FINAL YEAR PROJECT REPORT

AUTOMATED CLASSIFICATION OF CERVICAL CELL IMAGES FOR CANCER SCREENING

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

By

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SUPERVISED

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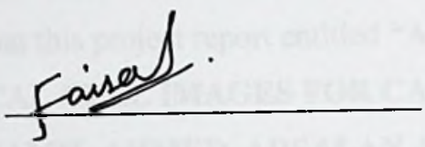
SPRING-2024

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 : 

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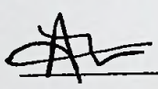
Signature : 

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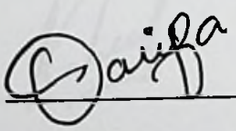
Signature : 

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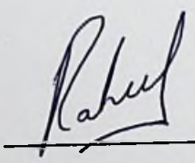
APPROVAL FOR SUBMISSION

We certify that this project report entitled **"AUTOMATED CLASSIFICATION OF CERVICAL CELL IMAGES FOR CANCER SCREENING"** was prepared by **FAISAL JAMIL AHMED, ARSALAN AHMED, & OSAID FAISAL** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Science in **Computer Science** at Bahria University, Karachi.

Approved by,

Signature : 

Supervisor: **Dr. Raheel Siddiqi**

Date : 13-06-2024

Specially dedicated to

My beloved grandmother, mother and father

(Faisal Jamil Ahmed)

My beloved grandmother, mother and father

(Arsalan Ahmed)

My beloved grandmother, mother and father

(Osaid Faisal)

ACKNOWLEDGEMENTS

We would like to thank everyone who had contributed to the successful completion of this project. We would like to express my gratitude to my project supervisor, **Dr. Raheel Siddiqi** 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 parents and friends who have helped and given us encouragement.

AUTOMATED CLASSIFICATION OF CERVICAL CELL IMAGES FOR CANCER SCREENING

ABSTRACT

Cervical cancer remains a leading cause of mortality among women worldwide, with multiple deaths annually. Effective screening programs that facilitate early detection are critical for improving outcomes and saving lives. The current standard relies on manual examination of Pap smear slides by skilledcytotechnologists, which is time-consuming, costly, and prone to human error. This project proposes an automated cervical cancer screening system using deep learning and computer vision techniques to analyze cytology images. A convolutional neural network classifier will be developed to categorize cervical cells extracted from whole slide images into normal, and abnormal classes. The model will be trained on a dataset of Pap smear imagery with expert cell classifications. Extensive experiments will tune the architecture, hyper parameters, and regularization strategies to optimize performance. Advanced techniques including transfer learning and data augmentation will be employed to enhance accuracy and generalizability. Once validated, this artificial intelligence-powered screening assistant could greatly increase the speed, consistency, and accessibilityof cervical cancer detection. By reliably flagging potentially cancerous cells, interventions could be administered sooner, preventing disease progression. The approach could be extended to improve outcomes for a variety of cancer types. This project will demonstrate the profound impact that AI and machine learning can have on life-saving medical diagnostics.

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