JU CHENGQUAN, PH.D.

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SUMMARY

- Singapore Permanent Resident with a multidisciplinary background, driving synergistic innovations in Operations Research (OR), Machine Learning (ML), and Artificial Intelligence (AI).
- Extensive experience in programming, OR & AI modeling, and real-world applications, with a strong foundation in service/network design and distributed/robust/hierarchical optimization.
- A reliable and strategic technical leader, known for problem-solving, team building, and fostering innovation with a blend of rigorous creativity and adaptive resilience.

EDUCATION

Ph.D. in Electrical Engineering (Sustainable Earth) , GPA: 4.83/5 — NTU, Singapore — 2013 – 2018

M.Sc. in Power Engineering , GPA: 4.88/5 (1st/388) — NTU, Singapore — 2012 – 2013

B.Eng. in Electrical Engineering , GPA: 3.44/4 — Wuhan University, China — 2008 – 2012

EXPERIENCE & PROJECTS

Personal Side Projects

- Podjekts: A collection of nano projects.
- Magpie: A graph-based framework for quickly building agentic workflows and automation pipelines.

OCBC, Singapore

Data Scientist (VP), AI Lab, Group Data Office — Feb 2024 – Current

Data Scientist (AVP), AI Lab, Group Data Office — Nov 2022 – Feb 2024

Technical lead, data science. Building end-to-end AI solutions, including:

- *Generative AI as a service* - Designed and deployed APIs for text generation, embeddings, and speech recognition, enabling scalable AI-driven applications.
- *Agent Systems and Workflow Automation* – Built task orchestration pipelines leveraging RAG and vector databases to transform banking operations.
- *AI for Risk Management* – Developed machine learning and AI models to enhance business risk assessment and mitigation strategies.
- *Strategic AI Adoption* – Partnered with stakeholders to identify gaps, uncover opportunities, and enhance human capabilities, improving productivity through AI integration.

News release: *OCBC* and *The Straits Times*.

Conversational AI

- *Enterprise LLM Deployment* – Designed and deployed on-premise large language model (LLM) service frameworks for secure and scalable AI applications.
- *Speech AI Solutions* – Developed scalable, high-performance Speech-to-Text and Text-to-Speech APIs for transcription, diarization, and voice activity detection, enabling applications such as sales surveillance and real-time contact center analytics.
- Achieved a projected annual cost saving of ~$500K.

Agent Framework

- Built a foundational agentic infrastructure to drive Generative AI applications, including document QA, chatbot automation, call summarization, and task orchestration.
- Developed agents capable of dynamic decision-making, task prioritization, and adaptive workflows
- *Plug & Play* - Designed modular and reusable components to support diverse AI-driven business applications.
- *Multi-agent collaboration* – Designed a system where AI agents coordinate and communicate to complete tasks.

Credit Risk Stress Testing Platform

- Developed a scalable and cost-efficient macro credit risk stress testing system with enhanced maintainability.
- Led a complete platform overhaul, replacing decades-old spaghetti code with optimized AI/OR-driven solutions, completed within 4 months.
- Achieved a projected annual cost saving of ~$500K by improving system efficiency and automation.

Shopee, Singapore

Expert Data Scientist, Map Department — Dec 2021 – Sep 2022

Senior Data Scientist, Map Department — Jul 2020 – Nov 2021

Team lead of data science SG team in map department. Our team mainly works on:

- Address point-of-interest (POI) services (autocomplete search, address standardization, geocoding and division autocomplete).
- NLP/ranking projects on search query pre-processing and post-processing.
- Routing engine, an infrastructural geographic service to provide various routing APIs, GPS trajectory data mining and segmented speed update projects.

POI Search Services and Query Processing

- POI search related API service development, maintenance and operation, including address autocomplete search, address standardization, geocoding and division autocomplete, to extend empowerment with business units such as express delivery and local life service providers.
- Modularized algorithm packages for query pre-processing (name entity recognition, query correction/expansion/understanding) and post-processing(address match, deduplication and retrieval ranking).
- Led the team for project delivery from conceptualization to implementation of technical solutions.

POI Database Pipeline

- POI database pipeline integration in multiple SEA countries.
- Concatenated and re-designed multiple data processing pipelines involving clustering and deduplication algorithms as reusable assets to resolve stakeholders' pain points.
- Performance improvement: Data coverage ratio increased from 62% to 77% in various use cases.

Routing Engine, An Infrastructural Geographic Service

- Designed and maintained API architecture and service operations, expanding functionalities to support live routing, navigation, car-hailing, and service region selection across multiple business units
- Integrated GPS trajectory data and machine learning models, improving ETA accuracy by 35%–50% compared to leading commercial APIs.
- Enhanced service robustness and scalability, achieving a 200%–400% increase in QPS and 150%–500% reduction in latency across various services
- Delivered economic benefits, reducing daily operational costs by ~$51K USD and optimizing ~3.5M API calls compared to commercial alternatives.

GPS Trajectory Data Mining

- Defined project scopes and methodologies and provided analytical applications with trackable business insights.
- Explored trajectory data to transpose time-series GPS trace-points into hierarchical speed settings to support routing engine, including admin-division based, road-type based, and way segment based.
- Actual time of arrival ground truth exploration with proposed clustering algorithms (TS-DBSCAN, density peak clustering).

Stack Assignment and Order Grouping

- Collaborated with business units to identify optimization opportunities and develop strategies for driver resource allocation, service commitment, and cost reduction.
- Designed and implemented dispatch and order grouping algorithms via an online API service, ensuring seamless integration with business KPIs and operational workflow.
- Achieved a 30% reduction in daily operational costs across selected countries by enhancing efficiency and automation.

> For past projects, please visit my personal website: here.

Envision Digital, Singapore

Optimization Engineer — Aug 2019 – Jun 2020

Key developer of power grid energy management platform and optimization engine, contributing to an $11M grant project and V2G applications across Europe.

Nanyang Technological University, Singapore

Research Fellow — Sep 2017 – Aug 2019

Independent contributor working on multiple research projects, inlcluding Grid-wide Intermittency Management of Distributed ESS, Distributed Robust Optimization for Networked Microgrids and Temporal Decentralization for Stochastic Optimization.

SKILLS

Programming

Proficient	Python, PySpark, Google OR-Tools, LaTeX, Gurobi, MATLAB, Simulink
Intermediate	NodeJS, Markdown, MySQL, PostgreSQL, PLECS
Basic	HTML5/CSS, Julia, R, PHP, LabVIEW, C#, C++

Language

Native	Chinese
Professional	English

PUBLICATIONS

Journal

C. Ju, P. Wang, L. Goel, and Y. Xu, "A two-layer energy management system for microgrids with hybrid energy storage considering degradation costs," *IEEE Trans. on Smart Grid*, vol. 9, no. 6, pp. 6047–6057, 2018.

Y. Wang, T. Zhao, C. Ju, Y. Xu, and P. Wang, "Two-level distributed voltage /var control using aggregated PV inverters in distribution networks," *IEEE Trans. on Power Delivery*, vol. 35, no. 4, pp. 1844–1855, 2020, ISSN: 1937-4208.

Arxiv

C. Ju, "Hierarchically coordinated energy management for a regional multi-microgrid community," 2021. DOI: 10.48550/ARXIV.2102.03745. [Online]. Available: https://arxiv.org/abs/2102.03745.

Conference

C. Ju, Y. Tang, Y. Wang, and Y. Xu, "A temporal decentralized algorithm for optimal stochastic energy scheduling in microgrids," in *2019 IEEE Power Energy Society General Meeting (PESGM)*, 2019, pp. 1–5.

C. Ju, Y. Tang, and Y. Wang, "Robust frequency regulation with hybrid energy storage systems in islanded microgrids," in *Asian Conference on Energy, Power and Transportation Electrification (ACEPT 2018)*, 2018, pp. 1–6.

C. Ju, S. Yao, and P. Wang, "Resilient post-disaster system reconfiguration for multiple energy service restoration," in *1st IEEE Conference on Energy Internet and Energy System Integration*, 2017, pp. 1–6.

C. Ju and P. Wang, "Two-stage energy management of residential microgrid community using pairing strategy," in *2017 IEEE PES General Meeting*, 2017, pp. 1–5.

C. Ju and P. Wang, "Optimal power flow with worst-case scenarios considering uncertainties of loads and renewables," in *2016 International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Oct. 2016, pp. 1–7.

C. Ju and P. Wang, "Energy management system for microgrids including batteries with degradation costs," in *2016 IEEE International Conference on Power System Technology (POWERCON)*, Sep. 2016, pp. 1–6.

C. Ju and P. Wang, "Dynamic optimal power flow including energy storage with adaptive operation costs," in *IECON 2015 - 41st Annual Conference of the IEEE Industrial Electronics Society*, Nov. 2015, pp. 561–566.