Junyoung Park

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Education

Korea Advanced Institute Science and Technology (KAIST)

- Ph.D. of Industrial & Systems Engineering 03. 2017 — 02. 2023
  Dissertation: Applications of graph neural networks in modeling and decision-making of dynamic networked systems
- Master of Industrial & Systems Engineering 03. 2016 — 02. 2017
- Bachelor of Industrial & Systems Engineering, and Business and Technology Management 03. 2011 — 02. 2016

Skills

Language	Python, Java, JavaScript, C++ , Julia, MATLAB
Deep learning	PyTorch, Tensorflow, PyG, DGL, PyTorch Lightning

Publications

Towards time and depth continuous modeling of the networked system via graph neural networks

- **Junyoung Park**, J. Choo, J. Park, “Convergent Graph Solvers”, ICLR, 2022
- **Junyung Park***, M. Poli*, S. Massaroli*, A. Yamashita, H. Asama, J.Park, “Graph Neural Ordinary Differential Equations”, DLGMA’20 AAAI 2020 (* Co-first authors)
- **Junyoung Park**, J.Park, “Physics-Induced Graph Neural Network: An application to wind farm power estimation", Energy 2019

Decision making on discrete networked systems (Neural Combinatorial Opitmization)

- M Kim, **Junyoung Park**, J.Park, “Sym-NCO: Leveraging Symmetricity for Neural Combinatorial Optimization”, Neurips 2022
- **Junyoung Park**, JH. Chun, J.Park “Leaning to schedule job-shop problems: Representation and policy learning using graph neural network and reinforcement learning", IJPR 2021
- **Junyoung Park**, S. Bakhtiyarov, J.Park, “SchelduleNet: Learning to solve multi-robot scheduling problems with reinforcement learning”, Under review
- **Junyoung Park**, M. Kim, J.Park, “Neuro CROSS exchange: Learning to CROSS exchange to solve realistic VRP”, Under review

Dynamic systems modeling via deep learning

- S. Woo, **Junyoung Park**, J.Park, Lance Manuel, “Wind field-based short-term turbine response forecasting by stacked dilated convolutional LSTMs", IEEE Transactions on Sustainable Energy 2019
- S. Woo, **Junyoung Park**, J.Park, “Predicting wind turbine power and load outputs by multi-task convolutional LSTM model", IEEE Power & Energy Society General Meeting (PESGM) 2018
- **Junyoung Park**, F. Berto, A. Jamgochian, M. J Kochenderfer, J. Park, “Generalizing to New Dynamical Systems through First-Order Context-based Adaptation", Under review

Experience

Visiting student researcher — Stanford Palo Alto, CA
Efficient meta-learning for dynamical systems 07. 2022 — Present

- Designed an efficient meta-learning algorithm for dynamical systems. Implemented and evaluated the algorithm in various ordinary and partial differential equations.

Founding member & algorithm developer — Omelet Daejeon, Korea
Solving real-world VRP with neural combinatorial optimization (NCO) 02. 2022 — Present

- Formulated micro fulfillment center delivery scheduling as a traveling salesman problem with time window (TSPTW). Pilot-test NCO approaches to solve the formulated TSPTW. Deployed an API server that supports delivery optimization.

Graduate Research Assistant — KAIST Daejeon, Korea
Optimal operation of semiconductor processing equipment 06. 2020 — 02. 2022

- Developed data acquisition platform gathering real-time operation data. Modeled the dynamics of a semiconductor-producing furnace via GNN. Employed model-based predictive control (MPC) with the GNN model to operate the furnace. Deployed the MPC-based control logic to the prototype furnace.

Optimal scheduling semiconductor fabrication process 10. 2018 — 02. 2021

- Modeled DRAM (memory) production process with a logic simulator. Developed GNN-RL algorithm to optimize semiconductor fabrication production scheduling. Deployed the GNN-RL algorithm and supported decision-making in the production line.

Optimal operation of polymerization process via learned controllers 02. 2019 — 07. 2019

- Developed a real-time data acquisition and processing hardware framework. Developed a recurrent neural network (RNN) model that predicts operational signals and physical properties of CREORA™. Developed a data-driven controller to optimize CREORA™ production line.

Research Assistant — Palo Alto Research Center (PARC) Palo Alto, CA
Multiple-time series anomaly detection 03. 2018 — 09. 2018

- Performed time-series data analytic to identify meaningful sensor observations for anomaly detection. Developed an RNN-based multiple-time series anomaly detection algorithm to monitor industrial plants.