Da, Longchao

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Education

- **Arizona State University** — Arizona, USA
  Ph.D. Student of Computer Science; — *August 2023 - now*
  Interest: *Reinforcement Learning, Sim2Real learning, Policy Evaluation*

- **New Jersey Institute of Technology** — New Jersey, USA
  Research Assistant of Informatics; — *July 2021 - May 2023*
  Interest: *Data Mining, Reinforcement Learning.*

Publications, Tutorials and Patents

- **[ECML-PKDD] CityFlowER: An Efficient and Realistic Traffic Simulator with Embedded Machine Learning Models**: Improve the realism in microscopic level traffic simulation while keeping high efficiency.
- **[AAAI 2024 - Oral] LLM Powered Sim-to-real Transfer for Traffic Signal Control**: Mitigate the sim2real transfer performance impairment in Reinforcement Learning by leveraging LLMs' inference ability (**first author**).
- **[AAAI 2024] Probabilistic Offline Policy Ranking with Approximate Bayesian Computation**: Offline policy evaluation for Reinforcement Learning methods (**first author**).
- **[ICLR 2024 @ LLM Agent] Open-TI: Open Traffic Intelligence with Augmented Language Model**: An open-sourced traffic intelligence using Augmented Language Model (**first author**).
- **[ICLR 2024 @ LLM Privacy] Privacy-preserving Fine-tuning of Large Language Models through Flatness**: Address privacy issue in LLM training process.
- **[arXiv 2024] LLM Uncertainty Quantification through Directional Entailment Graph and Claim Level Response Augmentation**: Identify the trustworthiness from LLMs response for better decision making.
- **[Machine Learning - 2023] LibSignal: An Open Library for Traffic Signal Control**: Provide cross-simulator training and testing bed for Classic and SOTA algorithms. Also accepted by NeurIPS 2022 workshop.
- **[IEEE-CDC 2023] Uncertainty-aware Grounded Action Transformation towards Sim-to-Real Transfer for Traffic Signal Control**: Uncertainty quantification to the action grounding process in sim2real problems (**first author**).
- **[IEEE-CASE 2023] Sim2Real Transfer for Traffic Signal Control**: First to formalize the sim2real problem in Traffic Signal Control and propose possible solutions as early edge explorations (**first author**).
- **[IEEE-ITSC 2023] Cross-simulator Datasets and Evaluations for Traffic Control Policies**: Host tutorial of our open-sourced library in the top-venue conference IEEE International Conference on Intelligent Transportation Systems.
- **[CIKM2022/Electronic Research Archive] CrowdGAIL: A Spatial-Temporal Aware Method for Agent Navigation**: A social-aware method with Generative Adversarial Imitation Learning to solve agent navigation tasks by trajectory prediction (**first author**).
- **[Chemrxiv 2024] Prediction of the Potential Energy Surface for Polyatomic Molecule with the Three Dimensional Special Euclidean Equivariant Transformer Network**: Leverage SE(3) Transformer Network to assure the high-accurate molecular energy surface prediction (**first author**).
- **[P1] A method for automatic identification of bolt CAD drawing(co-inventor)**: C.N. Patent Application CN 112434502 A, filed November, 2020. Patent Pending.
- **[P2] A self-interpretation method for network discrimination of partial black box problems(co-inventor)**: C.N. Patent Application CN 112434790 A, filed November, 2020. Patent Pending.
- **[P3] The utility model relates to an arm strength training device(co-inventor)**: C.N. Patent Application CN 112741986 A, filed February, 2021. Patent Pending.

Research and Project

- **LLM assistant traffic intelligence [IJMLC24] and trustworthiness [arXiv]**: Identify the feasibility of LLM assistance for general traffic research tasks and identify its uncertainty for better decision makings.
- **Mitigate sim2real problem in RL: UGAT[CDC23] and promptGAT[AAAI24]**: Design methods that help to mitigate performance impairment of simulator learned policy when deployed to real-world scenarios.
- **For a more realistic simulation: synthetic trajectory generation [CrowdGAIL] and more realistic simulator [CityFlowER]**: Learn motion features from human moving trajectories and trajectory generation / prediction, and provide a way to embed ML models into simulator efficiently.
- **Solve the realistic traffic signal control problems in roundabouts - Sedona, AZ, USA**: Cooperate with the Arizona Department of Transportation (ADOT) to solve the congestion problem in Sedona. Apply Genetic Algorithm to optimize the OD-demand matrix (Origin-Destination).
- **An Open-sourced library for Traffic Signal Control**: The development of a cross-simulator comparison platform of reinforcement learning models in traffic signal control tasks.

- **RL and applications: NeurIPS-2022 CityLearn Challenge, Drug Discovery and Design**: Leverage RL/IL algorithms to optimize the building's energy management policy, and provide efficient exploration towards synthesizable chemical structure.
- **Database and software projects**:

  1. Data Transferring Engine: The development of a data transferring engine crossing DBMS (e.g. From Oracle to Mysql).

  2. Smart Community: A system that promotes people's enthusiasm for voluntary affairs, under stable operation till now, with more than 80,000 active users.

Abilities

- **Python**: Pytorch, Tensorflow, Numpy, Pandas, Matplotlib, DataShader
- **JAVA**: Springboot, SpringMVC, Shiro, JAVA-Swing, JVM
- **DataBase/Data**: MySQL, Oracle, SQLite, Scala(big data), Spark-SQL

Honors and Awards

- **SCAI Doctoral Fellowship at Arizona State University** - Spring, 2024.
- Third prize of the NJIT-DANA KNOX Student Research Showcase (Graduate group) - April, 2023.
- NSF travel award by CIKM - September, 2022.
- Awarded as outstanding student & outstanding graduate thesis - June, 2022.
- Innovation achievement award first prize - 2021.
- National university student mathematical modeling provincial first prize - August, 2021.
- National and provincial project approval of college student innovation and entrepreneurship - 2021, 2019 (twice).

Experience

- **AI Scientist Intern** GE-Healthcare: 2024 Summer
  Reinforcement Learning and Segmentation
- **RL Research Intern** Zhejiang Lab: 2023 Summer
  Reinforcement Learning and drug discovery
- **Data Analyst Intern** YunQi Academy of Engineering: 2022 Summer
  Data-driven research on satellite image data mining

Service

- Program Committee Member of WWW 2024.
- Program Committee Member of ADMA 2024.
- Peer Reviewer of NurIPS 2022.
- Reviewer of IEEE Transactions on Intelligent Transportation Systems. 2022-2023.
- Reviewer of IEEE Transactions on Computational Social Systems. 2022-2023.
- SigmaXi Scientific Research Honor Society Member.
- Host of the Tutorial in IEEE-ITSC - Bilbao, Spain, 2023.