A PERSPECTIVE SURVEY ON SKIN CANCER DETECTION USING DEEP LEARNING

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Abstract

Different kinds of cancer were found in humans, and among them, skin cancer is the most dangerous type of cancer. Various types of Skin cancers are found. Among them, melanoma is the most Hazardous if it is not found early. It is helpful to cure Melanoma cancer if it is detected in the early stage. Computer vision can play an essential role in Medical Image Diagnosis. Skin lesion image is the input to the system, and it analyses to decide the presence or absence of skin cancer by applying novel image processing techniques. The lesion image analysis tools check the various Melanoma skin cancer parameters Like Asymmetry, Border, Colour. From the extracted feature parameters, it is classified that the image is Normal skin or Melanoma cancer lesion. This paper reviews various researchers' research contributions in detecting skin cancer present using machine learning and deep learning techniques.

Keywords: CNN, Deep Learning, Machine Learning, Basal cell carcinoma

I . INTRODUCTION

The outer covering of the body is the skin, and it is the largest organ of the human body. The skin protects the human body by preventing the elements and microbes from entering the body to regulate body temperature. There are around seven layers of ectodermic tissues in human skin. The skin lesion is the abnormal part of the skin when comparing to other parts of the skin. Infection may affect the skin, which is the main reason for a skin lesion. The main reason for melanoma in any body part is the presence of Melanocytes in

it. The leading supplier of melanocytes is ultraviolet radiation.

When healthy cells grow abnormally, it forms a mass called tumor, the beginning of cancer. Tumors are dangerous if they grow and span to other parts of the body. Skin tumors are grouped into three categories: A tumor can be a benign tumor or a cancerous tumor. A cancerous tumor is malignant, and it can grow and span to other parts of the body. Tumors are a hazardous type of skin cancer if it is malignant because this tumor grows abnormally and uncontrollably and spans to other parts of the skin. The naked eye inspection of the skin lesion will never observe all features precisely, resulting in misinterpretation and mistreatment and finally it leads to death. Survival rates can be increased by early-stage accurate detection of skin cancer. Hence, for better accuracy and efficiency in skin lesion analysis, automatic detection is more reliable. Skin cancer became the most common type of cancer, and every year, Dermatologists diagnose and find skin cancer in more than 3 million Americans. Skin cancer can be treated if it is found early. Hence, from the total cancer death, only less than 1% is responsible for skin cancer. Sometimes skin cancer requires a multidisciplinary team to manage it when it became advanced.

Out of the total percentage of skin cancer, melanoma cancer account for 4%. but the death rate of melanoma cancer is 75% of the total skin cancer death. It becomes dangerous and hazardous that makes it challenging to treat. The main reason for melanoma in any body part is the presence of Melanocytes in it. It is possible for the visual examination of the skin subsurface structure based on the use of incident light, and oil immersion is a non-invasive examination

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technique in Dermoscopy. The speed and accuracy of diagnosis are increased with the help of computer-aided diagnostics. Many proposed systems and algorithms may improve melanoma skin cancer diagnostics, and some are reviewed here.

II. RELEVANT WORKS ON SKIN CANCER DETECTION

In [1], AndreEsteva et al., 2017 demonstrated that Convolutional Neural Networks (CNN) based software analyzed the thousands of skin cancer clinical images and diagnosed skin cancer patients' status. They compared the CNN software diagnosis performance with other software and found that CNN Software yielded accurate diagnosis for skin cancer patients' biopsy.

In [2], researchers analysed skin lesions obtained from a medical specialist and introduced a new spectral technique to cure skin cancer.

In [3], Manu Goyal et al., 2020 strongly believed that Software with Machine learning and deep learning algorithms need to be implemented to diagnose skin cancer diseases. They stated clearly in their review paper that AI-based systems should assist dermatologists in diagnosing and classifying the type of cancer diseases for skin cancer patients and Machine learning-based software will help skin cancer patients cure their diseases. In [4], the paper described another method of detecting cancer using the DLS Model.

In [5], researchers introduced a convolutional neural network (AlexNet) and SVM method to detect the presence of skin cancer. Skin diseases are widespread. This method provides a massive success in the prediction of skin cancer even in scorching places. In conclusion, this research provides great success and has a thriving and influential role in detecting skin diseases in countries with hot weather like Saudi Arabia with deserts.

In [6], with the help of novel image processing techniques, it analyses the skin lesion image to conclude the presence of skin cancer.

In [7], Shunichi Jinnai et al.,2020 created the test dataset by randomly selecting hundreds of skin cancer patient data, and they also created training data set from hundreds of skin cancer patients. They trained a Faster, Region-based Convolutional Neural Networks (FRCNN) using their training dataset and analysed the FRCNN model's performance with other machine learning and deep learning algorithms. They compared the diagnostic performance of FRCNN with other 20 dermatologists. They proved that diagnostic accuracy provided by the FRCNN algorithm was better than skin specialists.

In [8], Tanja B Jutzi et al.,2020 conducted an online survey using the open-source software LimeSurvey to implement Artificial Intelligence techniques to diagnose melanoma skin problems. They designed a questionnaire to evaluate patients' anticipations for using Machine learning software tools for diagnosing and curing melanoma skin cancer disease. They concluded from the survey that most skin cancer patients are eagerly willing to use AI-based software tools to diagnose skin cancer diseases like melanoma accurately, and patients were told the diagnosing capacity of Machine learning software tools is best.

In [9], Tanzila Saba,2020 demonstrated a mechanism for how cancer can be diagnosed and cured using machine learning with supervised, unsupervised, and deep learning techniques. He also addressed the recently implemented machine learning techniques for cancer detection for breast, brain, lung, liver, skin cancer leukemia.

In [10], features like symmetry, border, color, and diameter of the affected area is extracted using the ABCD scoring method. Textural features are extracted using HOG and

GLCM. In [11], the paper narrated Convolution Neural Network, a multiple AI algorithm for curing skin cancer.

III. CONCLUSION

Melanoma is the most uncured and unpredictable form of cancer if not found early. In order to reduce death rates, development of skin disease, and disease transmission, skin disease detection is essential. Melanoma cancer can be easily cured if it is detected in the early stage. Dermatologists detecting it by looking at the images of the affected area will never be accurate. Detecting skin diseases through Clinical procedures is a hugely expensive and time-consuming task. In the initial stage, for dermatology, Image processing techniques aid in developing an automated screening system. Dermatologists can easily classify skin diseases from the extracted features. This paper reviews various research projects undergone in the medical field of skin cancer.

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