

AI Based Skin Cancer Detection System

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ABSTRACT- Skin Cancer is the fast-growing cancer among the various cancers. The early detection for this cancer is important that decreases the amount of deaths. The traditional method like biopsy is time taking process, invasive method and a specialist is needed to treat cancer. To overcome these limitations, this paper AI Based Skin Detection System uses the deep learning technique for the accurate and efficient classification of the skin lesions or moles. The proposed system analyzes the image uploaded by the user and classifies them as cancerous(malignant) or non-cancerous(benign). This is a user-friendly web application which is non-invasive, cost-efficient and produces a efficient and accurate solution.

Keywords: Skin Cancer, Artificial Intelligence, Deep Learning, Benign, Malignant

I. INTRODUCTION

At present skin cancer is one of the most common health problems affecting the people around the world. It usually occurs when the skin cells start growing in a abnormal way. And also, due to continuous exposure to the harmful sun's radiation. If skin cancer is detected at an earlier stage, it can be treated successfully and can save the lives of human.

If the signs of the cancer are not identified at the earlier stage, those conditions may lead to serious complications. Especially in rural and remote areas, access to well-educated dermatologists is limited. As a result, many patients could not be able to get diagnosed at the earliest. In addition, manual explanation depends mainly on human judgement which may vary from one expert to another which leads to inconsistent in diagnosis.

At present, with the help of new technologies and image processing will help to improve the diagnosis in medical field, artificial Intelligence is being used in every fields widely which helps the doctors to analyse medical images in efficient and provides more accurate output.

II. RELATED WORKS

Some of the research hights the importance of the perspective study by Kavitha et al. (2024) concentrates on deploying on mobile, improving the data privacy and efficiency. On similar lines, Moturi et al. (2024) using AI techniques like Grad-CAM into CNN-based systems to improve clinical trust for lesion visualization. Additionally, Bharathi et al. (2024) uses deep learning algorithms for accurate outputs on smaller datasets.

Related works done by Senthil Kumar et al. (2021) applies CNN-models for achieving high performance using the standard datasets available in the web sources. In addition, to enhance robustness, Ahmed et al. (2020) proposed a system that improve the classification accuracy and generalization.

III. PROBLEM STATEMENT

Skin cancer is one of the most life-threatening diseases in the world where early detection plays crucial role in increasing the survival rates. Traditional methods believe on biopsy, need expert dermatologists, making the process time-consuming, invasive, costly, and unreachable to the rural or limited resources available regions. Existing approaches of skin cancer detection, although accurate, have some of the limitations that need to be addressed which includes high working computational requirements, lack of scalability, datasets and poor interpretability. As deep learning models are more efficient for larger datasets and devices rather than implemented on the low-resource devices. To overcome all these limitations, this project can produce a user-friendly, well scalable, accurate, non-invasive methodology. The system balances the performance, usage, to support early screening.

IV. AIM AND OBJECTIVES

The main aim of this project is to develop a skin cancer detection system that can analyse skin lesion images and help in identifying cancer at an early stage. The system is intended to assist in improving the accuracy of diagnosis and reducing the time required for detection.

OBJECTIVES

The objectives of the proposed system are listed below:

- To understand the basic causes and types of skin cancer and study existing diagnosis methods.
- To collect skin lesion images and perform pre-processing to enhance image quality.
- To separate the affected skin region from the image using appropriate segmentation techniques.
- To extract meaningful features such as colour, texture, and shape from the segmented skin lesion.
- To know the normal or cancerous skin lesion through the extracted features.
- Using the sample data, the system accuracy and reliability is tested.
- To support the early detection of skin cancer with a simple design and non-invasive method.

V. PROPOSED SYSTEM

The proposed system AI Based Skin Cancer Detection System designed to provide accurate, non-invasive and scalable output for early diagnosis using the deep learning based CNN(Convolutional Neural Networks) with EfficientNet b0 architecture that analyses the lesion images and classify as benign and malignant. Where users can upload the images of skin moles for diagnosis with the help of web application. The users authentication is necessary which includes for the security and also includes the previous history of the patients for continuous monitoring.

The main agenda of our project is to improve the diagnosis accuracy at the earlier stage which helps the users for early prediction, reliable performance and helps the healthcare professionals for the precised decisions.

VI. EXPERIMENTAL RESULTS

The implementation stage of AI Based Skin Cancer detection system focusses on building the system which helps to detect the skin cancer at earlier stage.

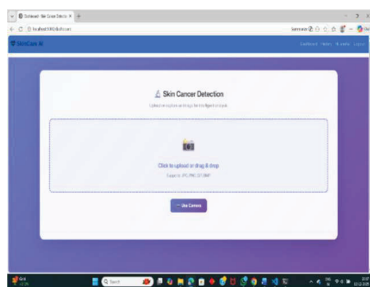


Fig: Dashboard

The above image describes the user dashboard where the user is able to upload the images of the skin lesions that diagnose and give the result based on the user input.

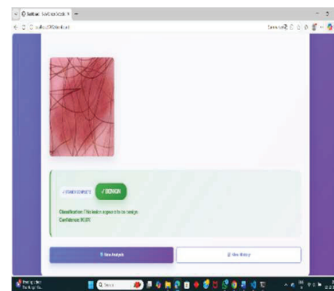


Fig: Analysis of image-Benign

The above image represents the analysis of the skin image uploaded by the user as benign i.e., the user is not having any cancerous cells present within the body and is safe from loosing the life.

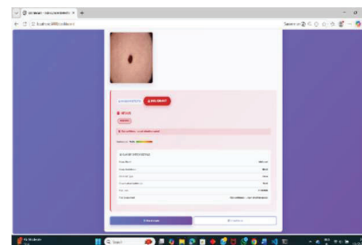


Fig: Analysis of image-Malignant

The image speaks about the analysis of the image that shows the user that he is having the cancerous cells present in his body and also shows the users about the confidence value along with the type of cancer.

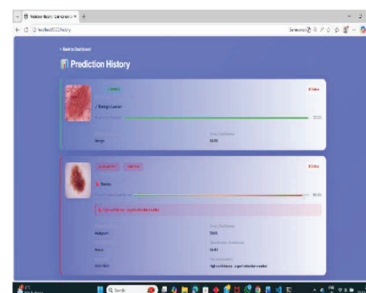


Fig: History of Analysis

The user can also observe the changes in the health parameters from the prediction history which helps for the continuous monitoring of the skin health.

VII. FUTURE ENHANCEMENTS

In the future, AI Based Skin cancer detection system can be enhanced by integrating advanced wearable sensors which enable continuous and helps in real-time monitoring. These sensors can collect important parameters such as skin temperature, moisture level, texture variation and colour

changes which can provide additional data for improving the accuracy and efficiency of skin cancer detection.

Further improvements may also include an development of the mobile application interface by expanding the datasets, we can train the model for better accuracy. The integration of natural language processing with the Artificial intelligence system, can help users to receive information, alerts, and guidance in their native languages.

CONCLUSION

The AI Based Skin Cancer detection system demonstrates how artificial intelligence can transform healthcare by enabling faster and more reliable detection of skin abnormalities. By applying deep learning technique to analyse the skin images, the system helps to identify the potential cancerous conditions at an earlier stage, which is essential for effective treatment and reducing mortality rates.

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