**Human Skin Disease Detection By Using CNN**

*A Real Time Research Project Report Submitted to*

# **Jawaharlal Nehru Technological University Hyderabad**

***In partial fulfillment of the requirements for the award of the degree of***

#### BACHELOR FOR

#### TECHNOLOGY

**IN**

**INFORMATION TECHNOLOGY**

*By*

S.Karthik - 23E11A1268

K.Mahesh-23E11A1258

P.Madhu - 23E11A1266

K.Pranav reddy-23E11A1277

***Under the guidance of***

**Mrs.SAILAJA.,** M.E

Assistant Professor

Department of Information Technology



**DEPARTMENT OF INFORMATION TECHNOLOGY**

# BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC, Accredited by NBA (UG Programmes: CSE, ECE, EEE & Mechanical) Approved by AICTE, Affiliated to JNTUH Hyderabad

Ibrahimpatnam -501 510, Hyderabad, Telangana

**JUNE 2025**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

# BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC, Accredited by NBA (UG Programmes: CSE, ECE, EEE & Mechanical) Approved by AICTE, Affiliated to JNTUH Hyderabad

Ibrahimpatnam -501 510, Hyderabad, Telangana

Certificate

*This is to certify that the Real Time Research Project work entitled*

*“***HUMAN SKIN DISEASE DETECTION BY USING CNN”** *is the bonafide work done*

**By**

**S.Karthik - 23E11A1268**

**K.Mahesh -23E11A1258**

**P.Madhu - 23E11A1266**

**K.Pranav reddy-23E11A1277**

*in the Department of Computer Science and Engineering,* ***BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY,*** *Ibrahimpatnam is submitted to Jawaharlal* ***Nehru Technological University, Hyderabad*** *in partial fulfillment of the requirements for the award of* ***B.Tech*** *degree in* ***Information Technology*** *during* ***2024- 2025.***

|  |  |
| --- | --- |
| **Supervisor:**  **Mrs.SAILAJA**  **Assistant Professor**  **Dept of Computer Science and Engineering Bharat Institute of Engineering and Technology Ibrahimpatnam–501 510, Hyderabad** | **Department I/C**  **Mrs.SAILAJA**  **Professor**  **Dept of Computer Science and Engineering Bharat Institute of Engineering and Technology Ibrahimpatnam– 501 510, Hyderabad** |

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of the task would be put

incomplete without the mention of the people who made it possible, whose constant guidance and encouragement crown all the efforts with success

We avail this opportunity to express our deep sense of gratitude and hearty thanks to **Sri CH. Venugopal Reddy**, Chairman & Secretary of BIET, for providing congenial atmosphere and encouragement.

We would like to thank **Prof. G. Kumaraswamy Rao**, Former Director & O.S. of DLRL Ministry of Defence, Sr. Director R&D, BIET, and **Dr. V Srinivasa Rao**, Dean CSE, for having provided all the facilities and support.

We would like to thank our Department Incharge / HOD **Mrs.Sailaja**, for encouragement at various levels of our Project.

We are thankful to our Project Coordinator **Mr. Nripesh kumar**, Assistant Professor, Computer Science and Engineering for her support and cooperation throughout the process of this project.

We are thankful to our guide **Mrs.Sailaja** , Assistant Professor, Computer Sciencand Engineering for his sustained inspiring Guidance and cooperation throughout the process of this project. His wise counsel and suggestions were invaluable.

We express our deep sense of gratitude and thanks to all the Teaching and Non-Teaching Staff of our college who stood with us during the project and helped us to make it a successful venture.

We place highest regards to our Parent, our Friends and Well-wishers who help along lot in making the report of this project

**S.Karthik - 23E11A1268**

**K.Mahesh-23E11A1258**

**P.Madhu - 23E11A1266**

**K.Pranav reddy-23E11A1277**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC, Accredited by NBA (UG Programmes: CSE, ECE, EEE & Mechanical) Approved by AICTE, Affiliated to JNTUH Hyderabad

Ibrahimpatnam -501 510, Hyderabad, Telangana

Declaration

We hereby declare that this Real Time Research Project is titled **Human Skin Disease Detection By Using CNN** is a genuine Real Time Research Project work carried out by us, in **B.Tech (Information Technology)** degree course of **Jawaharlal Nehru Technology University Hyderabad, Hyderabad** and has not been submitted to any other course or university for the award of my degree by me.

Signatures of the Project team members 1.

2.

3.

4.

5.

**ABSTRACT**

In this work, we propose a novel approach for the detection of skin diseases using Convolutional Neural Networks (CNNs). Skin diseases pose a significant health concern globally, necessitating accurate and timely diagnosis for effective treatment. Leveraging the power of CNN, our method aims to automate the detection process, thereby enhancing diagnostic accuracy and efficiency. We begin by providing an overview of common skin diseases and their impact on individuals and healthcare systems. Recognizing the importance of early detection, we delve into the limitations of traditional diagnostic methods and the potential of automated systems to address these challenges. Our approach builds upon the foundation of CNNs, which excel in image recognition tasks by automatically learning relevant features from input images. Through an extensive review of existing literature, we highlight previous work in this domain, identifying key findings, methodologies, and limitations. Furthermore, we describe the dataset used for training and evaluation, emphasizing its importance in facilitating robust model development. Our findings underscore the promise of CNNs in skin disease detection, offering a potential solution to improve healthcare outcomes in dermatology. Furthermore, we discuss the practical implications and potential applications of our research, including its relevance in clinical settings, telemedicine, and public health initiatives. We also address the limitations and future directions of our work, emphasizing the importance of ongoing research and collaboration in advancing the field of computer-aided dermatology. We meticulously curated a diverse dataset comprising high-resolution images of various skin conditions, sourced from reputable medical databases and clinical sources. This dataset encompasses a wide spectrum of dermatological disorders, including but not limited to eczema, psoriasis, melanoma, and acne. Each image is annotated with corresponding disease labels, ensuring comprehensive coverage of skin pathology.

Keywords: Dermoscopic, skin issues, timely diagnosis, autonomous diagnosis system, CNN techniques, computer-aided diagnosis, actinic keratoses, benign keratosis, melanocytic nevi, basal cell carcinoma, dermatofibroma, melanoma, vascular skin lesions, early detection, improved patient care .

**1.INTRODUCTION**

Skin diseases represent a significant burden on global healthcare systems, affecting millions of individuals worldwide. From common conditions such as acne and eczema to more severe disorders like melanoma, the prevalence and diversity of dermatological ailments underscore the pressing need for accurate and timely diagnosis. Traditional diagnostic approaches in dermatology rely heavily on visual inspection by trained clinicians, often leading to subjective assessments and variability in diagnosis. Moreover, limited access to specialized dermatologists in certain regions exacerbates disparities in healthcare delivery, hindering timely intervention and treatment. In response to these challenges, there has been growing interest in leveraging artificial intelligence (AI) and machine learning techniques to develop automated systems for skin disease detection. Among these, Convolutional Neural Networks (CNNs) have emerged as a powerful tool, capable of extracting intricate patterns and features from medical images with remarkable accuracy. CNNs' ability to learn hierarchical representations directly from raw image data makes them particularly well-suited for image classificationtasks, including dermatological diagnosis.

With the rapid advancement of Artificial Intelligence (AI) and Deep Learning, particularly Convolutional Neural Networks (CNNs), the medical field has begun to explore automated image analysis as a diagnostic tool. CNNs have proven to be highly effective in various computer vision tasks, including object detection, facial recognition, and more recently, medical image classification. In the context of skin disease detection, CNNs can learn and extract meaningful features from dermatological images, enabling accurate and efficient classification of multiple disease types.

This project focuses on developing a CNN-based deep learning model for the automatic detection and classification of human skin diseases using image data. The model will be trained on a curated dataset of skin disease images and evaluated using standard performance metrics. By leveraging the power of CNNs, this system aims to assist healthcare professionals and patients in identifying skin conditions promptly, thereby improving access to care, especially in remote and underserved regions**.**

* 1. **PROBLEM STATEMENT**

Skin diseases represent a major portion of the global disease burden, affecting millions of individuals regardless of age, gender, or geographic location. Timely diagnosis and treatment are critical to prevent the progression of these diseases, especially in cases like **melanoma**, which can become fatal if not detected early. Despite the seriousness of such conditions, there exists a significant gap in **access to quality dermatological care**, particularly in rural, remote, and economically disadvantaged areas.

Traditional diagnosis methods are primarily visual, relying on dermatologists to interpret clinical or dermoscopic images. This approach is often limited by human subjectivity, fatigue, and the similarity of visual features across different skin conditions. Misdiagnosis or delayed diagnosis can lead to inappropriate treatment, increased health costs, or worsening of the disease.

The shortage of trained dermatologists, combined with the increasing incidence of skin disorders, further exacerbates this issue. In low-resource settings, patients may go undiagnosed or self-medicate based on assumptions, which can be dangerous. Therefore, **there is an urgent need for a fast, reliable, and scalable solution that can assist in the accurate diagnosis of skin diseases**.

In recent years, **deep learning techniques**, particularly **Convolutional Neural Networks (CNNs)**, have shown immense potential in image classification tasks. CNNs can automatically learn and extract important features from medical images, often surpassing traditional machine learning algorithms in accuracy and efficiency. They offer a non-invasive, cost-effective, and highly scalable approach to assist in medical diagnosis.

**1.2.MOTIVATION**

The increasing prevalence of dermatological diseases worldwide poses a significant public health concern. Skin disorders such as melanoma, eczema, psoriasis, and fungal infections are not only widespread but also visually similar in appearance, making clinical diagnosis challenging. In many parts of the world, especially in rural or underserved regions, there is a severe shortage of qualified dermatologists, which leads to delayed diagnoses, improper treatments, and a decline in overall patient health outcomes.

Traditional diagnostic methods primarily rely on manual visual inspection, dermoscopic evaluation, and, in some cases, skin biopsies. These methods, while effective in clinical environments, are time-consuming, subjective, and dependent on specialist availability. As a result, there is a need for an efficient, scalable, and accurate system that can assist in the early detection and classification of skin diseases.

In recent years, advances in **Artificial Intelligence (AI)** and **Deep Learning** have introduced new possibilities in the field of medical image analysis. In particular, **Convolutional Neural Networks (CNNs)** have demonstrated exceptional performance in the automatic classification of images, including radiology scans, histopathology slides, and dermatological photographs. CNNs are capable of learning hierarchical representations from raw image data, extracting low-level features like edges and colors in early layers and more abstract features in deeper layers.

When applied to skin disease detection, CNNs can effectively differentiate between subtle visual characteristics of different skin conditions. This automated approach not only reduces human error but also enables real-time diagnosis in non-clinical environments such as mobile applications or community health programs. Moreover, CNN-based systems can function as decision-support tools for clinicians, providing a second opinion or highlighting regions of interest in skin lesion images.

Hence, the motivation behind using CNNs for human skin disease detection lies in their ability to:

* Automate and accelerate the diagnostic process.
* Reduce diagnostic inconsistencies and improve accuracy.
* Expand healthcare access to under-resourced areas.
* Support early detection, leading to improved treatment outcomes and lower healthcare costs.

**1.3.OBJECTIVES**

1. **To study and understand different types of human skin diseases**  
   Analyze common dermatological conditions such as eczema, melanoma, psoriasis, fungal infections, etc., and identify their visual features.
2. **To collect, preprocess, and annotate a relevant dataset**  
   Use publicly available skin disease image datasets (e.g., HAM10000, DermNet) and perform preprocessing steps such as resizing, normalization, and augmentation.
3. **To develop a CNN-based deep learning model**  
   Design and train a CNN architecture (or use pre-trained models like ResNet, Inception, DenseNet) to learn distinguishing features of different skin diseases.
4. **To evaluate the model’s performance using appropriate metrics**  
   Measure model accuracy, precision, recall, F1-score, and loss using training, validation, and test datasets.
5. **To compare the performance of different CNN architectures**  
   Analyze and compare multiple models (e.g., InceptionV3, ResNet50, DenseNet) to identify the most accurate and efficient architecture for the task.
6. **To deploy the model for practical usage**  
   Optionally, create a user-friendly interface (e.g., web or mobile app) to upload skin images and get instant predictions.
7. **To support early diagnosis and enhance dermatological healthcare**  
   Use the system to assist both medical professionals and individuals in identifying skin conditions earlier and more accurately.