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MSc. Big Data Analytics

CMM799

MSc Project Report

Hybrid CNN Transfer Learning Model to Diagnose Pneumonia
using Quantum Image Classification

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ABSTRACT

Pneumonia is a serious state of acute respiratory infection, which is one of the largest infectious cause of death in children, and elders. Though pneumonia can be mild at the start of infection, in the absence of early diagnosis it can progress to a life-threatening state. Due to the severity of the disease, the accuracy and precision of the diagnosis is a necessity. However, existing systems basically operates in a classical classification domain without taking advantage of quantum mechanics to improve the accuracy and precision of the model.

This dissertation presents a background to the problem, literature study to identify the medium for pneumonia diagnosis, review on existing technology in the domain of data pre-processing, convolutional neural networks, transfer learning pattern and pretraining neural network, and on quantum image classification. And it also presents existing research, proposed design, prototype implementation and testing process, and evaluation.

The developed prototype makes use of quantum mechanics to outperform classical classification of pneumonia diagnosis. And compared against some of the key existing application to showcase its improved accuracy and precision, hence it is justified that the research produces acceptable results.

Key words— Pneumonia diagnosis, Chest x-ray imaging, Data pre-processing, Convolutional neural network, Transfer learning, Pre trained neural network, Image classification, Quantum image classification.