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Analysis of the Skin Disease: Stages, Challenges, and Soft Computing Methods: A Review

Subhkiran[1], Gurleen Sidhu[2]
[1]*Baba Banda Singh Bahadur Engineering College ,Fatehgarh Sahib ,Punjab.*
[2]*Baba Banda Singh Bahadur Engineering College ,Fatehgarh Sahib ,Punjab.*

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ABSTRACT– Skin disease refers to a wide variety of problems affecting the skin , including illnesses brought on by bacterial, viral, fungal, allergy, and parasitic infections as well as skin cancer and skin diseases. These diseases may result in rashes, inflammation , itching, or other changes to the skin. Skin disease is investigated by using soft computing methods. This article discusses soft computing method that is used in every field. Moreover , this paper describes the advantages and disadvantages of image processing and soft computing approaches used accurately to identify skin diseases and also represent the results of the specific method.

Keywords –Skin Diseases , Skin disease types, Image processing techniques, Soft computing;Challenges.

I. INTRODUCTION

The skin is the biggest organ and plays a crucial role as a protective layer. The skin's main function is to shield the body from environmental hazards and prevent the loss of essential nutrients. The incidence of skin disorders is on the rise. Skin diseases impact people of all ages and backgrounds, across all cultures. In order to cure skin disorders, dramatically minimise their consequences, and boost survival chances, early detection is crucial. People historically used computer-aided diagnosis for automatic skin disease recognition based on pictures of skin disorders to help in the diagnosis and treatment of skin diseases. The rapid development of AI technology has allowed deep learning to rapidly produce a computer vision. "Medical image processing of skin diseases has emerged as an integral part of the study of image and video processing, machine learning, and intelligent medicine. Many researchers and doctors are interested in the ability to spot skin diseases just by looking at a picture. [1].

Abnormalities in the skin's layers cause a variety of skin diseases. Medical experts can diagnose and treat a variety of skin disorders. Other skin conditions have symptoms but are invisible to a doctor. One form of skin cancer caused by UV radiation damage to the DNA of skin cells is melanoma.

Fig.1. A wide variety of skin diseases.[2]

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Figure 1: Skin disease classifications [2]. The skin not only acts as a barrier to the outside world but also as a sensory organ for the rest of the body. The skin is the largest organ in the body and protects the internal organs, muscles, and bones. The skin is made up of seven layers of ectodermic tissue.Causes of skin diseases include a lack of proper cleanliness, increasing pollution, climate change, and exposure to damaging UV radiation. An increase in cancer rates of 2%-3% has been linked to even a 1% drop in ozone levels. India has a high incidence of both infectious diseases and photosensitive skin disorders. The skin, the person's mental health, and their quality of life are all at risk if these conditions are not treated as soon as feasible [3]. In the past, computer-aided diagnosis for automatic skin disease recognition based on skin illness images was used to solve the problem of skin disease diagnosis and treatment. The rapid development of AI technology has resulted in the rapid development of deep learning, which has resulted in a computer vision. The medical image processing of skin diseases has become an important part of and received a lot of attention from researchers in the domains of image processing, machine learning, and intelligent medicine. Many doctors and researchers have focused on developing methods for detecting skin diseases in photographs [1]. The remainder of this work is structured to achieve later goals. Segmentation approaches and difficulties are discussed in Section 4, after Sections 2 and 3 on related and existing work, on Skin Disease stages and types. The paper's conclusion is presented in Section 5..

II. RELATED WORK

Methods, instruments, and models for early detection and prognosis of skin diseases are collected here. Multiple authors have done research in the field of using image processing to spot melanomas. Those interested in the best MATLAB analysis formats have done research and analysis on them. Some examples of preprocessing techniques are black-bordered cropping, alignment, shading, and hair removal [4]. In the CNN, many layers are learned in unconventional ways, making it a popular deep learning method. Two-dimensional data, such as photographs, require a special kind of multilayer neural network. Each of the input layers of the built neural network uses a different facet of the input image, which is retrieved using a different set of digital filters. Convolution layers confuse the image by using different kernels [5]. Using the ABCD rule, Zaqout [6] built a prototype to classify the skin damage shown in dermoscopy images. Pre-processing, which in his method includes filtering and The process begins with contrast enhancement, moves on to region of interest segmentation via thresholding and statistical methods, then features extraction (including asymmetry calculation), and finally classification (separating images into benign, malignant, and suspicious categories). The proposed strategy was applied to the Hospital Pedro Hispano and Matosinhos datasets with the help of the MATLAB programmes. Results are encouraging and consistent with expectations. Wei et al.'s analysis of how to develop automatic systems for better skin disease diagnosis". They propose employing image pre-processing to remove noise, a GLCM matrix to partition the regions of interest, and feature extraction followed by support vector machines to classify the images. The authors have reduced the number of superfluous factors by using a Euclidean distance transformation and an image filtering technique. In order to improve the accuracy with which skin diseases are classified, the vertical image division can produce ten different vertical images. Using the ABCD rule (asymmetry, border, colour, and diameter), the authors analysed the colour and border of cutaneous lesions. To classify the features, they employed a backpropagation-trained multilayer perceptron network (MLP). Using geodesic active forms and a Gabor filter, we can clean up the image by eliminating stray hairs. The ABCD scoring method was then used to extract characteristics [8].

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III. STAGES OF SKIN DISEASE

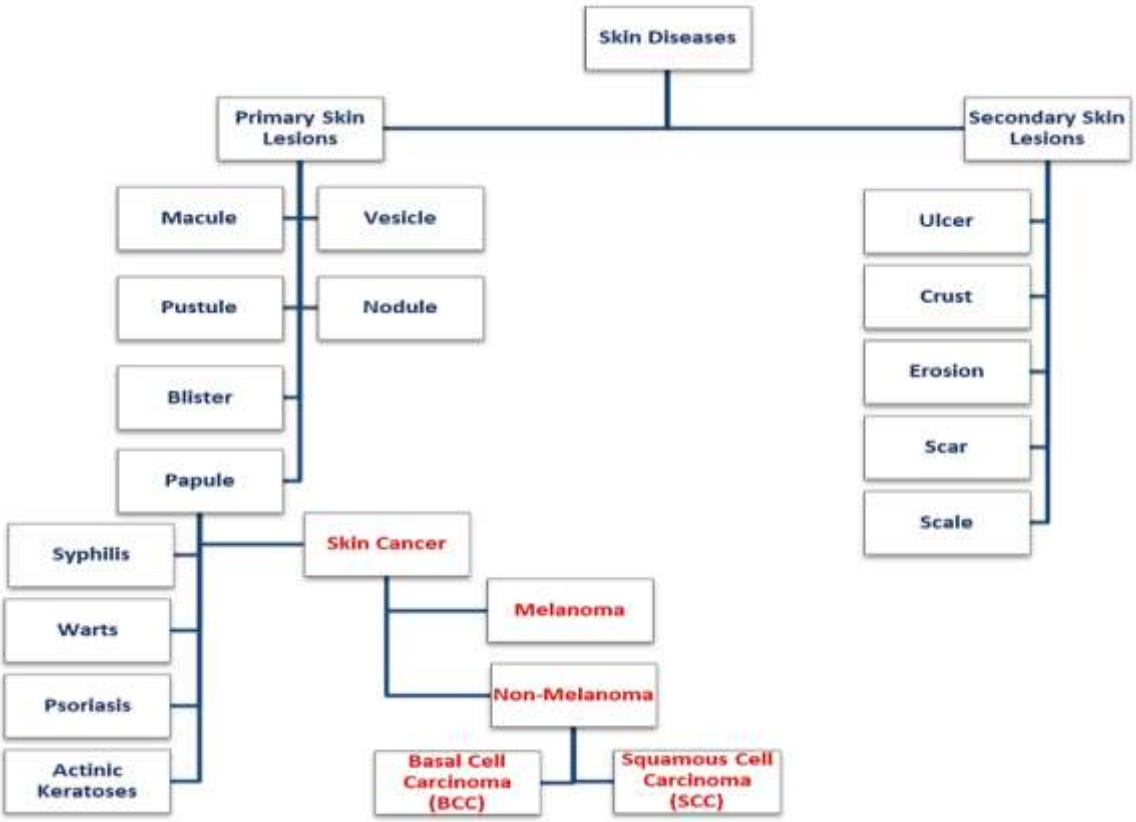

Fig.2 [2]

IV. IMAGE PREPROCESING TECHNIQUES

The goal of image pre-processing is to raise the quality of the final product by enhancing the source image. This method is essential for acquiring dermoscopy images. This is a necessary step because the captured image could not be very clear. The epidermis stores identifying features such as hair colour, scars, and skin tone. Therefore, images must be preprocessed before skin lesion detection can be performed [2]. There are numerous approaches to preprocessing an image. Image Manipulation and Retouching Photoshop's Dual-Hair-Remover 3. One example of a pre-processing method is depicted in Figure 2..

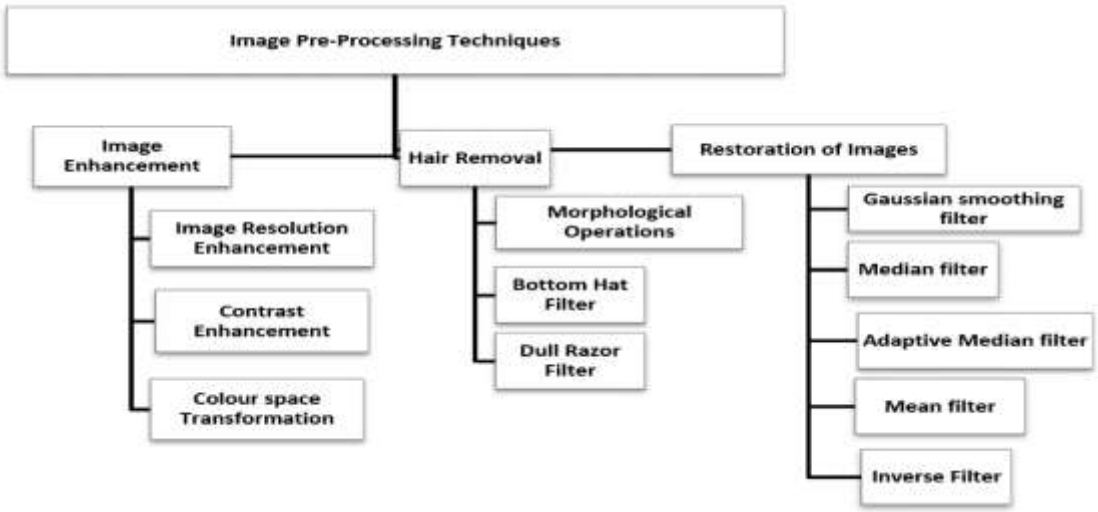

Figure 3. Types of Image Pre-Processing[2]

V. CONCLUSION AND FUTURE SCOPE

Skin diseases are currently a major public health issue worldwide. More than 100 million people around the world are affected by skin disorders. There is currently no cure for skin cancer, which is likewise on the rise. That's why early diagnosis is so important for both patients and medical professionals. Early detection of disease increases the likelihood of a positive outcome from treatment. This article focuses on skin diseases. Under soft computing, we describe the reasons for and steps of the detection process. Soft computing is a technique that has found use in every industry. Image processing methods are also covered in detail. Future work should focus on creating a model that makes optimal use of optimisation techniques to boost performance indicators.

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