JU CHENGQUAN, PH.D.

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SUMMARY

- Singapore PR; with five years of working experience and multi-disciplinary knowledge to enable synergetic innovations with professionals of diverse backgrounds in OR and AI realms.
- Rich project experience in data analysis, statistical and scientific modeling, programming, and algorithm applications.
- Solid research background on distributed/robust/hierarchical optimization applied in power engineering and microgrids.
- A reliable and assertive team player and problem solver with rigorous creativity and resilient adaptability.

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

WORKING EXPERIENCES

Expert Data Scientist

Shopee, Singapore — Dec 2021 – Current

POI Search and Query Correction, Map Department

- Project owner of address POI-search autocomplete related projects, leading a small team of three to extend empowerment with business partners such as express delivery and local life service providers.
- Service migration and decoupling to improve pre-processing (name entity recognition) and post-processing (de-duplication, ranking) logics.
- Conceptualized the technical design of query correction and established the entire processing pipeline (corpus, tokenization, candidate detection and correction) at the development stage.
- Boosted the total recall ratio from 62% to 77% by re-designing database schema and utilizing multiple queries.

Senior Data Scientist

Shopee, Singapore — Jun 2020 – Nov 2021

Routing Service, Map Department

- Project owner and core developer of routing service, an infrastructure to provide geographic services.
- New Features Development: Launched two new APIs in Aug 2021, and integrated routing services with more operational modes and adjustable target-oriented objectives to support downstream users on business cases such as live routing, navigation, car hailing and service region selection.
- Quality of Service Improvement: Significantly improved API robustness and capacity by new format support and re-write of web framework with NodeJS. The maximum QPS has been increased by 200% to 400% on different service APIs, respectively.
- Accuracy Improvement on ETA: Employed GPS trajectory data and machine learning models to improve of ETA accuracy, by 35%-50% compared with leading commercial APIs in various countries.
- Economic Benefits: Our service has brought about 51K USD cost saving daily for the average usage of 3.5M calls, compared with leading commercial APIs.

Optimization Engineer

Envision Digital, Singapore — Aug 2019 – Jun 2020

Grid Modeling and Optimization

- Core developer of optimization engine for grid optimization with vehicle-to-grid applications.
- Developed comprehensive models including grid connection, battery storage, electric vehicles, gas turbines, and various loads (curtailable, dispatchable, shiftable, interruptible).
- Developed web framework and RESTful API for hosting optimization as a service using Flask.
- Utilized advanced modeling methods and optimization techniques in electrical energy sectors to formulate specific business cases into optimization problems.

Research Fellow

NTU, Singapore — Sep 2017 – Aug 2019

Grid-wide Intermittency Management of Distributed Energy Storage Systems (DESS)

- Conducted grid-wide frequency regulation using by collecting, cleansing and analyzing data from distributed PV sites.
- Developed a scale-down DESS in HDB blocks for intermittency management and frequency support, and integrated latest control algorithms, including ramp-rate based, frequency and SoC regulation to hierarchical controllers.

Distributed Robust Optimization for Networked Microgrids

- Proposed a novel coordinated EMS of regional microgrids that reduces the total operational cost by 10% on average.
- Developed a triple-layer distributed optimization framework for microgrid clusters, to effectively reduce the operational cost and address robust operations against volatile uncertainties.

Temporal Decentralization for Stochastic Optimization

- Developed a temporal decentralized algorithm for the optimal stochastic energy scheduling.
- Achieved the fast convergence of the proposed algorithm advantages on optimal results and computation time.

PAST PROJECTS

Energy Management of Microgrids (*doctoral*) NTU, Singapore Jan 2014 – May 2017

- Distributed and robust optimization for energy scheduling in the regional multi-microgrid community.
- Stochastic/robust/dynamic optimal power flow (OPF) under uncertainties of loads and renewables including energy storages.
- Energy management system with parameterized degradation costs.

Intelligent Trading/Metering/Billing System NTU, Singapore Aug 2012 – May 2013

- Developed multi-agent wireless network communication in intelligent trading/metering/billing system.
- Data acquisition, collection and supervision in line with Zigbee coordinators using C# and MySQL database, and Web portal design for ITMBS via PHP and HTML.

Battery Protection and State of Charge (SoC) Balancing NTU, Singapore Jan 2012 – May 2012

- Designed a decentralized system of battery protection and SoC balancing, and a hardware-in-loop platform with LabVIEW.

SKILLS

Strength

Modeling and Optimization, Data Mining and Analytics, Machine Learning, Hierarchical/Distributed Coordination

Programming

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

Language

Native	Chinese
Professional	English
Basic	Japanese

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 Transactions on Power Delivery*, pp. 1–1, 2019, ISSN: 1937-4208.

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)*, Oct. 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*, Nov. 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*, Jul. 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.