Zhengxu Yu

yuzxfred@gmail.com 07852 446689 zhengxuyu.github.io https://www.linkedin.com/in/yuzhengxu
https://github.com/zhengxuyu

Intro

Zhengxu Yu is currently a senior researcher at Alibaba Group. He obtained his Ph.D. from Zhejiang University, advised by Prof. Deng Cai and Prof. Xiaofei He. Previously, He obtained his Master's degree from University of Surrey, advised by Prof. H Lilian Tang.

His research interests focus on Machine Learning and Artificial General Intelligence, particularly in AI reasoning and decision-making models, alignment of AI decisions with human cognition, and stochastic modeling in dynamic systems.

His current research goal is to develop AI decision-making methods that can generate decisions which are practically applicable in the physical world and aligned with human cognition.

Zhengxu has published 11 research articles in top-tier international conferences and journals in the field of computer science, including IJCAI, AAAI, ECCV, etc.

Education

Zhejiang University, Ph.D. in Computer Science — Sept 2017 – Mar 2021

- **Research Interests**: Machine Learning, Computer Vision, Generative Model, Data Mining

University of Surrey, M.Sc. in Information Systems — Sept 2015 – Nov 2016

- **Research Interests**: Machine Learning, Computer Vision, Data Mining

Jilin University, B.Sc. in Communication Engineering — Sept 2011 – June 2015

Experience

Senior Algorithm Researcher, Alibaba Group – Hangzhou, China — Apr 2021 – present

- Developed Reinforcement Learning (RL) and Large Language Model (LLM) based models for reasoning and automatic decision making.
- Developed optimization methods to align AI decision-making models with human cognition.
- Developed stochastic modeling methods in dynamic system (e.g., urban traffic, dynamic engineering systems).
- Led cross-functional teams to deliver AI solutions and mentored research interns and junior developers.
- Collect customer needs to clarify goals and decompose complex scenarios into deliverable models in projects.

Research Intern, Damo Academy, Alibaba Group – Hangzhou, China — Jan 2018 – Apr 2021

- Proposed several multi-agent reinforcement learning methods to facilitate the coordination of multiple agents in cooperative and competitive scenarios.
- Proposed several optimization methods to improve the generalization ability of deep neural networks in computer vision tasks.
- Proposed a Generative Adversarial Network (GAN) based synthetic data generating model for augmenting training data in computer vision tasks.
- Proposed several Deep Graph Neural Network (GNN) models for stochastic modeling tasks in dynamic systems.

Projects

Urban Device Automatic Operation System — 2023-present

- Built a large-scale system from scratch to manage massive urban IoT devices, which empowered device management, visual perception and automatic control.
- Developed a RL based model for automatic cooperative control in a dynamic system.
- Proposed a novel ReAct model for automatic task reasoning and decision-making.
- Designed & developed a data pipeline to gather human preference on AI decisions.

- Developed an RLHF based Alignment framework to align the policy model using human feedbacks.

Urban Security Management System 2022-2023

- Led a cross-functional team to develop a visual-based crowd monitoring system for accident prevention and risk mitigation at large urban events.
- Responsible for proof of concept development, designing the MLOps pipeline, managing client communications, and coordinating cross-functional teams.

Urban Traffic Flow and Accident Risk Forecasting 2021-2022

- Proposed a GNN-based model for stochastic traffic flow forecasting in urban areas.
- Developed a Multilayer Perceptron Network-based model to predict high-risk drivers from a dataset of 5 million samples, resulting in a 10% higher recall rate for actual accidents in a highly imbalanced dataset.

Technologies

Languages & Technologies: Python, PyTorch, Pandas, LangChain

Publications

Optimizing traffic efficiency via a reinforcement learning approach based on time allocation 2023

Cao, X., Jin, Z., **Yu, Z.**, Hua, X., Hu, Y., Qian Wei., Zhu K., Cai D., He, X.

10.1007/s13042-023-01838-1 (International Journal of Machine Learning and Cybernetics)

Progressive Transfer Learning 2022

Yu, Z., Jin, Z., Wei, L., Huang, J., Cai, D., He, X., Hua, X.S.

10.1109/TIP.2022.3141258 (IEEE Transactions on Image Processing (TIP))

Lidar point cloud guided monocular 3D object detection 2022

Peng,L., Liu,F., **Yu,Z.**, Yan,S., Deng,D., Yang,Z., Liu,H., Cai,D.

10.1007/978-3-031-19769-7-8 (ECCV)

COP: customized correlation-based filter level pruning method for deep CNN compression 2021

Wang, W., **Yu, Z.**, Fu, C., Cai, D., He, X

10.1109/TIP.2022.3141258 (Neurocomputing)

Urban Traffic Light Control via Active Multi-agent Communication and Supply-Demand Modeling 2021

Guo, X.+, **Yu, Z.+**, Wang, P., Jin, Z., Huang, J., Cai, D., He, X., Hua, X.S., (**+**Co-first author)

10.1109/TKDE.2021.3130258 (IEEE Transactions on Knowledge and Data Engineering)

Apparel-invariant Feature Learning for Person Re-identification 2021

Yu, Z., Zhao, Y., Hong, B., Jin, Z., Huang, J., Cai, D., Hua, X.S.

10.1109/TMM.2021.3119133 (IEEE Transactions on Image Processing (TIP))

MaCAR: Urban Traffic Light Control via Active Multi-agent Communication and Action Rectification 2020

Yu, Z., Liang, S., Wei, L., Jin, Z., Huang, J., Cai, D., He, X., Hua, X.S.

10.24963/IJCAI.2020/345 (IJCAI)

PI-RCNN: An efficient multi-sensor 3D object detector with point-based attentive cont-conv fusion module 2020

Xie, L., Xiang, C., **Yu, Z.**, Xu, G., Yang, Z., Cai, D., He, X.

10.1609/aaai.v34i07.6933 (AAAI)

SIF: Self-Inspirited Feature Learning for Person Re-Identification 2020

Wei, L., Wei, Z., Jin, Z., **Yu, Z.**, Huang, J., Cai, D., He, X., Hua, X.S.

10.1109/TIP.2020.2975712 (IEEE Transactions on Image Processing (TIP))

Progressive Transfer Learning for Person Re-identification 2019

Yu, Z., Jin, Z., Wei, L., Guo, J., Huang, J., Cai, D., He, X., Hua, X.S.

10.24963/ijcai.2019/586 (IJCAI-2019)

Dual Graph for Traffic Forecasting 2019

Wei, L.+, **Yu, Z.+**, Jin, Z., Xie, L., Huang, J., Cai, D., He, X., Hua, X.S., (**+**Co-first author)

10.1109/ACCESS.2019.2958380 (IEEE ACCESS)