Jinqi Li

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Education Experience

Master of Engineering in Computer Science and Technology

June 2024

China University of Geoscience (Beijing)
Advisor: **Professor Yunyun Niu**

Bachelor of Engineering in Computer Science and Technology

June 2021

China University of Geoscience (Beijing)

Research Interests

- **Deep Reinforcement Learning**
- **Learning-based Method for Optimization**

Publications

1. J. Li, B. T. Dai, Y. Niu, J. Xiao, Y. Wu. Multi-Type Attention for Solving Multi-Depot Vehicle Routing Problems. *IEEE Transactions on Intelligent Transportation Systems*, (2024). Multi-Type Attention for Solving Multi-Depot Vehicle Routing Problems | IEEE Journals & Magazine | IEEE Xplore
2. J. Li, Y. Niu, G. Zhu, J. Xiao. Solving Pick-up and Delivery Problems via Deep Reinforcement Learning Based Symmetric Neutral Optimization. *Expert Systems with Applications*, (2024). Solving pick-up and delivery problems via deep reinforcement learning based symmetric neural optimization - ScienceDirect

Research Experience

Graduate Research Assistant

School of Information Science, China University of Geoscience in Beijing **2021 -2024**

Natural Science Foundation of China (Grant number 61872325)

Natural Science Foundation of China (Grant number 62172373)

Multi-Type Attention for Solving Multi-Depot Vehicle Routing Problems

- Proposed a novel DRL policy network for solving multi-depot vehicle routing problem (MDVRP) and multi-depot open vehicle routing problem (MDOVRP), namely MD-MTA, which is the first DRL method to solve MDOVRP.
- Proposed a multi-type attention mechanism for handle multi-depots instances, which is able to effectively facilitate the aggregation of various embeddings and the selection of nodes for route construction.

- Presented a depot rotation augmentation mechanism, which arms the MD-MTA with an efficient rollout and further enhances the performance in the context of multiple depots.

Solving Pick-up and Delivery Problems via Deep Reinforcement Learning Based Symmetric Neural Optimization

- Proposed a novel DRL policy network for solving pick-up and delivery traveling salesman problem (PDTSP) and one-to-one pick-up and delivery traveling salesman problem (m-PDTSP), namely PD-SNO, which is the first DRL method to solve m-PDTSP.
- Developed a multi-head symmetric attention mechanism, which is able to capture the relationship between symmetric partitions of instances and construct the solution by gathering the symmetric embeddings with the constantly updated environment.
- Designed a multi-query symmetric rollout and a rotational symmetric augmentation-based loss function to effectively train the policy network, which forces the policy network take the multi-trajectories generated by both methods mentioned above into account.
- Presented a exchanged augmentation mechanism, which arms the PD-SNO with an efficient rollout and further enhances the performance in the context of symmetric node set (pickup and delivery).

Honors and Awards

1. The scholarship for graduate student in CUGB **2021-2024**

Other Information

Languages: English (IELTS 7.5)

GRE scores: V155+Q170
Programming Languages: Python, C++
Software: PyTorch, Gurobi, OR-Tools