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Skin Disease System Using Deep Learning: A Review

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ABSTRACT: The classification of face skin diseases from clinical images is a critical task in dermatology, enabling early diagnosis and appropriate treatment. Convolutional Neural Networks (CNNs) have demonstrated remarkable performance in image classification tasks. This abstract provides an overview of studies that investigate the effectiveness of various CNN algorithms for the classification of face skin diseases using clinical images.Skin diseases can manifest in a wide range of forms, making accurate and timely diagnosis a challenging endeavor. Clinical images serve as valuable diagnostic resources, offering rich visual information to dermatologists. In recent years, the application of CNNs for automated classification has shown great promise.This research compiles and evaluates the performance of CNN algorithms. The study employs a diverse dataset of clinical images encompassing various skin conditions, textures, and colors.Each CNN architecture undergoes rigorous training and validation to assess its classification accuracy, sensitivity, and specificity.

KEYWORDS- Artificial Intelligence, Deep Learning, Skin, Cosmetic, Diseases; Survey, Cosmetology, Intelligent System

I. INTRODUCTION

Skin diseases are a widespread health concern that affects people of all ages and demographics. Timely and accurate diagnosis is crucial for effective treatment and management of these conditions. In recent years, advances in computer vision and deep learning have opened new avenues for the automated classification of skin diseases using clinical images. Convolutional Neural Networks (CNNs) have played a pivotal role in this domain, enabling precise and rapid classification of skin conditions. This introduction provides. an overview of the significance, motivation, and objectives of studies on different CNN algorithms for face skin disease classification based on clinical images.

The primary objectives of studies on different CNN algorithms for face skin disease classification include:

1. Improved Diagnostic Accuracy: Developing CNN models that can achieve high accuracy in classifying a wide range of skin diseases based on clinical images.
2. Efficiency and Speed: Creating models that can provide rapid assessments, reducing the time from image acquisition to diagnosis.
3. Generalization: Designing algorithms that can generalize well across diverse patient populations, skin types, and lighting conditions.
4. User-Friendly Interfaces: Integrating the models into user-friendly applications, such as mobile apps or web-based platforms, to ensure accessibility to both healthcare professionals and patients.
5. Validation and Clinical Integration: Conducting rigorous validation studies to assess the real-world performance and clinical relevance of the developed models.
6. Privacy and Security: Ensuring data privacy and security, particularly for systems that involve the use of patient images and personal information.

This research domain holds promise for revolutionizing the diagnosis and management of skin diseases, ultimately benefiting individuals who seek timely and accurate assessments. The subsequent sections of this study will delve into the specific CNN algorithms, datasets, methodologies, and results of various research endeavors aimed at achieving these objectives. The findings of these studies will contribute to the broader goal of enhancing healthcare delivery and patient outcomes in the field of dermatology.

II. RELETED WORK

TriyannaWidiyaningtyas et al.: In this study, the classification method used to diagnose skin diseases in cats is the C4.5 algorithm. The dataset used was obtained from the animal clinic "Purple Shop" in Malang. The algorithm testing process is carried out using k-fold crossvalidation. Algorithm performance evaluation is measured by using a confusion matrix, namely by measuring the value of accuracy, precision, and recall.

Wirdayanti et al.: This study aims to build a model for the detection of facial skin diseases by utilizing the texture features in digital images of facial skin. The model is an automatic initial screening system for facial skin that can be used before carrying out further diagnosis processes by utilizing relatively expensive medical technology. Characteristics in facial images are obtained by extracting the textural features of the face digital image.

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ShuchiBhadula et al.: In this paper, five diverse machine learning algorithms have been chosen and executed on skin infection data set to anticipate the exact class of skin disease. Out of a few machine learning algorithms, we have worked on Random forest, naive bayes, logistic regression, kernel SVM and CNN. A similar examination dependent on confusion matrix parameters and training accuracy has been performed and delineated utilizing graphs. It is discovered that CNN is giving best training precision for the right expectation of skin diseases among all selected.

Neha Agrawal et al.: Proposed study presents a model that uses an approach allied to transfer learning for computer vision to differentiate different types of dermatological skin diseases melanoma, vitiligo, and vascular tumor. This model employed the Deep learning model Inception_ v3 as a base model. Using modern architecture considerably increases efficiency.

Weipeng Li et al.: This paper applied a novel multiplication-based fusion strategy to the intelligent diagnosis of skin disease. Experiments showed that the proposed approach can effectively improve the diagnosis performance particularly for smallsample classes. It was also observed that not all metadata helped improve diagnosis performance, indicating that effective metadata selection before data fusion may be necessary if the number of metadata types becomes large. Qualitative analysis also supported that the proposed fusion approach can help classifiers more accurately focus on lesion regions during diagnosis.

Zhiwei Qin et al.: There are many types of skin cancer, and melanoma is the most lethal one. Dermoscopy is an important imaging technique to screen melanoma and other skin lesions. However, Skin lesion classification based on computer-aided diagnostic techniques is a challenging task owing to the scarcity of labeled data and class-imbalanced dataset. It is necessary to apply data augmentation technique based on generative adversarial networks (GANs) to skin lesion classification for helping dermatologists in more accurate diagnostic decisions.

M. Kalaiyarivu et al.: In this study, an electronic method for diagnosing skin diseases is suggested. For this technique, a combination of ML and DL models was used. One deep learning model for feature extraction from training data was integrated with four well-known machine learning classifiers in the proposed approach.

Parvathaneni Naga Srinivasu et al.: The proposed model is efficient in maintaining stateful information for precise predictions. A grey-level co-occurrence matrix is used for assessing the progress of diseased growth. The performance has been compared against other state-of-the-art models such as Fine-Tuned Neural Networks (FTNN), Convolutional Neural Network (CNN), Very Deep Convolutional Networks for Large-Scale Image Recognition developed by Visual Geometry Group (VGG), and convolutional neural network architecture that expanded with few changes.

Saja Salim mohammed et al.: In this paper, quite many previous studies related to methods of classification of skin diseases based on the principle of machine learning were collected. In a group of previous studies, the researchers used some systems, mechanisms, and algorithms. Several systems have been successful in classifying skin diseases and achieving varying diagnostic accuracy.

S. Chatterjee et al.: This paper reports a methodical approach for the identification of closely similar skin abnormalities as melanoma, nevus, BCC and SK. In this work, empirical wavelet transform is explored to obtain in detail texturalvariations along the skin lesion. Empirical wavelet fractal descriptor (EWFD) is introduced to quantify the textural complexity of each sub-band images.

III. CONCLUSION

This study created a data set mostly made up of photos of facial skin illnesses and conducted trials utilising five popular cnn structures for the clinical image identification of six common facial skin diseases. The findings show that cnn are capable of identifying face skin convolutional neural network (cnn) algorithms used for face skin disease classification based on clinical images. These algorithms aimed to provide accurate and efficient diagnosis of skin diseases through automated image analysis. Please note that there might have been advancements and new algorithms.

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