



FINAL YEAR PROJECT REPORT

**SKIN CANCER DETECTION USING DEEP
LEARNING**

**In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)**

By

**IMAN MUHAMMAD ASIF
MUHAMMAD TABISH
ZAINAB HASSAN**

**57148 (BSCS)
57166 (BSCS)
57147 (BSCS)**

SUPERVISED

BY

**MS.SAMEENA JAVAID
BAHRIA UNIVERSITY (KARACHI CAMPUS)**

SPRING-2022

DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

Signature : Iman

Name : Iman Muhammad Asif

Reg No. : 57148

Signature : per

Name : Muhammad Tabish sheikh

Reg No. : 57166

Signature : Zainab

Name : Zainab Hassan

Reg No. : 57147

Date : 14/6/22

The copyright of this report belongs to Bahria University according to the Intellectual Property Policy of Bahria University BUORIC-P15 amended on April 2019. Due acknowledgement shall always be made of the use of any material contained in, or derived from, this report.

© 2019 Bahria University. All right reserved.

ACKNOWLEDGEMENTS

We would like to thank everyone who had contributed to the successful completion of this project. We would like to express our gratitude to our research supervisor, Ms Sameena Javaid for her invaluable advice, guidance and her enormous patience throughout the development of the research.

In addition, we would also like to express our gratitude to our loving parent and friends who had helped and given us encouragement.

SKIN CANCER DETECTION USING DEEP LEARNING

ABSTRACT

In healthcare, including dermatology, Artificial intelligence is widely used. One of the subfields of AI that involves statistical models along with algorithms that learn progressively from any given dataset to predict the characteristics of the new samples and achieve the desired goal is Machine learning. However, there is a very significant role of ML in detecting skin cancer, but the dermatology skill lags behindhand radiology in terms of Artificial intelligence acceptance. With the rapid spreading, use, and development of technologies, Artificial intelligence has become extensively accessible even to the overall people. People can use Artificial intelligence in initial skin cancer detection. E, g. using Deep Convolutional Neural Networks can help develop any system that can be able to evaluate images of the skin for the skin cancer diagnoses. Hence, in this article, we present a completely automated system of skin cancer detection through lesion images. We have used transfer learning algorithms like MobileNetV2, VGG16, and InceptionV3. Our models are designed into multiple phases including data collection, augmentation, model building, fine-tuning, and finally prediction. We have presented a comparison of these three models. MobileNetV2 model with fine-tuning gives higher accuracy of 99%. Finally, we will make an android app for our MobileNetV2 (Fine-tuned model) to test our results.

CHAPTER

1	INTRODUCTION	13
1.1	Background	13
1.2	Problem Statements	14
1.3	Aim(s) and Objective(s)	14
1.4	Scope of Project	15
2	LITERATURE REVIEW	16
2.1	BACKGROUND	16
2.2	RELATED WORK	16
2.3	COMPARISON TABLE WITH EXISTING STUDY	17
2.4	CHAPTER SUMMARY	18
3	DESIGN AND METHODOLOGY	19
3.1	PROPOSED METHODOLOGY	19
3.2	PROCESS MODEL	19
3.3	MODULES DISCUSSION	20
3.3.1	MOBILENETV2 MODEL	20
3.3.2	VGG16 MODEL	22
3.3.3	INCEPTIONV3 MODEL	22
3.3.4	ANDROID DEVELOPMENT MODULE	23
3.4	PROJECT DIAGRAM	23
3.4.1	DATA SET	24
4	IMPLMENTATION	25
4.1	MODULE DEVELOPMENT	25
4.1.1	MOBILENETV2 MODEL	25
4.1.2	VGG16 Model	27
4.1.3	ANDROID STUDIO IMPLEMENTATION	27
4.2	GUI and Source Code	28
4.3	Result and Discussions	48

5	TESTING AND EVALUATION	49
5.1	Test Plan	49
5.2	Testing Modules	49
5.2.1	RESULTS DERIVED BY MOBILENETV2 MODEL	49
5.2.2	MOBILENETV2 RESULTS AFTER FINE-TUNING	50
5.2.3	VGG 16 Model	51
5.2.4	InceptionV3 Model	52
5.3	Test Cases and Evaluation	53
5.3.1	Comparison of MobileNetV2, VGG16, and InceptionV3	54
5.3.2	Predictions made by MobileNetV2	55
6	CONCLUSION AND FUTUER WORK	57
6.1	Conclusion	57
6.2	Future work	57
	REFERENCES	58
	APPENDICES	61