Mingxuan Song

+86 13146069237 | songmingxuan@stu.edu.cn
Beijing, China

EDUCATION

Peking University Sep 2023 - Jun 2028

PhD in Computer System Architecture, School of Computer Science No.5 Yiheyuan Road, Beijing, P.R.China

China University of Geosciences, Wuhan Sep 2019 - Jun 2023

Bachelor in Computer Science and Technology, School of Computer Science No. 388 Lumo Road, Wuhan, P.R. China

GPA Rank: 3/137 National Scholarship, National College Students' Innovation and Entrepreneurship Training Program, Second Prize in the National Mathematical Modeling Competition, and two other national-level awards.

PUBLICATIONS

- **M. Song**, P. Li, B. Zhou, S. Yin, Z. Xiao, and J. Long. AERO: Enhancing Sharding Blockchain via Deep Reinforcement Learning for Account Migration, In Proceedings of the Web Conference 2025 (**WWW 2025 Oral**), April 2025.
  Observing the long-tail distribution phenomenon in transaction data within sharding blockchains, this paper designs an account migration algorithm based on Proximal Policy Optimization and a novel blockchain data structure adapted for reinforcement learning. It addresses the issues of excessive cross-shard transactions and unbalanced shard loads in sharding blockchains.
- S. Yin, Z. Xiao, **M. Song**, and J. Long. Adversarial Distillation Based on Slack Matching and Attribution Region Alignment Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR 2024**), June 2024.
  Recognizing the insufficient robustness learning of student models in knowledge distillation, this paper proposes an improved adversarial distillation method based on slack matching and attribution region alignment to enhance defense capabilities against adversarial attacks. I was responsible for coding and experimental evaluation.
- P. Li, **M. Song**, M. Xing, Z. Xiao, Q. Ding, et al. SPRING: Improving the Throughput of Sharding Blockchain via Deep Reinforcement Learning Based State Placement In Proceedings of the Web Conference 2024 (**WWW 2024 Oral**), May 2024.
  Identifying the lack of an efficient address allocation algorithm in sharding blockchains, this paper proposes a PPO-based address allocation algorithm to mitigate the excessive cross-shard transaction rate and unbalanced shard loads. I was responsible for refining the idea, coding, experimental evaluation, and writing the reinforcement learning section of the paper.
- **M. Song**, C. Hu, W. Gong, X. Yan. Domain Knowledge-Based Evolutionary Reinforcement Learning for Sensor Placement (**Sensors**), May 2022.
  Recognizing the limitations of heuristic algorithms in water pollution monitoring, this paper introduces an evolutionary reinforcement learning (ERL)-based sensor placement algorithm to enhance the effectiveness of sensor deployment in water distribution networks.

PROJECT EXPERIENCE

Frontier Technologies of Blockchain-Based Web 3.0 (National Key R&D Program, No. 2023YFB2703800) Jan 2024 – Present

Blockchain Intelligent Information Platform Based on Large-Scale Language Models Mar 2023 – Mar 2024

Sensor Placement in Complex Water Supply Networks Based on Evolutionary Reinforcement Learning (National Natural Science Foundation Project, No. 62073300) May 2021 – May 2022

SKILLS AND ABILITIES

Languages: English, Chinese (native)

Programming Skills: Proficient in Python, PyTorch, Golang, MATLAB. Well-versed in PPO, DQN, Transformer, and other advanced machine learning algorithms.

Research Abilities: Received extensive and systematic research training, enabling efficient literature review and investigation. Skilled in identifying key problems and proposing effective solutions. Capable of rigorous and proficient academic writing.