PROJECT REPORT

On

**Skin Cancer Image Classification using CNN Models and Optimization Techniques**

Submitted in Partial Fulfillment of Award of

**BACHELOR OF TECHNOLOGY**

**In**

**Computer Science & Engineering**

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COLLEGE OF ENGINEERING AND DESIGN

ALLIANCE UNIVERSITY

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May, 2024



**COMPUTER SCIENCE & ENGINEERING**

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**01CERTIFICATE**

This is to certify that the project work entitled “Skin Cancer Image Classification using CNN Models and Optimization Techniques” submitted by Chandana MN [20030141CSE060], Bandi Rupa Sravya [L20030141CSE101] and Sameer Ali Khan [20030141CSE051] in partial fulfillment for the award of the degree of Bachelor of Technology Computer Science & Engineering of Alliance University, is a bonafide work accomplished under our supervision and guidance during the academic year 2023-2024. This thesis report embodies the results of original work and studies conducted by students and the contents do not form the basis for the award of any other degree to the candidate or anybody else.

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**DECLARATION**

We hereby declare that the project entitled “Skin Cancer Image Classification using CNN Models and Optimization Techniques” submitted by us in the partial fulfillment of the requirements for the award of the degree of Bachelor of Technology Computer Science & Engineering of Alliance University, is a record of our work carried under the supervision and guidance of Dr. Lokesh Singh, Assistant Professor, Department of Computer Science & Engineering

We confirm that this report truly represents the work undertaken as a part of our project work. This work is not a replication of work done previously by any other person. We also confirm that the contents of the report and the views contained therein have been discussed and deliberated with the faculty guide.

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**ACKNOLEDGEMENT**

**PREFACE**

**ABSTRACT**

Skin cancer is among the most diagnosed forms of cancer globally, with early detection being crucial to improving patient outcomes. This project explores the use of convolutional neural networks (CNNs) to aid in the early diagnosis of skin cancer through dermoscopic image analysis. We have developed a robust CNN model that learns from a comprehensive dataset of annotated dermoscopic images, capturing various manifestations of skin cancer. This dataset includes cases of "Melanocytic Nevi", "Melanoma", "Vascular Lesions", "Dermatofibroma", "Benign Keratosis Like Lesions", "Basal Cell Carcinoma", And "Actinic Keratoses".

Our model employs advanced optimization methods, notably stochastic gradient descent, to enhance predictive accuracy by effectively minimizing the loss function. To ensure the reliability of our model, we conducted rigorous evaluations against ground truth labels encompassing multiple skin cancer types. The results demonstrate the CNN's effectiveness in accurately classifying different forms of skin cancer, suggesting that this technology could complement traditional diagnostic methods.

In addition to the predictive model, we have designed an intuitive web interface to facilitate interaction between users and the model. The interface allows users, both medical professionals and patients, to upload dermoscopic images for analysis and prediction. It also provides clear guidance on using the platform, ensuring a user-friendly experience. Moreover, the platform includes features for booking appointments with dermatologists, viewing nearby dermatologists on a map, and maintaining communication between doctors and patients.

The preliminary findings suggest that this approach could significantly enhance the speed and precision of skin cancer detection, potentially leading to improved patient survival rates. The integration of a user-friendly interface with advanced CNN-based image classification provides a comprehensive solution that could be adopted in clinical settings to assist in early skin cancer detection and diagnosis.

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**CHAPTER 1**

1. **Introduction**