



**INFORMATICS  
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**Automated Diagnosis of Alzheimer's using Quantum Machine  
Learning**

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## **Abstract**

Alzheimer's Disease is one of the most common cause of dementia with ten million new cases every year. Early detection of the disease is being crucial thus, medical professionals can begin treatment to slow or halt the progression of the disease. Due to the criticality of the disease, accurate and precise diagnosis results are being a necessity. This dissertation aims to provide a system which automates the diagnosis process of the disease using neuroimaging biomarker mainly magnetic resonance imaging which has proven to be one of the earliest biomarkers used to diagnose the disease.

This dissertation proposes and implements a novel approach to the problem in a quantum machine learning perspective. Quantum machine learning uses quantum mechanical properties such as super-position and entanglement to process data. Which is believed to outperform classical computing in processing quantum like data. We compare different quantum machine learning approaches and classical algorithms to select a suitable approach to automate the diagnosis process. The implemented system outperforms several state-of-the-art classical systems which shows promising application of quantum machine learning in disease diagnosis and neuroimaging.

**Keywords:** Alzheimer's disease, Quantum Machine Learning; Alzheimer's disease Automation, classification, quantum computing, Magnetic resonance imaging