**Skin Lesion Detection using Deep Feature and DNA Features**

**A Project Report**

***Submitted by:***

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in partial fulfillment for the award of the degree

of

**BACHELOR OF TECHONOLOGY**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Faculty of Engineering and Technology, Institute of Technical Education and Research**

**SIKSHA ‘O’ ANUSANDHAN (DEEMED TO BE) UNIVERSITY**

**Bhubaneswar, Odisha, India**

**(June 2021)**

**CERTIFICATE**

This is to certify that the project report titled “Skin Lesion Detection using Deep feature and DNA Features” being submitted by (Soumya Sourav Pradhan, Abinash Acharya, Satyaswaroop Nayak, CSE-A) to the Institute of Technical Education and Research, Siksha ‘O’ Anusandhan (Deemed to be) University, Bhubaneswar for the partial fulfillment for the degree of Bachelor of Technology in Computer Science and Information Technology is a record of original confide work carried out by them under my/our supervision and guidance. The project work, in my/our opinion, has reached the requisite standard fulfilling the requirements for the degree of Bachelor of Technology.

The results contained in this thesis have not been submitted in part or full to any other University

or Institute for the award of any degree or diploma.

(Mr. Jitesh Pradhan)

Department of Computer Science and Engineering

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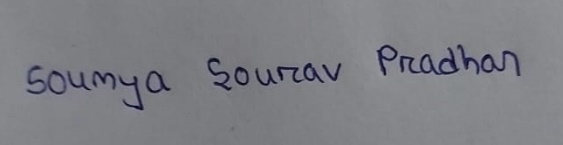
**ACKNOWLEDGEMENT**

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A special thanks goes to our team mates, who helped each other in building this project from scratch and completing it in time. Many thanks go to our subject instructor, Mr. Jitesh Pradhan who has invested his full effort in guiding the team in achieving the goal.

**Place: Bhubaneswar Signature of students**

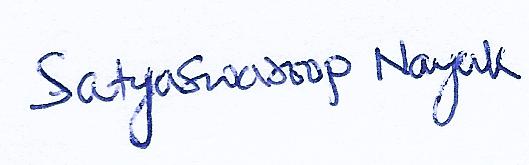
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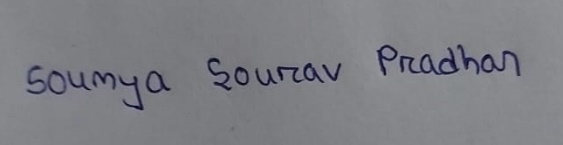
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**DECLARATION**

We declare that this written submission represents our ideas in our own words and where other’s ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/fact/source in our submission. We understand that any violation of the above will cause for disciplinary action by the University and can also evoke penal action from the sources which have not been properly cited or from whom proper permission has not been taken when needed.

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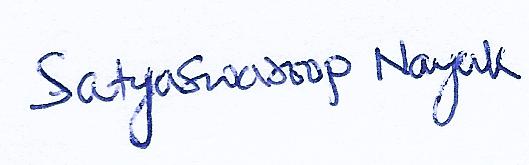
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**REPORT APPROVAL**

This project report entitled “Skin Lesion Detection using Deep feature and DNA Features” by (Soumya Sourav Pradhan, Abinash Acharya, Satyaswaroop Nayak, CSE-A) is approved for the degree of Bachelor of Technology in Computer Science and Engineering.

**Examiners**

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**Table of Contents**

|  |  |  |
| --- | --- | --- |
|  | Title Page | i |
|  | Declaration of the Student | ii |
|  | Certificate of the Guide | iii |
|  | Abstract | iv |
|  | Acknowledgement | v |
|  | List of Figures | vi |
|  | List of Tables (optional) | vii |
|  | Timeline / Gantt Chart | viii |
|  |  |  |
| **1.** | **INTRODUCTION** | **1** |
|  | * 1. Preface   2. Problem Definition   3. Project Overview/Specifications   4. Hardware Specification   5. Software Specification   1.3.1  1.3.2  … | 1  2  3  4  5 |
|  |  |  |
| **2.** | **LITERATURE SURVEY** | **5** |
|  | 2.1 Existing System  2.2 Proposed System  2.3 Feasibility Study | 5  6  7 |
|  |  |  |
| **3.** | **SYSTEM ANALYSIS & DESIGN** |  |
|  | 3.1 Requirement Specification  3.2 Flowcharts / UML Diagrams / ERDs/  3.3 Design and Test Steps / Criteria  3.3 Algorithms and Pseudo Code  3.3.1  3.3.2  3.4 Testing Process  … | 9  10  12  16  18  19  22  27 |
|  |  |  |
| **4.** | **RESULTS / OUTPUTS** | **40** |
| **5.** | **CONCLUSIONS / RECOMMENDATIONS** | **47** |
| **6.** | **REFERENCES** | **49** |
| **7.** | **APPENDICES** | **50** |
| **8.** | **SIMILARITY REPORT** | **51** |

1. **INTRODUCTION**

**1.1 Preface**

The skin is the human body's biggest organ. Skin cancers can occur when skin cells become disordered and grow out of control, and they can spread to other parts of the body. Skin cancer is the most common cancer on the planet. Skin cancer, for example, is the most frequent cancer with one in every five people in developed countries developing the disease over their lifetime. Malignant melanoma is one of the most dangerous types of skin cancer (the most lethal form) kills 10,000 people per year. However, if caught early enough, it can be healed with a simple excision, whereas a later diagnosis is linked to a higher risk of death - the estimated mortality rate is 50%. We offer a fully automatic computerized system for skin lesion classification, which uses optimized deep features from a variety of well-known CNNs and abstraction levels.

**1.2 Problem Definition and Objectives**

Melanoma is the most dangerous type of skin cancer, with an incidence that has increased dramatically over the previous 30 years. Early detection of melanoma is the most effective approach to cure it. The five-year relative survival rate for melanoma at the localized stage is 98 percent, and it reduces to around 14 percent in the advanced stage. As a result, early and accurate detection of melanoma is crucial. Dermoscopy imaging is used to detect pigmented skin lesions in order to diagnose melanoma or suspected skin lesions. It is a non-invasive approach that is used to detect suspicious skin lesions as a first step.

**1.3 Motivation**

Cancer is an extremist life threat to human life. It can sometimes result in a human's death. In the human body, various types of cancer can exist, and skin cancer is one of the most rapidly developing tumors that can lead to death. It is triggered by a variety of circumstances, including smoking, alcohol consumption, allergies, infections, viruses, physical activity, changes in the environment, and exposure to ultraviolet (UV) light, among others. UV rays from the sun have the potential to destroy the DNA inside skin cells. Skin cancer can also be caused by odd swellings of the human body. As skin cancer is linked to a higher risk of death - the estimated mortality rate is 50%, however if caught early enough, it can be healed with a simple excision whereas a later diagnosis is linked to a higher risk of death. To reduce the death rate due to skin cancer where in early detection can save the life of the person.

**1.4 Project Overview/Specification**

In this project we have implemented Convolutional Neural Network (CNN) to segment skin lesion images taken with camera into two categories namely benign and malignant. In the dataset we have used over 2800 images from which 80% is used to train the model and the rest 20% is used to test the model. As per software specification we have used the opensource libraries such as keras, numpy, matplot lib.

**1.4.1 Hardware Specification**

* + - * Windows 10
      * Processor : Minimum i-3 3rd gen

**1.4.1 Hardware Specification**

* + - * OS: Windows 10
      * Tools: Jupyter Notebook
      * Technologies: Python 3.8,Tensorflow,Keras,VGG16
      * Dataset: Kaggle

**2.LITERATURE SURVEY**

**2.1 Preface(work required)**

Many persons have proposed numerous types of Skin lesion detection systems. That are based on various CNN techniques such as Alexnet, ResNet, GoogLeNet.

We will learn about the existing system, its flaws, and how to overcome them with the suggested approach through a literature review.

The feasibility study will then be known to us. We will know all of the elements and values of the proposed system thanks to the feasibility research.

**2.2 Existing System**

There are just a few automated skin lesion classification systems on the market, with the majority of them being PC-based and requiring additional accessories and/or regulated circumstances to acquire data.

* The Automated Melanoma Recognition system created by H. Ganster is an example of an integrated system. A fusion of the outputs of three algorithms was used to achieve automated picture segmentation, which resulted in 96% correctly segmented images. When classifying into three classes, a 24-NN classifier achieved 73 percent melanoma recognition, and 87 percent sensitivity and 92 percent specificity for the “not benign” class in a two-class situation.
* A system developed by F.Ercal and others that used dermatologist-defined lesion boundaries and a commercial Neural Network classifier with calculated features representing lesion shape irregularity and asymmetry, as well as relative colors, to develop a system. This technique was successful in classifying 80% of the time. Neither of the aforementioned solutions were designed for use by the general public or implemented on mobile devices.
* MoleSense is a PC program developed by Opticom Data Research (Canada) that collects photos of skin lesions, analyses them using ABCD rules, and extracts feature values, but does not classify them.