Po-Wei (George) Huang

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Education

National University of Singapore **Aug 2020 - Jun 2023**

Bachelor of Computing (Computer Science) with Honours (Highest Distinction) (GPA 4.81/5.00)

- Second Major in Mathematics
- Turing Programme (Honours Research Specialization Program)
- Study Focus Area: Algorithm and Theory / Artificial Intelligence
- Coursework: Design and Analysis of Algorithms (A^+), Information Theory (A^+), Optimisation Algorithms (A^+), Randomised Algorithms (A), Algorithm Mechanism Design (A), Artificial Intelligence (A), Uncertainty Modelling in AI (A), AI Planning and Decision Making (A), Quantum Mechanics I/II (A), Probability (A)

Nanyang Technological University **Aug 2019 - May 2020**

BEng/BBus Double Degree in Business and Computing (GPA 4.91/5.00(CS) 4.74/5.00(Business))

- Incomplete; transferred to NUS by end of freshman year
- Coursework: Computational Thinking (A^+), Data Structures (A^+), Data Science and AI (A^+)

Preprints

P.-W. Huang, X. Li, K. Koor, P. Rebentrost (2023). Hybrid quantum-classical and quantum-inspired classical algorithms for solving banded circulant linear systems. *arXiv:2309.11451 [quant-ph], submitted to QIP 2024 and npj Quantum Information.*

P.-W. Huang, P. Rebentrost (2023). Post-variational quantum neural networks. *arXiv:2307.10560 [quant-ph], accepted at QTML 2023 as short talk, under review at Physical Review Research.*

Publications

P.-W. Huang (2022). Domain specific augmentations as low cost teachers for large students. *Proceedings of the First Workshop on Information Extraction from Scientific Publications (WIESP@AACL-IJCNLP2022).*

P.-W. Huang, A. Ramesh Kashyap, Y. Qin, Y. Yang, and M.-Y. Kan (2022). Lightweight contextual logical structure recovery. *Proceedings of the Third Workshop on Scholarly Document Processing (SDP@COLING2022).*

Research Experience

Research Assistant **May 2023 - Present**

Principal Investigator: Patrick Rebentrost (Centre for Quantum Technologies)

- Investigating hybrid quantum-classical algorithms and quantum machine learning with provable guarantees.
- Exploring algorithmic quantum solutions for algorithmic game theoretical optimization problems.

Undergraduate Researcher **Aug 2022 - Apr 2023**

Supervisor: Patrick Rebentrost, Rahul Jain (Centre for Quantum Technologies)

- Proposed "post-variational" strategies that convert quantum optimization to convex optimization problems.
- Conducted error analysis of such strategies and provided upper bounds of quantum measurements required.

Undergraduate Researcher **Apr 2021 - Jul 2022**

Supervisor: Min-Yen Kan (Web IR/NLP Group @ NUS)

- Optimized document structure extraction performance by 10% for marco-F1 against a previous model.
- Adapted sliding attention framework to induce quadratic speedup in runtime.
- Applied deep semi-supervised learning techniques to increase model robustness to out-of-domain data.

Student Researcher **Sep 2018 - May 2019**

Supervisor: Hung-Ping Lin (NCKU Chemistry)

- Synthesized porous bio-carbon as a replacement material of graphene-based supercapacitors.
- Experimented on different properties of bio-carbon that affect capacitance.

Achievements and Awards

Degree Honours – Highest Distinction *(2023)*

Certificate of Distinction – Algorithms & Theory / Artificial Intelligence *(2023)*

Top Students for Design and Analysis of Algorithms / Optimisation Algorithms *(2022, 2023)*

Dean's List *(Fall 2020, Spring 2021, Fall 2022)*

Honour List of Student Tutors *(2022)*

Talks

"Post-variational quantum neural networks." *Contributed talk at QTML 2023.* (Nov 23, 2023)
"Post-variational strategies for quantum machine learning." *QML Seminar, QAISG.* (Oct 24, 2023)
"Post-variational quantum neural networks." *CS Seminar, Centre for Quantum Technologies.* (Aug 30, 2023)
"Hybrid quantum-classical neural networks." *Bachelor's Dissertation Presentation, NUS.* (Apr 17, 2023)
"Domain specific augmentations as low cost teachers for large students." *Contributed talk at First Workshop on Information Extraction from Scientific Publications.* (Nov 21, 2022)
"Neural logical recovery for scholarly articles." *Undergraduate Research Opportunity Programme (UROP) Presentation, NUS.* (Apr 18, 2022)

Academic Services

Sub-reviewer for QTML 2023, QIP 2024

Teaching Experience

NUS School of Computing **Jan 2021 - Apr 2023**

Teaching Assistant (Data Structures and Algorithms)

- Provided algorithm design consultation and pseudocode fine-tuning for 120+ students over 6 semesters.
- Graded programming assignments for 200+ students over 7 semesters.
- Designed lab materials for Java programming and data structure applications.

Industrial Experience

OpenRead **Mar 2022 - Sep 2022**

Part-time NLP Engineer (Neural Engine Development Team)

- Constructed an inference engine for table and figure extraction using vision models from scientific articles.
- Developed document reconstruction program for PDF files using multimodal ensemble neural networks.
- Assembled summarization pipeline for long scholarly documents.

Continental Automotive Singapore **May 2022 - Jul 2022**

Software Engineer Intern (Central Engineering Department)

- Developed an internal tool to track coding issues with the purpose of reducing manual time.
- Designed heuristic-based algorithm for string matching for issue detection.
- Participated in Agile ceremonies and familiarized Agile workflows.

Taiwan Semiconductor Manufacturing Company (TSMC) **Jul 2021 - Sep 2021**

Software Engineering Intern (Equipment Edge Computing Team)

- Facilitated database transfer from SQL to NoSQL increasing read/write access speed by 10x.
- Created Spring-based backend of the existing dashboard to streamline database accessing procedures.
- Deployed cluster-balanced Cassandra database with Prometheus and Grafana interface for easy monitoring.

Standard Test Scores

TOEFL iBT: 118/120 (Jun 2018)
GRE Physics Subject Test: 990/990 (Oct 2023)

Skills

Spoken Languages: English (full professional proficiency), Chinese (native)
Programming Languages: C/C++, Java, Python
Quantum Computing: Qiskit, Pennylane