developed their own CNN that performs pre-processing, feature extraction, and classification. CNN contains an input layer, two layers each containing alternating convolutions and max pooling, and a final fully connected layer. Outcomes were divided into two classes: melanoma and nevus.

Yao et al. [8] recommended a new single look alike stationed method for differentiating skin lesions in small, unbalanced datasets. They first trained different DCNN on different small and uneven datasets, then included DropOut and DropBlock regularizations to bring down overfitting, followed by a recasted RandAugment extension. We proposed a strategy to address the shortcomings of sample under depiction in small correction records.

Padmavati et al. [9] intended an automated approach to skin lesion classification using pre-trained and fine-tuned DL networks. Researchers evaluated their execution applying familiar perceptible conducts such as specificity, sensitivity, precision, and precision, and weigh up them with different TL approaches.

Maduranga et al. [10] conferred an AI-based mobile appliance for detecting skin diseases. They practiced a CNN to HAM10000 dataset to classify skin disorders.

Soliman [11] exercised a multiclass SVM to classify skin disorders and used a pretrained convolutional neural network (CNN) to extract compatible features.

In deep learning, CNNs have certain drawbacks that the authors need to explain proficiently using four main datasets, including classifier evaluation affected by image distortion, suggested that improved accuracy frequently hides corruption robustness issues to some extent [12, 13].

This study shows that CNNs offer a better approach to skin cancer spotting, and that the image acquisition step plays an important role in algorithm execution [14].

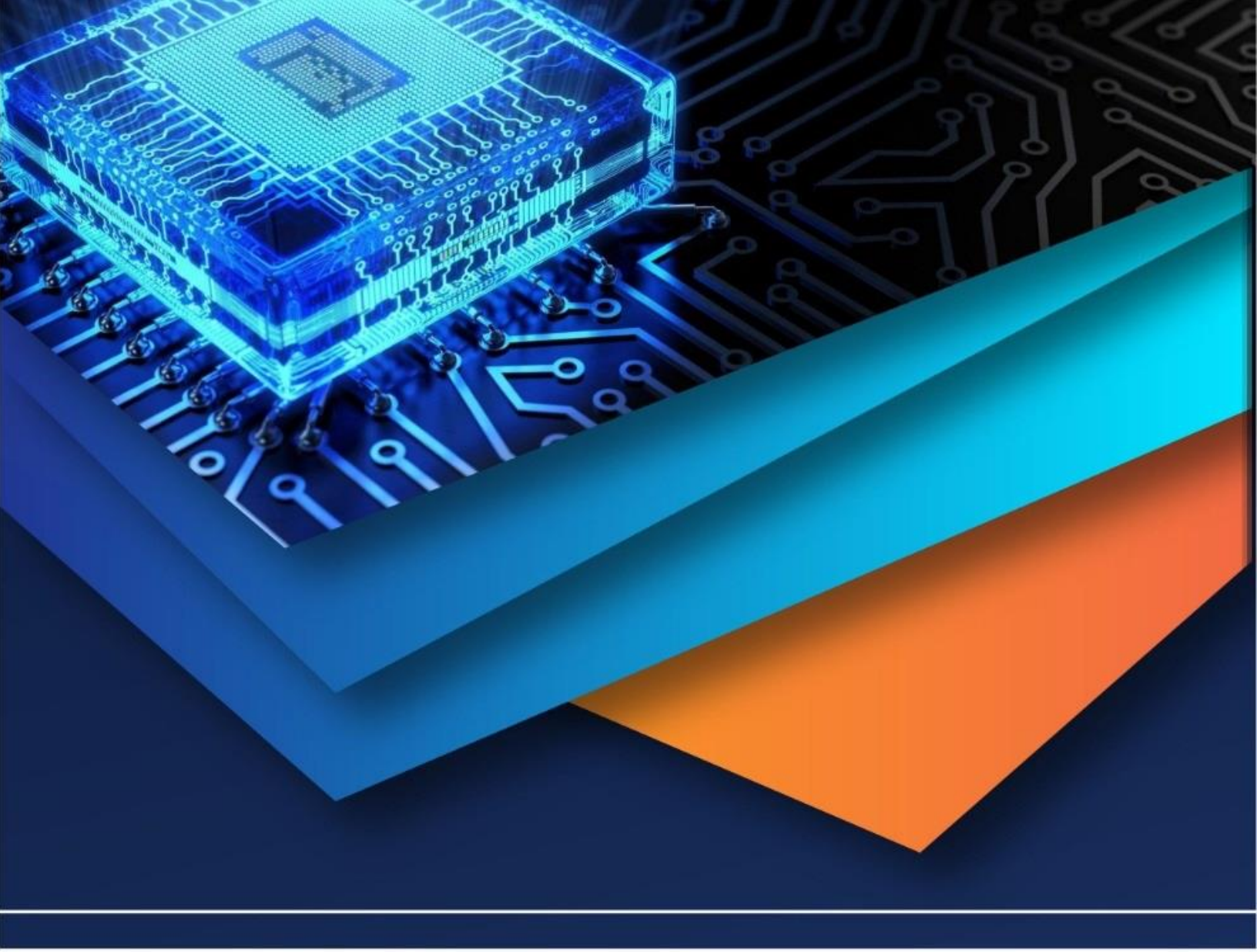
[15] showed that practicing pre-trained networks outperforms DCNN from scratch in the absence of labelled input data. In lieu of establishing a comprehensive CNN from scratch, we fortuitously approached the problem by confining a network trained on images about specific knowledge of medical scenarios.

III. CONCLUSION

Skin diseases are now a world-wide issue. People in numerous province suffer from various types of skin disorder. These diseases can be combated by developing different techniques and procedures. Dermoscopy images can be utilized to assist in diagnosing skin lesions through a computer-aided diagnosis system based on CNN that vitally draw factors within mould that aid in decisive categorization. DL methods are universally used for the detection and classification of diseases.

REFERENCES

[1] K.B. Vaishnavee, K. Amshakala, An automated MRI brain image segmentation and tumor detection using SOM-clustering and Proximal Support Vector Machine classifier, in: 2015 IEEE International Conference on Engineering and Technology, ICETECH, 2015.
[2] R. Mehrotra, M. Ansari, R. Agrawal, R. Anand, A transfer learning approach for AI-based classification of brain tumors, Mach. Learn. Appl. 2 (2020).
[3] M. Khairandish, M. Sharma, V. Jain, J. Chatterjee, N. Jhanjhi, A hybrid CNN-svm threshold segmentation approach for tumor detection and classification of MRI brain images, IRBM (2021).
[4] Sanketh RS, Madhu Bala M, Narendra Reddy PV, et al. Proceedings of 4th International Conference on Intelligent Computing and Control Systems (ICICCS). 2020. doi: 10.1109/ICICCS48265.2020.9121075.
[5] Gulati S, Bhogal RK. Proceedings of International Conference on Advances in Computing and Data Sciences. 2019
[6] Rahi MdMI, Khan FT, Mahtab MT, et al. Proceedings of IEEE Asia-Pacific Conference on Computer Science and Data Engineering (CSDE). 2019.
[7] Nasr-Esfahani E, Samavi S, Karimi N, et al. Proceedings of 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). 2016.
[8] P. Yao, Single model deep learning on imbalanced small datasets for skin lesion classification, IEEE Trans. Med. Imaging 41 (5) (2022).
[9] K. Padmavathi, H. Neelam, M.P.K. Reddy, P. Yadlapalli, K.S. Veerella, K. Pampari, Melanoma detection using deep learning, in: 2022 International Conference on Computer Communication and Informatics, ICCCI, 2022.
[10] M. Maduranga, D. Nandasena, Mobile-based skin disease diagnosis system using convolutional neural networks (CNN), I.J. Image Graphics Signal Process. 3 (2022) 47–57.
[11] Md. Al Mamun, Mohammad Shorif Uddin, A survey on a skin disease detection system, Int. J. Healthc. Inform. Syst. Inform. 16 (4) (2021) 1–17.
[12] R. Bala and C. Singh, "An optimized CNN-based handwritten gurmukhi character recognition from punjabi script image," International Journal of Scientific Research in Computer Science Applications and Management Studies, vol. 9, no. 3, pp. 1–10, 2020.
[13] R. C. Maron, J. G. Schlager, S. Haggenm¨uller et al., "A benchmark for neural network robustness in skin cancer classification," European Journal of Cancer, vol. 155, pp. 191–199, 2021.
[14] M. Dildar, S. Akram, M. Irfan et al., "Skin cancer detection: a review using deep learning techniques," International Journal of Environmental Research and Public Health, vol. 18, no. 10, p. 5479, 2021.
[15] Sreelakshmi D, Inthiyaz S. Fast and denoise feature extraction based ADMF–CNN with GBML framework for M.R.I. brain image. International Journal of Speech Technology, 2021.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY