Department of Electrical and Computer Engineering
North South University

Senior Design Project

Deep Learning Based Diabetic Retinopathy Detection from Fundus Images with Mobile Application & Web Solution

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Faculty Advisor:

Dr. K. M. A. Salam

Professor

Department of Electrical & Computer Engineering

Fall, 2020

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' names & Signatures

1. Md. Zillur Rahman

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2. Nusrat Jahan Khan Shila

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APPROVAL

We, **Md. Zillur Rahman (ID-1510157642)**, and **Nusrat Jahan Khan Shila (ID-1512879642)** are members of **CSE: 499 (Senior Design)** from the Electrical and Computer Engineering department of **North South University**; have worked on the project titled **"Deep Learning Based Diabetic Retinopathy Detection From Fundus Images With Mobile Application & Web Solution"** under the supervision of Dr. K. M. A. Salam as a partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science & Engineering and has been accepted as satisfactory.

Supervisor's Signature

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Dr. K. M. A. Salam
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Chairman's Signature

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Dr. Rezaul Bari
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ACKNOWLEDGEMENT

By mercy of the Almighty, we have completed our senior design capstone project entitled **"Deep Learning Based Diabetic Retinopathy Detection from Fundus Images with Mobile Application & Web Solution".**

Foremost, we would like to express our sincere gratitude to our advisor Dr. K. M. A. Salam for his continuous support in our capstone project progress throughout the whole 499A and 499B, for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped us in all the time of research, writing and completing of this project.

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Abstract

Diabetic retinopathy is one of the leading causes of blindness today, and the number of patients is growing at an unprecedented rate as the world's population increases. At the time of the first diagnosis of diabetes, up to 21% of people with type-2 diabetes have been screened for diabetic retinopathy. As the number of patients grows exponentially, it poses two challenges for the future. The challenges are: access to traditional screening tests will be limited if any modern innovative technology does not bridge the demand-supply gap and if the traditional system attempts to accommodate a larger number of patients with less resources, there is a possibility of error and failing to comply with health guidelines and standards. A deep learning-based scalable software solution may be a game changer in dealing with those unprecedented challenges. As deep learning achieves state-of-the-art performance in many fields, even outperforming experts, it will ultimately restrict inaccurate and fault diagnosis, and a robust software solution will democratize access to this health technology. This paper proposes a deep neural network or deep learning-powered automated system for screening and grading diabetic retinopathy with 88% accuracy using 299x299 pixel fundus images using a modular android smartphone application.