Zhaoyi Song

📞 +1 (734) 585-4967 | ✉️ zhaoyi.song.cs@gmail.com | 🌐 zhaoyi.info | 🐙 troysung | 💼 Zhaoyi Song

---

Education

Tongji University   Shanghai, China
Master of Engineering in Software Engineering   *Sept. 2021 – Mar. 2024 (Expected)*
  - GPA: 91.71/100.0. TOEFL: 106 (R30, L28, S21, W27).
Bachelor of Engineering in Software Engineering   *Sept. 2017 – Jun. 2021*
  - GPA: 4.77/5.0 (92.7/100.0, Rank 10/216, **Top 5%**).
  - Awarded 1st Prize Scholarship (Top 5%, 2017) and 2nd Prize Scholarship (Top 10%, 2018 & 2019).

Experience

Meituan   Shanghai, China
Software Development Engineer Intern, In-Store Business Group   *Jun. 2023 - Sept. 2023*
  - Trained as a software engineer at *Meituan.com*, China's premier food delivery and local service platform, responsible for maintaining merchant details for millions of businesses and handling transaction models.
  - Streamlined software systems by refactoring interfaces, maintained data integrity with Hive SQL, optimized load handling via message queues, and developed a batch settlement data management tool.

ByteDance, Ltd.   Shanghai, China
Software Development Engineer Intern, Nuverse Team   *Nov. 2020 – Oct. 2021*
  - Contributed to the DevOps and quality assurance of Game Software Development Kit (GSDK), a suite of development tools for Unity/UE game developers to access core game development functionalities.
  - Pioneered a non-invasive automation testing tool for mobile apps. Crafted illustrative code samples and developed a demo mobile app to showcase SDK features, typical use-case scenarios, and best practices.

Research Projects

HELSA: Hierarchical Multi-Agent Pathfinder   *Jun. 2022 - Apr. 2023*
Advisor: Rongqing Zhang, Associate Professor, Director of Network and Machine Intelligence Lab
  - Proposed a hierarchical reinforcement learning framework for large-scale multi-agent pathfinding, addressing the challenges of sample inefficiency resulting from sparse rewards and partial observability.
  - Utilized **spatiotemporal abstraction** to decompose problems and combined **multi-agent communication** with **heuristic guidance** to facilitate decentralized policy learning.
  - The proposed method outperforms existing state-of-the-art (SOTA) approaches in large-scale scenarios.

Synthetic Dataset for Image Change Detection   *Oct. 2019 – April 2020*
Advisor: Qingjiang Shi, Professor, School of Software Engineering, Tongji University
  - A power plant aimed to detect anomalies in surveillance footage. Given the scarcity of real-world data, realized a strategy to develop a synthetic dataset and train models to detect discrepancies in the footage.
  - Created synthetic datasets by manipulating normal frames to simulate potential anomalies.
  - Utilized a Siamese neural network with CenterNet as its backbone for image change detection.
  - Demonstrated the potential of our approach in real-world settings, assisting the power plant in detecting anomalies effectively through transfer learning using only a limited set of real-world data.

A Large Linear Systems Solver   *Sept. 2019 - Jan. 2020*
Advisor: Qingfeng Du, Professor, Director of XLab at Tongji University
  - Sped up the solution of large sparse/dense linear equations utilizing the **CUDA** framework.
  - Optimized several iterative methods through techniques such as **shared memory**, **loop unrolling**, and **warp shuffling**, resulting in a 50x acceleration compared to the non-optimized version.
  - Accelerated the conjugate gradient method for solving sparse matrix equations with the **CUDA graph programming model**, achieving over 80x faster performance to the non-optimized version.

Publications

  - **Zhaoyi Song**, Rongqing Zhang, and Xiang Cheng. "HELSA: Hierarchical Reinforcement Learning with Spatiotemporal Abstraction for Large-Scale Multi-Agent Path Finding". In: *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'23)*. Detroit, MI, USA.

Skills

Programming Languages: Python, Java, C/C++, Golang, HTML/CSS, Javascript and C#
Tools: LaTeX, Git, PyTorch, Jenkins, Unity, SpringBoot, Kafka, MyBatis, React, Gin, Kitex, MySQL and Redis