Department of Electrical and Computer Engineering

North South University

Senior Design Project

Prostate Cancer Cell Prediction from Histopathological Images using Convolutional Neural Network

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Fall, 2022

DECLARATION

This is to certify that this project is our original work. No part of this work has been submitted elsewhere, partially or fully, for the award of any other degree or diploma. Any material reproduced in this project has been properly acknowledged.

Students' name & Signature

1. **Watan Al Arafat**

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2. **Md. Mushfiqur Rahman**

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APPROVAL

The capstone project entitled "**Prostate Cancer Cell Prediction from Histopathological Images using Convolutional Neural Network**" by 1.**Watan Al Arafat (ID# 1731311042), 2. Md. Mushfiqur Rahman (ID# 1620003042)** was approved in partial fulfillment of the requirement of the degree of Bachelor of Science in Computer Science and Engineering on May and has been accepted as satisfactory.

Supervisor's Signature

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ACKNOWLEDGMENT

First of all, we wish to express our gratitude to the Almighty for giving us the strength to perform our responsibilities and complete the report.

The capstone project program is very helpful in bridging the gap between theoretical knowledge and real-life experience as part of the Bachelor of Science (BSc) program. This report has been designed to provide practical experience through theoretical understanding.

We also acknowledge our profound sense of gratitude to all the teachers who have been instrumental in providing us with the technical knowledge and moral support to complete the project with full understanding.

It is imperative to show our appreciation to our honorable faculty member, **Dr. Mohammad Monirujjaman Khan,** for his undivided attention and help in achieving this milestone. Also, our gratitude is divine to the North South University ECE department for providing us a course such as CSE 499 in which we could really work on this project and materialize it the way we have dreamed of.

We thank our friends and family for their moral support in carving out this project and for always offering their support.

ABSTRACT

In cancer research, pinpointing a patient's future response to treatment is crucial for making informed decisions. This study delves into a potential method for predicting the return of prostate cancer after surgery, utilizing imagery from tissue samples. Scientists analyzed a group of patients, categorizing them based on whether their cancer returned after treatment. To account for existing variations besides the cancer itself, they meticulously matched patients within the group based on factors like age, ethnicity, and disease severity. The proposed technique hinges on a sophisticated form of artificial intelligence known as deep learning. Uniquely, it employs two distinct AI models: one to pinpoint individual cells within the tissue, even in dense areas, and another to classify these cells. By analyzing these classified cells, the researchers were able to estimate, with promising accuracy, the likelihood of cancer recurrence in a patient. This method, if further validated, holds the potential to revolutionize treatment decisions for prostate cancer, offering a more personalized approach. The broader implications of this research extend beyond prostate cancer. This approach, with further development, might be adaptable to predicting treatment outcomes in various cancers. We have found the accuracy 93.33 percent.

Keywords- *Prostate; Cancer; Convolutional Neural Network; CNN; Deep Learning, prediction.*