Review Paper on Detection of Diabetic Retinopathy through Quantum Transfer Learning

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Abstract*: Diabetic Retinopathy (DR) is a common complication among diabetes patients that can cause vision impairment owing to lesions on the retina. Late-stage discovery of DR often leads to irreversible blindness. The usual approach of diagnosing DR through retinal fundus imaging by ophthalmologists is both time-consuming and costly. Although classical transfer learning methods have been extensively employed for computer-aided DR detection, their high maintenance costs can restrict their performance. In contrast, Quantum Transfer Learning is projected to provide a more effective solution to this difficulty, acting on heuristic principles and being highly optimized for the task. Our suggested method will exploit this hybrid quantum transfer learning mechanism to detect DR. We propose to utilize the Blindness Detection dataset from Kaggle to develop our model, leveraging pre-trained classical neural networks for initial feature extraction. For the classification stage, we will utilize a Variational Quantum Classifier. This future effort seeks to prove that quantum computing, coupled with quantum machine learning, can do tasks with a level of power and efficiency unattainable by classical computers alone. By harnessing these new technologies, we intend to greatly enhance the identification and diagnosis of Diabetic Retinopathy, perhaps saving many from the risk of blindness*

Keywords: Diabetic Retinopathy, Quantum Transfer Learning, Quantum Machine Learning, Variational Quantum Classifier, Deep Learning