

TONG DOU

Mobile: +(86) 13416345830

Email: tong.dou@foxmail.com

RESEARCH INTERESTS

Quantum Computing: Variational quantum algorithms, Classical shadow tomography

Machine Learning: Neural networks, Optimization

POSITION & EDUCATION

Tongji University, Shanghai, China 03/2023–01/2024

Research Assistant, Shanghai Research Institute for Intelligent Autonomous Systems; *Advisor: Shuming Cheng*

South China University of Technology (SCUT), Guangzhou, China 09/2019–06/2022

Master of Control Science and Engineering; *Advisor: Wei Cui*

South China University of Technology (SCUT), Guangzhou, China 09/2015–06/2019

Bachelor of Engineering in Automation

RESEARCH EXPERIENCE

Characterizing Quantum Systems through Classical Shadow Tomography 05/2023-01/2024

- Conducted research on analyzing properties (e.g., quantum fidelity, non-linear functions) of quantum states using classical shadows.
- Collaborated with other researchers on utilizing classical shadow techniques to enhance quantum state tomography.

Hybrid Convolutional Network Based on Variational Quantum Algorithms 10/2020-12/2021

- Developed hybrid neural networks combining parameterized quantum circuits and classical neural networks.
 - Proposed an optimization algorithm combining parameter-shift rules and backpropagation.
 - Wrote the program of hybrid neural network models using Julia with Yao.jl.
 - Designed and analyzed the simulation experiments.
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SELECTED HONORS & AWARDS

Postgraduate *First-Class* Scholarship, SCUT 2021

Postgraduate *First-Class* Scholarship, SCUT 2020

Honorable Award in Huawei Developer Challenge Quantum Computing Software Innovation Contest 2020

Postgraduate *Second-Class* Scholarship, SCUT 2019

QUALIFICATIONS

Skills: Python (Qiskit, PennyLane), Julia (Yao.jl), Matlab

Languages: Chinese (Native), English (IELTS: 7.0)

Hobbies: Soccer, Basketball, Swimming

PUBLICATIONS

1. **Tong Dou**, Guofeng Zhang, Wei Cui. Efficient Quantum Feature Extraction for CNN-based Learning. *Journal of the Franklin Institute*, 360(11): 7438-7456, 2023.
<https://doi.org/10.1016/j.jfranklin.2023.06.003>
2. **Tong Dou**, Zhenwei Zhou, Tao Liu, Kaiwei Wang, Hao Wang, Wei Cui. Quantum-classical hybrid neural network and its application in fault diagnosis (in Chinese). *Control Theory & Applications*, 38(11): 1785-1792, 2021.
<https://dx.doi.org/10.7641/CTA.2021.10881>
3. **Tong Dou**, Kaiwei Wang, Zhenwei Zhou, Shilu Yan, Wei Cui. An unsupervised feature learning for quantum-classical convolutional network with applications to fault detection. *2021 40th Chinese Control Conference (CCC)*, IEEE, 2021: 6351-6355.
<https://doi.org/10.23919/CCC52363.2021.9549885>
4. Wei Cui, **Tong Dou**, Shilu Yan. Threats and Opportunities: Blockchain meets Quantum Computation. *2020 39th Chinese Control Conference (CCC)*, IEEE, 2020: 5822-5824.
<https://doi.org/10.23919/CCC50068.2020.9189608>