

'Quantum Calculator' Algorithm Demonstrates Ability of Current Quantum Computers to Solve Optimization Problems

New Research from Multiverse Computing Shows How Limited-Qubit Devices Can Find Solutions to Complex Mathematical Problems with Remarkable Efficiency

SAN SEBASTIÁN, SPAIN, December 14, 2022 /EINPresswire.com/ -- [Multiverse Computing](#), a global leader in delivering value-based quantum computing solutions, has released new research that illustrates how today's quantum computers can be used to do complex mathematical calculations using a new algorithm.



The algorithm created by Multiverse is designed to turn a quantum computer into a mathematical tool that can run complex calculations used by scientists on a daily basis, including derivatives, partial differential equations, Fourier analysis and other calculations which currently require specialized software to complete.



We can transform today's NISQ devices into advanced quantum-based 'calculators' that are able to do very complex calculations with very few qubits and limited error correction and provide value now."

Román Orús, co-founder and Chief Scientific Officer at Multiverse

A [new paper](#), titled "Variational Quantum Continuous Optimization: a Cornerstone of Quantum Mathematical Analysis," explains this advancement.

"Our research shows that we can transform today's Noisy Intermediate-Scale Quantum (NISQ) devices into advanced quantum-based 'calculators' that are able to do very complex calculations with very few qubits and limited error correction and provide value now," said Román Orús, co-founder and Chief Scientific Officer at Multiverse.

"These simulations are at least comparable to the best

classical computers today and will only improve as quantum computing performance increases," Orús added.

The algorithm created by Multiverse is designed to enable calculations based on "continuous variables" which can't be counted because they can take on an unlimited number of values

between the lowest and highest points of measurements.

The algorithm could be used to optimize operations in a factory, for example, taking into account multiple continuous variables, such as temperature, humidity, air pressure and other constantly changing conditions.

The Multiverse team designed the algorithm to run on programmable quantum computers and tested the algorithm on a simulator. The algorithm's efficiency is derived from the combination of two approaches to enable continuous optimization – encoding qubits with three continuous variables and quantum state tomography. The algorithm makes use of all the powerful features of quantum computers: entanglement, superpositions, and now continuous encoding.

“We will still be able to use these types of algorithms once we have fault-tolerant computers,” Orús said. “Quantum computers with more qubits and advanced error correction will only increase the accuracy, quality and the speed of the solution.”

About Multiverse Computing

Multiverse Computing is a leading quantum software company that applies quantum and quantum-inspired solutions to tackle complex problems in finance to deliver value today and enable a more resilient and prosperous economy. The company's expertise in quantum algorithms and quantum-inspired algorithms means it can secure maximum results from current quantum devices as well as classical high performance computers. Its flagship product, Singularity, allows professionals across all industries to leverage quantum computing with common software tools. The company also serves companies in the mobility, energy, life sciences and industry 4.0 sectors.

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