Department of Electrical and Computer Engineering
North South University

Senior Design Project

Comparative Analysis of Multi-disease Prediction using Deep learning

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Faculty Advisor:
DR. K. M. A. SALAM
Professor
Department of Electrical and Computer Engineering

Summer, 2023

December, 2023

To

Dr. Rajesh Palit
Chairman,
Department of Electrical and Computer Engineering
North South University, Dhaka

Subject: **Submission of Capstone Project Report on "Comparative Analysis of Multi-disease Prediction using Deep learning"**

Dear Sir,
With due respect, we would like to submit our **Capstone Project Report** on **"Comparative Analysis of Multi-disease Prediction using Deep learning"** as a part of our BSc program. The report deals with Multiple deep learning model architecture with multiple disease prediction system. This project was very much valuable to us as it helped us gain experience from practical field and apply in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

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MD. Mehedi Hasan Bhuiyan Nipu

ECE Department

North South University, Bangladesh

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Md. Raihan Uddin Sarker

ECE Department

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APPROVAL

MD. Mehedi Hasan Bhuiyan Nipu (ID: 1911870042), Md. Raihan Uddin Sarker (ID: 1912115042) , Meherin Afroz Mime (ID: 1912965642) and Ahanaf Akif Parvez (ID: 1821145042) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled "Comparative Analysis of Multi-disease Prediction Using Deep Learning" under the supervision of **DR. K. M. A. SALAM** partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Engineering and has been accepted as satisfactory.

Supervisor's Signature

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DR. K. M. A. SALAM
Professor
Department of Electrical and Computer Engineering
North South University
Dhaka, Bangladesh.

Chairman's Signature

…….

Dr. Rajesh Palit
Professor
Department of Electrical and Computer Engineering
North South University
Dhaka, Bangladesh.

DECLARATION

This is to declare 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. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

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1. MD. Mehedi Hasan Bhuiyan Nipu

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2. Md. Raihan Uddin Sarker

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3. Meherin Afroz Mime

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4. Ahanaf Akif Pervez

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ABSTRACT

This study focuses on the development and deployment of a multi-disease prediction system utilizing deep learning algorithms applied to MRI brain images. The research involves the creation of a specialized network model trained on MRI datasets collected from Kaggle, aimed at predicting various neurological conditions. The proposed model's architecture involves convolutional layers extracting intricate features from the MRI images, transitioning from raw data to pixel-level details, edges, shapes, and finally, disease-relevant regions. Visualization techniques highlight the extracted features and emphasize the network's ability to differentiate between healthy and diseased brain structures. Moreover, the study elucidates the interpretability of the CNN model through weight visualization and modified fully connected layers, delineating distinctions between classes, such as healthy controls and patients with Parkinson's disease. The performance evaluation of multiple deep learning models, including Basic CNN, Modified CNN, AlexNet, and VGG16, is conducted across various epochs. Results showcase notable accuracies in predicting Brain Stroke, Parkinson's disease, and Alzheimer's disease, with each model exhibiting distinct performance metrics. For instance, in Parkinson's disease prediction, transfer learning with VGG16 attains an accuracy of 98.79%, while Basic CNN achieves 91.984% accuracy in Brain Stroke prediction. This comparative analysis highlights the efficiency of deep learning methodologies in diagnosing neurological conditions using MRI data. The findings underscore the potential of these models in facilitating accurate disease identification, paving the way for improved diagnostic tools and interventions in neurology.