

Chen Luo

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EDUCATION

Syracuse University

Syracuse, NY

Doctor of Philosophy in Electrical & Computer Engineering, GPA: 4.00/4.00

Aug 2018 – Dec 2023

- Advisor: Professor Qinru Qiu
- Concentration: Deep Learning, Reinforcement Learning, Computer Vision, NLP Large Language Models, Robotics
- Thesis: Unmanned Aerial Systems (UAS) Traffic Density Prediction and Multi-Agent Task Allocation

Master of Science in Computer Engineering, GPA: 3.73/4.00

Aug 2016 - May 2018

- Selected Coursework: Object Oriented Design, Machine Intelligence with Deep Learning, Advances in Deep Learning, Image and Video Processing, Natural Language Processing, Biometrics

TECHNICAL SKILLS

Programming Language: Python, C/C++, JAVA, R, MATLAB, SQL, Linear Programming

Deep Learning Framework: PyTorch, Keras, Tensorflow, Pandas, TRL, CNTK, OpenCV, OpenAI Gym, Google Cloud's Vision

Developer Tools: Github, Amazon Web Services, Google Clouds Platform, Linux, Docker, Cplex, MongoDB, ROS

PROFESSIONAL EXPERIENCE

Baidu USA

Sunnyvale, CA

NLP Large Language Model (LLM) Expert Intern

Dec 2023 – March 2024

- Formulated guidelines to accurately label a 200,000-pair training dataset for RLHF reward models, achieving a 95% accuracy rate, led to a noteworthy enhancement in the model's conversational ability, averaging 103 rounds.
- Applied the Reinforcement Learning from Human Feedback (RLHF) DPO method to optimize the large-scale emotion-companion language models, resulting in a notable increase in the retention rate from 38% to 48%.
- Collaborated with the business teams across China and Japan, implementing Supervised Fine-tuning (SFT) on pre-trained large language models, contributing to a significant improvement in the overall user experience, with Daily Active Users (DAU) reaching 10,000.

AstraZeneca US

San Francisco, CA

R&D Intern

May 2021 – Aug 2021

- Developed a robust computer vision-based real-time raw-material container monitoring system, effectively replacing human inspection and significantly optimizing production efficiency by 35%.
- Successfully deployed a container identification recognition model on the Google Cloud Platform utilizing Optical Character Recognition (OCR) techniques, achieving an impressive recognition accuracy of 98%.
- Collaborated with a team of 4 to develop a product feedback attitude prediction model coordinated with Google Looker.
- Extended a model for medicine product quality inspection to handle limited new data resulting in 99% accuracy.

Thales USA, Inc

Syracuse, NY

IUCRC Researcher

Nov 2017 – Nov 2018

- Established Multi-agent Air Traffic and Resource Usage Simulation (MATRUS) simulation framework in JAVA.
- Implemented Sparse Represented TS (SRTS) routing algorithm for UAS trajectory planning.
- Reduced 82% of turn points and maintained 100% communication connectivity in heavy traffic scenarios.
- Outperformed traditional TS routing algorithm with up to 84.69% trajectory planning time reduction.

RESEARCH EXPERIENCE

Syracuse University, Research Assistant

Fall 2018 – Present

Multi-Agent Cooperative Games Using Belief Map Assisted Training

July 2021 – May 2023

- Proposed a novel belief-map assisted multi-agent system (BAMS) for multi-agent cooperative games.
- Adopted attention-based inter-agent communication mechanism to overcome partial observation limitation.
- Improved actor-critic model training convergence speed by up to 68% with the assistance of BAMS.
- Compared to other state-of-art works, reduce the average step taken to complete the cooperative game by 34.62%.

Distributed Auction for Multi-Agent Task Allocation

Sept 2019 – July 2021

- Extended original Consensus-Based Bundle Algorithm (CBBA) to incorporate budget constraints with 7 heuristic algorithms.
- Implemented a graph convolutional network (GCNs) predictor to predict different CBBA heuristic algorithms' total reward.
- Increase the probability of the algorithm providing optimal solutions under constraints using heuristics by up 9 times higher.

- Boosted decision-making capabilities of heuristic algorithms by 39% accuracy improvement compared to random selection.

Architecture Search and Model Compression for Fast UAS Traffic Density Prediction

March 2020 – March 2021

- Built an architecture prediction model to find the best prune strategy for fast UAV traffic density prediction.
- Developed incremental training technique to train regression models by trade-off accuracy and correlation.
- Reduced original model weight parameter size by 55.38% and speeded up execution time by 63.24% with similar accuracy.

Motion Transfer based on Generative Adversarial Network (GANs)

Jan 2020 - May 2020

- Modified and adapted the Pix2Pix image-to-image translation method for the specific task of human motion transfer.
- Implemented the model to enhance the temporal coherence between consecutive frames for more realistic motion transition.
- Conducted a comparative analysis with “Everybody Dance now”, demonstrating comparable performance in terms of human motion transfer quality and accuracy.

Spatial-Temporal Deep Learning Model for UAS Traffic Density Prediction

Nov 2018 - March 2020

- Proposed a mission-aware spatial-temporal CNN model for UAS traffic instantaneous density distribution prediction.
- Extended original instantaneous density prediction model to a continuous prediction framework.
- Compared to the baseline model, improved the prediction accuracy by 15.2% with a 0.947 correlation score.
- Increased prediction time horizon from 60 cycles to 360 cycles (1 hour) with a 0.892 average correlation score.

SELECTED PUBLICATION

Conference Publications:

- Luo, C.**, Huang, Q., Wu, A., Khan, S., Li, H. and Qiu, Q., Multi-agent Cooperative Games Using Belief Map Assisted Training. 2023 26th European Conference on Artificial Intelligences (ECAI). IEEE, 2023.
- Zuo, R., Wang, Z., **Luo, C.**, Zhao, J., Caicedo, C., Gursay, M.C., Qiu, Q. and Solomon, A., An Integrated Simulation Platform for the Analysis of UAS BVLOS Operations Supported by 4G/5G Communications. 2022 Integrated Communication, Navigation and Surveillance Conference (ICNS). IEEE, 2022: 1-12.
- Luo, C.**, Huang, Q., Kong, F., Khan, S. and Qiu, Q., Applying Machine Learning in Designing Distributed Auction for Multi-Agent Task Allocation with Budget Constraints. 2021 20th International Conference on Advanced Robotics (ICAR). IEEE, 2021.
- Zhang, Z*, **Luo, C***, Gursay, M.C., Qiu, Q., Caicedo, C. and Basti, F., 2021. Neural Network Architecture Search and Model Compression for Fast Prediction of UAS Traffic Density. 2021 Integrated Communications Navigation and Surveillance Conference (ICNS). IEEE, 2021: 1-9. (* equal contribution)
- Zhong, C., Zhao, Z., **Luo, C.**, Gursay, M.C., Qiu, Q., Caicedo, C., Basti, F. and Solomon, A., A cost-benefit analysis to achieve command and control (C2) link connectivity for beyond visual line of sight (BVLOS) operations. 2020 Integrated Communications Navigation and Surveillance Conference (ICNS). IEEE, 2020: 2D1-1-2D1-14.
- Zhao, Z., **Luo, C.**, Solomon, A., Basti, F., Caicedo, C., Gursay, M.C. and Qiu, Q., 2020. Machine Learning-Based Traffic Management Model for UAS Instantaneous Density Prediction in an Urban Area. 2020 IEEE/AIAA 39th Digital Avionics System (DASC) Conference. IEEE, 2020:1-10.
- Zhao, Z., **Luo, C.**, Zhao, J., Qiu, Q., Gursay, M.C., Caicedo, C. and Basti, F., A Simulation Framework for Fast Design Space Exploration for Unmanned Air System Traffic Management Policies. 2019 Integrated Communications Navigation and Surveillance Conference (ICNS). IEEE, 2019: 1-10.
- Jin Z, Zhao Z, **Luo C**, Fang, H., Basti, F., Gursay, M.C., Caicedo, C and Qiu, Q. Simulation of real-time routing for uas traffic management with communication and airspace safety considerations. 2019 IEEE/AIAA 38th Digital Avionics System (DASC) Conference. IEEE, 2019:1-10..
- Zhao Z, Jin Z, **Luo C**, Fang, H., Basti, F., Gursay, M.C., Caicedo, C and Qiu, Q. Temporal and Spatial Routing for Large Scale Safe and Connected UAS Traffic Management in Urban Areas. 2019 IEEE 25th International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA). IEEE, 2019: 1-6.

Patent:

- Luo, Chen. 2017. Safety communication method of wireless sensor network of lightweight class heterogeneous radio frequency parameters. CN106332068A, filled October 08, 2016, and issued January 11, 2017.

HONORS

- Graduate Awards Scholarship, Syracuse University, Syracuse, 2016-2018
- The First Prize Scholarship, Hunan University, P.R.China, 2014