Using QCNN for Quantum Chemistry

Qiskit Mentorship Program

Mentor

Waheeda Saib

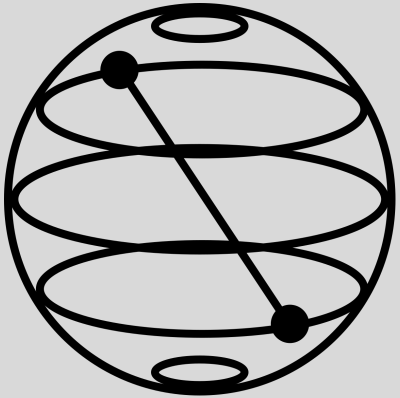
- Waheeda Saib is a Researcher and IBM Quantum ambassador at IBM Research-Africa in Johannesburg, South Africa.
- Waheeda holds a BSc in Information Technology from the University of Kwazulu Natal. She is completing a Masters in Data Science and Quantum Informatics from the University of Edinburgh.
- As an IBM Quantum ambassador, she represents IBM Quantum at Quantum Conferences and Tech events in Africa, to promote quantum computing and its relevance to the African continent.

Mentee

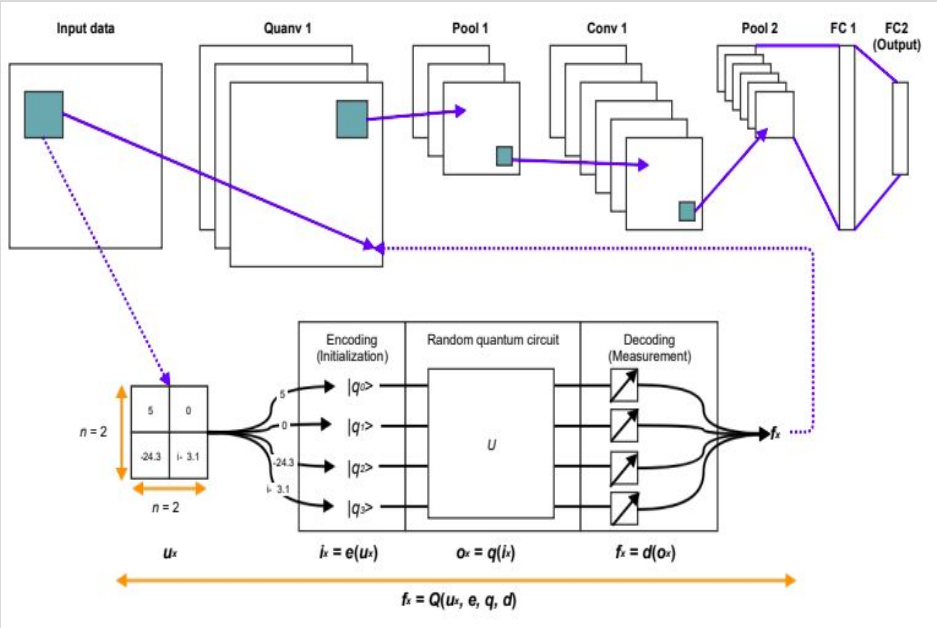
Kareem H. El-Safty

- I live in Ismailia, Egypt.
- I'm 27 years old.
- I Have a B.Sc. in Communications & Electronics Engineering.
- I'm an AI Engineer at DevisionX and a Research Assistant at Wigner Research Centre for Physics.
- Research Member in Alexandria Quantum Computing Group
- Master student at Suez Canal University.
- Qiskit Advocate at IBM.
- Certified AI Analyst from IBM.
- Won a national grant for Udacity's AI Nanodegree.
- Currently, I'm preparing myself to be an ML Teacher at ITI and for the AWS Certified Machine Learning – Specialty.
- I love rap, techno, and trance music.

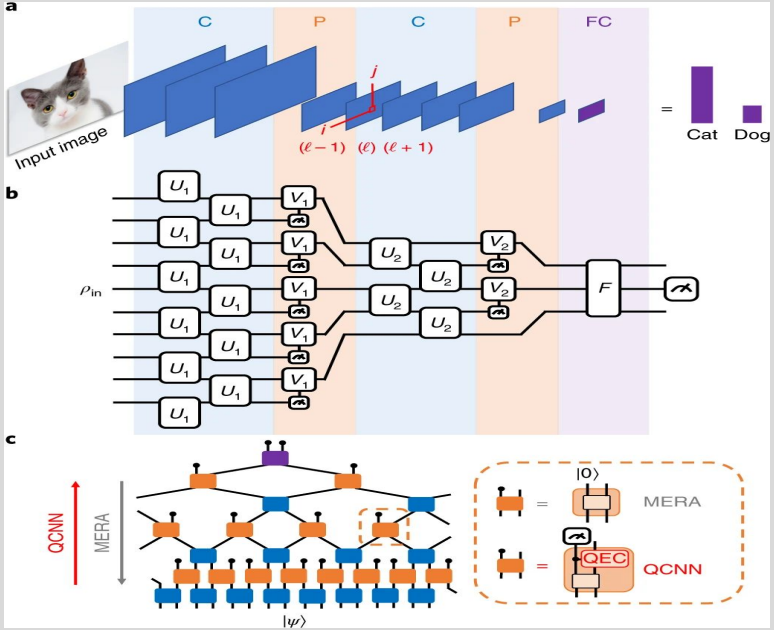
First Phase



First Phase

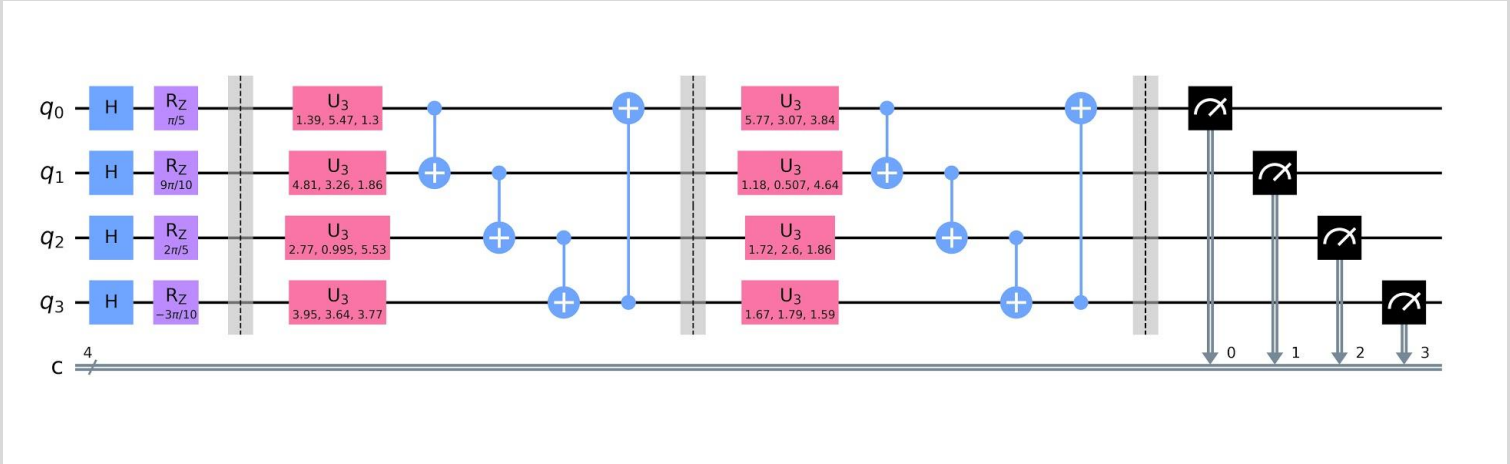


arXiv:1904.04767



https://doi.org/10.1038/s41567-019-0648-8

First Phase


q_0
q_1
q_2
q_3
c
4
H
R_Z $\pi/5$
R_Z $9\pi/10$
R_Z $2\pi/5$
R_Z $-3\pi/10$
U_3 1.39, 5.47, 1.3
U_3 4.81, 3.26, 1.86
U_3 2.77, 0.995, 5.53
U_3 3.95, 3.64, 3.77
U_3 5.77, 3.07, 3.84
U_3 1.18, 0.507, 4.64
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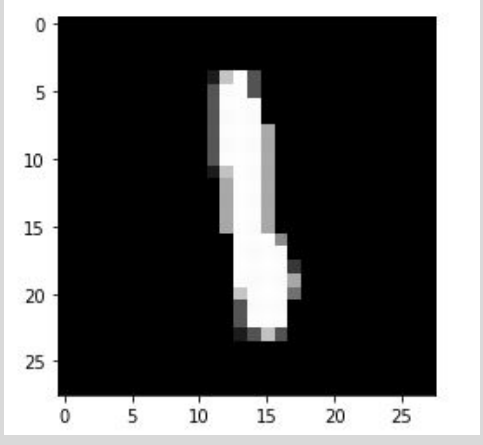
2
3

First Phase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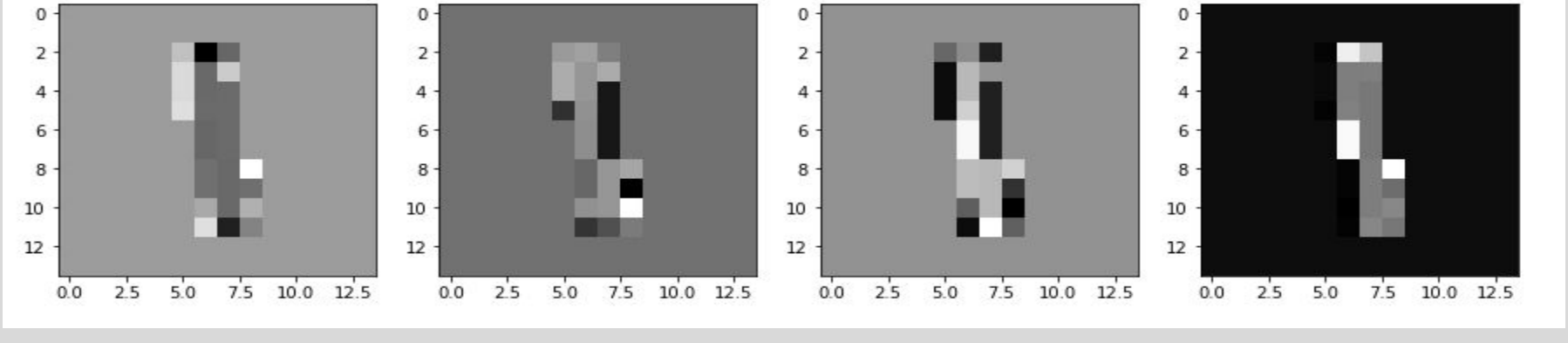
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12.5

Second Phase

1. Use QCNN to extract the features from the Hamiltonian
2. Use a VQE scheme to find the minimum energy of the system
3. Verify the results from arXiv:2011.02966

Thanks for Listening