JU Chengquan, Ph.D.

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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

📍 *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 of data science. Building end-to-end solutions of including:
▸ Generative AI as a service: Text generation, embedding and audio speech recognition infrastructural APIs.
▸ Agents system: task pipeline and orchestration with RAG and vector database for businesses transformations of bank operations.
▸ OR/ML/AI models for risk management capabilities. Continuous engagement with stakeholders to help identify gaps, aware opportunities, augment human capabilities and improve productivity with AI.
News release: *OCBC* and *The Straits Times*.

Generative AI
▸ On-premise design and deployment of enterprise LLM service frameworks.
▸ Speech-To-Text: Scalable and high-performant API service for transcription, diarization and voice activity detection to leverage use cases such as sales surveillance, real-time audio analysis at contact centre, etc.
▸ Agent framework as infrastructure to support GenAI based use cases: document QA, chatbot, call summarization, etc.

Credit Risk Stress Testing Platform
▸ Development of a high performing macro credit stress testing system to achieve scalability, easy maintenance/enhancement and saving cost.
▸ Rebuild of the platform from spaghetti code across decades from scratch with optimized solutions leveraging on AI/OR techniques within 4 months.
▸ Projected cost saving: ~$500K per annum.

📍 *Shopee, Singapore*

Expert Data Scientist, Map Department 📅 Dec 2021 – Nov 2022

Senior Data Scientist, Map Department 📅 Dec 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, and 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
▸ API architecture development and service operation, with expanded operational modes/objectives to support diversified business units including live routing, navigation, car hailing and service region selection.
▸ Applied GPS trajectory data and machine learning models to improve of ETA accuracy by 35%-50% in various countries compared with leading commercial APIs.
▸ Significantly improved service robustness and capacity, where QPS increased by 200% to 400% and latency decreased by 150% to

500% in different services.

▸ Economic benefits: ~$51K USD daily cost-saving for average usage of around 3.5M calls compared with leading commercial API solutions.

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

▸ Engaged with business units, identified opportunities and developed strategies for driver resource utilization, service commitment and cost-saving.

▸ Designed and developed dispatch/grouping algorithms with the online API service to push KPIs and requirements with business partners.

▸ Economic Benefits: The daily operational cost in selected countries decreased by 30%.

⚲ *Envision Digital, Singapore*

Optimization Engineer
📅 Aug 2019 – Jun 2020

Core developer of optimization engine for power grid energy management, affiliated with $11M grand call and V2G applications in Europe.

Optimization Engine for Power Grid Energy Management

▸ Developed comprehensive modeling of electrical units and loads and conducted optimization with MIP models.

▸ Developed web service with RESTful APIs to host optimization as a service.

▸ Utilized advanced modeling strategies and optimization techniques in electrical energy sectors to formulate specific business cases into optimization problems.

⚲ *Nanyang Technological University, Singapore*

Research Fellow
📅 Sep 2017 – Aug 2019

Independent contributor working on multiple research projects.

For more previous projects please refer to my personal website here.

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.

Open-source

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.