

Interferometric Variational Quantum Learning Model

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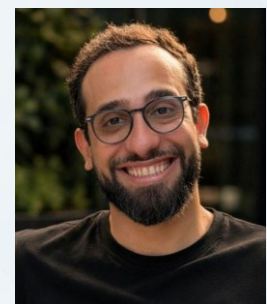
Venues: Online and NITheCS Seminar Room, Stellenbosch University

ABSTRACT

Variational quantum circuits are a central paradigm for quantum machine learning in the noisy intermediate-scale quantum (NISQ) era. Most existing approaches follow the expectation-value framework, where predictions are obtained from measurements of observables after data encoding and variational evolution. In this presentation, I will introduce an alternative interferometric learning architecture in which the model output is extracted from coherent amplitudes of a parameterized unitary using an ancilla-mediated interference protocol. This formulation naturally connects variational quantum learning with the structure of deterministic quantum computation with one clean qubit (DQC1) and admits an interpretation in terms of amplitude engineering and Ramsey-type interferometry.

BIOGRAPHY

Fernando M de Paula Neto holds a PhD (2018) and a Master's degree (2016) in Computer Science from the Federal University of Pernambuco (UFPE), and a Bachelor's degree (2014) in Computer Engineering (with University Honours) from UFPE. He is currently an Adjunct Professor at the Center for Informatics at UFPE (CIn-UFPE). He conducts research in Quantum Computing and Machine Learning, mainly focusing on quantum algorithms, intelligent quantum algorithms, optimisation of quantum circuits, computability of circuits, open quantum systems, classification and interpretability of intelligent systems applied in the medical field, non-linear dynamical systems, and chaos. He received the award for the second best doctoral thesis in the Artificial and Computational Intelligence Thesis and Dissertation Competition, promoted by the Brazilian Computer Society.



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