

S E M I N A R

Generation using an optimized HHL Quantum Algorithm

Gabriela Pinheiro (Fluminense Federal University, Brazil)

Friday, 4 October 2024 @ 14h00-15h00 SAST

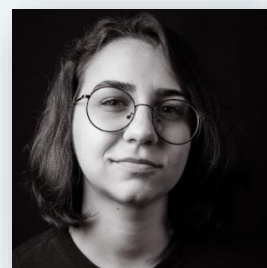
Venues: Online and Physics Seminar Room, Stellenbosch University

ABSTRACT

Support Vector Machine (SVM) is a Machine Learning model that uses a hyperplane to classify elements of a dataset, being possible to find the coefficients of said hyperplane by solving a linear system of equations. There is a quantum algorithm which could potentially obtain exponential advantage over classical algorithms at solving linear systems of equations: the HHL. However, an efficient implementation of the algorithm is yet to be developed. The current era of Quantum Computing presents a series of technical challenges to implement and execute circuits, with smaller circuits having less noise influence. Taking this scenario into consideration, circuit reduction optimizations were developed to enhance the executions quality, one example being the HHL optimization proposed in [Lee et al. 2019]. This seminar shows the process of using SVMs generated with optimized HHL Quantum circuits to classify pulsar candidates, where the quantum generated SVMs closely matched the accuracy of their classical counterparts with the optimized circuits having a significant execution speedup over the originals.

BIOGRAPHY

Gabriela Pinheiro graduated with a bachelor's degree in Computer Science at Universidade Federal Fluminense (UFF) in 2023 with the Undergraduate thesis "Automation of the Quantum Algorithm HHL for implementing SVMs on hybrid computers". She is currently pursuing a MSc degree in Computer Science at UFF, with her research being focused on the fields of Quantum Computation and Information, Quantum Machine Learning and Artificial Intelligence.



REGISTER: <https://bit.ly/3XN3JE9>

