XIN LI

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North China Electric Power University
No.2 Beinong Road, Changping Distric, Beijing
Skills: Matlab;Python;C++;Scikit-learn;Keras; Opencv;Git;Pyomo.
Software: Latex, Origin, Excel, Visio, Zotero, Visual Studio, Sourcetree.
Languages: English(Fluent), German&French(Elementary)

EDUCATION

North China Electric Power University Sept, 2019 - June, 2022
Master of Engineering in Control Science and Engineering *Beijing, China*
GPA: 3.59/4.00, Average score: 85.9/100

North China Electric Power University Sept, 2015 - June, 2019
Bachelor of Engineering in Automation *Beijing, China*
GPA: 3.51/4.00, Average score: 85.1/100

RESEARCH EXPERIENCE

Reserach Assistance North China Electric Power University
2020.01-2021.01

- **Project** Research on key technologies for the operation of integrated energy systems containing multiple energy supplies and outputs.—Project for State Grid Shandong Electric Power Company

  Overview Designing the operation strategies for the integrated in an industrial park.

  My Work 1) I helped model the operation and management of the integrated energy systems. 2) I proposed some optimal operation methods based on heuristic PSO. 3) I analyzed the energy system efficiency and economic aspects of the relevant optimization algorithms and incorporated them into the final report.

- **Project** Technique system evaluation for construction of State Grid's Lanzhou national new area energy innovation park—Project for State Grid Gansu Electric Power Company

  Overview Evaluating and desiging the development plann on energy-related technques in a national new park.

  My Work 1) Technique Review: I helped review the cutting-edge energy techniques according to their deveploment and application. 2) System module designing: I was responsible for planning some modules of the digital technology system suitable for the Energy Internet Unification Park. 3) Recommendation: I helped recommend technology direction and research pathway setting.

- **Project** Flame image based combustion feature detection and combustion stability research for thermal plants

  Overview Combustion flexibility modelling based on flame video, in which we apply computer version techniques and deep learning methods.

  My Work 1)Feature modelling: We estibulished a new type of flame image static features by gabor-GLCM, I proposed hybrid dynamic features of flame image based on DIS and Dense optical

flow. 2)Deepling methonds: I conducted oxygen content regression prediction model as well as state monitoring model using improved LSTM and GRU based on multi-feature fusion.

Research Intern. Jibei Electric Power Research Institute
2021.01-2021.12

- **Project** Study on the development pathway for future power system with high RES penetration considering source-grid-load coordination based on China's carbon neutral policy.

  Overview Designing future power system and decarbonization pathway considering high renewable penetration and system stability.

  My Work 1) I participated in low-inertia power system planning, load supporting strategies designing, and "source-grid-load" coordination considering the uncertain fluctuation from RES. 2) I helped analyse the carbon neutral constrains of future power system. 3)I designed and simulated pathways of future power system.

- **Project** Research on interaction response techniques designed for large-scale flexible resource on demand side to accomodate high penetration of renewable energy

  Overview Developing coordination strategies on demand side to help accomodate high penetration of renewable energy.

  My Work 1) Scenario modelling: I helped conduct demand-side characteristics modelling under different flexible demand scenarios. 2)Data analysis: I participated in analyzing data of operation to model the grid-side flexibility demand. 3)Case study: I helped simulate the operation of the power system with high penetration of renewable energy considering the demand flexibility.

- **Project** Research on the deployment and integrating strategies for the large-scale renewable energy hubs

  Overview Investigating accomodation strategies for renewable energy hub.

  My Work 1)Output forecast: I using deeplearning method to forecast the coordination scenarios of renewable energy and the integrated power system; 2) Scenarios modelling: I helped simulate scenarios of the future renewable energy with different penetration percentages in the generation side of the whole power systems.

Master Thesis

- **Name** Game-theoretic scheduling in integrated energy system considering energy flexibility from consumers
- **Main Work** Focus on how local residents can benefit from their flexibility in community energy management. 1) I analysed the behavior, satisfaction characteristic and thermal & energy flexibility of different types of consumers(residential, commercial, and industrial) for flexibility & satisfaction modelling. 2) I designed the system operating, energy management model and revenue distributing mechanism for energy supply aggregators considering flexibility from demand. 3)I optimized the operation and demand response of the community energy system based on game theory, with a case study.

INDUSTRY EXPERIENCE

Research Engineer TsIntergy Technology &
2022.09-2023.05 *Energy Planning & Operation Center of Tsinghua University*

- **Main Duty**

  Managed electricity spot market clearing system

  Virtual power plant optimization and trade modelling

- **Main Projects**

  * Bidding Optimization for Virtual Power Plant Considering Storage Degradation based on CVaR

  Overview Designing bidding strategies for energy storage system in virtual power plants considering storage degradation.

  My Work 1) I was responsible for estimating the degradation of energy storage systems and modeling it based on CVaR; 2) I designed and proposed optimization algorithms that consider the degradation model of energy storage systems; 3) I conducted a case study and took into account the variations over multiple years.

  * Optimization of Building Cooling System Operation and Demand Response Portfolio

  Overview Modelling and optimizing the internal cooling system of large buildings and developed strategies for demand response participation.

  My Work 1) I participated in researching the parameters and coupling operation of various components in the building cooling system, including cooling storage; 2) Based on the research findings and equipment parameters, I designed the overall operating model; 3) Using simulated calculations of detailed building load data and considering the operational requirements from onsite engineers, I conducted optimization of the overall system operation while leaving room for demand response; 4) I also performed demand response optimization and developed strategies for participating in demand response programs.

  * Maintenance and Algorithm Development of Spot Electricity Market Clearing System

  Overview Maintaining the operational electricity market clearing system and developing new functionalities.

  My Work 1)I participated in the development of a rapid estimation function for market reserves; 2) I contributed to the development of energy storage participation in market clearing function; 3) I was responsible for communicating with field engineers during live operations, and resolving any system bugs that arise.

  * Algorithm Design for Load Flexibility's Participation in Electricity Market

  Overview Designing market participation mechanisms and algorithms for demand-side flexibility.

  My Work 1) I participated in researching flexibility resources and conducted modeling; 2) I was responsible for designing market mechanisms and pricing methods for demand-side flexibility participation; 3) I proposed an integrated clearing model that incorporates demand-side flexibility.

  * A managed electricity spot market SCUC model Considering Different StarUp and Shutdown States Based on Pyomo

  Overview Developing a prototype of an electricity market clearing system considering different start-up and shutdown states based on Python.

  My Work 1) I modeled different types of start-up and shutdown states; 2) Based on the operational electricity market clearing system, I developed a new clearing system using Python with pyomo; 3) I conducted clearing tests using actual electricity system data.

  * Investigation on Participation of the Storage System in Guangdong Electricity Market

  Overview Energy storage participation in the electricity market clearing test in Guangdong Province.

  My Work 1)I developed charge and discharge constraint models based on various operating conditions and integrated them into the overall electricity market clearing model; 2)I was responsible

for pricing energy storage based on the nodal electricity price model; 3) I conducted tests in the actual system, selecting different nodes and using real-world data for validation.

* Collaborative Operation Integrating Wind and Solar Generation with Hydrogen and Ammonia Production

Overview Developing an operational optimization strategy for integrated production of hydrogen and ammonia using solar, wind.

My Work I participated in designing a system decision model for PtX production based on electricity market prices

PUBLICATIONS

Journal

- Multi-year Planning for the Integration Combining Distributed Energy System and Electric Vehicle in Neighborhood Based on Data-driven Model
  Xin Li, Lunding Guo, Yuchen He, Guotian Yang,
  International Journal of Electrical Power and Energy Systems, Q1, 2022,published
  DOI: https://doi.org/10.1016/j.ijepes.2022.108079
- An optimization framework for low-carbon oriented integrated energy system management in commercial building under EV demand response
  Zensen Wang, **Xin Li**, Yu Li, Tianqi Zhao, Xue Xia, Hanzhi Zhang
  Processes, Q2, 2021, published
  DOI: https://doi.org/10.3390/pr9101737
- Gabor-GLCM-Based Texture Feature Extraction Using Flame Image to Predict the O_2 Content and NO_x
  Guotian Yang, Yuchen He, **Xin Li**, Xinli Li
  ACS Omega, Q2, 2022, published
  DOI: https://doi.org/10.1021/acsomega.1c03397
- Research on integrated energy supply priority scheduling based on Fbprophet load forecast and customer satisfaction constraint
  Yukai Li, Jiabing Han, Quan Wang, Meng Yang, Jun Zhao, **Xin Li**, Xinli Li
  Journal of North China Electric Power University(CN), 2021, published
- Boiler flame motion feature extraction and correlation analysis based on improved optical flow method
  Guotian Yang, Yuchen He, **Xin Li**, Xinli Li
  Journal of North China Electric Power University(CN), 2021, published
- Modeling of boiler variable-load combustion system based on GBDT-BidGRU
  Guotian Yang, Yuchen He, **Xin Li**, Xinli Li
  Thermoelectric Power Generation(CN), 2021, published

Conference

- Power system evolutionary planning based on LHS-kmeans method for generating future load scenarios, Zensen Wang, **Xin Li**, Yu Li, Tianqi Zhao, Xue Xia, Hanzhi Zhang, 2021 3rd International Conference on Smart Power & Internet Energy Systems (SPIES), 2021
- Carbon neutral planning for high percentage of renewable power systems considering WIPP as inertia support, Zensen Wang, **Xin Li**, Yu Li, Tianqi Zhao, Xue Xia, Hanzhi Zhang, 2021 IEEE Sustainable Power and Energy Conference (iSPEC), 2021

REFERENCES

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  Relationship: Prof.Guotian Yang is the supervisor of my master program

- **Dr.Zesen Wang**
  Senior Researcher
  Jibei Electric Power Research Institute
  Tel: +86 185-1831-6341
  Email: 1253100185@qq.com
  Add: No.1. Dizangan Road, Xicheng District, Beijing. 100000
  Relationship: Dr.Zesen Wang is the supervisor of my internship

- **Dr.Xiaowen Lai**
  CTO of Tsintergy Technology
  Tsintergy Technology
  Email: laixw@tsintergy.com
  Add: No.108. Tiyu East Road, Tianhe District, Canton. 510620
  Relationship: Dr.Xiaowen Lai is the leader of the team I belonged in Tsintergy Technology