Wenjun Li

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EDUCATION

Singapore Management University, Singapore, Singapore   **Expected in April 2025**
PhD in Computer Science, Supervisor: Professor Pradeep Varakantham

University of Southern California, Los Angeles, CA, U.S.   **May 2020**
MS in Electrical Engineering, **GPA 3.6/4.0**

China Jiliang University, Hangzhou, China   **June 2018**
BEng in Opto-electronics Information Science and Engineering, **GPA 3.7/4.0**, **Rank 7/135**
Excellent Graduate; 1st Class Scholarship for Academic Excellence

WORK EXPERIENCE

Intern at Huawei International, Singapore   **June 2024 – Present**
- **Adaptive Tool Use in LLMs:** Introduced a novel algorithm, MeCo, for adaptive tool use in LLMs. MeCo captures emergent representations of high-level cognitive phenomena that quantify the LLM's meta-cognitive scores, guiding decisions on external tool usage. [Preprint [1]].

Intern at Geely, Hangzhou, China   **June 2019- Aug 2019**
- Applied the Kanade-Lucas-Tomasi (KLT) algorithm for moving object detection (MOD) within the Active Parking Assist (APA) framework. Designed an algorithm to filter noisy flows, mitigated the impact of moving vehicles, and employed clustering methods to identify and extract information about moving objects.

RESEARCH EXPERIENCE

Large Language Models   **March 2023 – Present**
- **Enhanced Fine-tuning Strategies:** Extensively explored the impact of fine-tuning on the planning capabilities of LLMs. Developed the Clustering-based Maximum Diversity Sampling (CMDS) algorithm to select diverse and representative data in the embedding space, significantly improving the sample efficiency for fine-tuning. [Preprint [2]].

Non-Expert Human Training with Environment Generation Approaches   **Sept 2023 – Present**
- **Developed 3D Emergency Response Training Game:** Conceptualized and created an immersive 3D emergency response training game using Unity. Designed scenarios that challenge players to acquire and apply emergency response knowledge, including the use of diverse medical equipment for patient rescue.
- **Designed Adaptive Human Training Algorithm:** Developed an adaptive training algorithm based on the similarity and transferability of training tasks, enhancing training efficiency and overall outcomes. [Preprint [3]].

Environment Generation for Training Generalizable RL Agents   **June 2021 – May 2024**
- **Enhanced Environment Generation with Novelty Quantification:** Employed the GMM model to dynamically compute state-action space coverage and quantify the novelty score of environments. Developed a novelty-driven framework to improve existing environment generation algorithms. [Accepted as Oral Presentation at NeurIPS 2024 [4]].
- **Integrated Meta-Reinforcement Learning Techniques:** First, encode student policy with validation performance on environments selected by Quality Diversity (QD). Then, integrated meta-reinforcement learning with environment generation to train a versatile teacher agent capable of generalizing across student agents with diverse learning properties. The student policy is encoded with Quality Diversity. [Accepted to AAAI 2024 [5]].
- **Developed Novel Distance Metric:** Introduced a distance metric based on the occupancy measure of agent trajectories to quantify environment distance. Utilized this metric to measure the diversity of training environments, achieving state-of-the-art generalization performance. [Accepted to IJCAI 2023 [6]].

Wildlife Conservation Trust by Google   **March 2021 – Jan 2022**
- **Hierarchical CNN Model for Conflict Prediction:** Designed a hierarchical CNN model to predict human-wildlife conflicts. Conducted extensive experiments on the WCT dataset and co-authored a paper [8].
- **Addressing Data Sparsity with Sequential Decision-Making:** Applied sequential decision-making

* Equal contribution

methods to determine optimal spatial granularity and address data sparsity issues in prediction. Integrated a predictive model and clustering technique with the CNN model. Conducted experiments and validated the proposed model's performance on the WCT dataset.

Adversarial Training   **Aug 2020 – March 2021**

- **Ensemble Adversarial Training:** Proposed an ensemble adversarial training method that leverages data difficulty levels, achieving state-of-the-art performance under white-box attacks.
- **Risk-Averse Methods in Adversarial Training:** Implemented the Conditional Value at Risk (CVaR) approach in adversarial training and validated that the risk-averse method is not suitable for supervised adversarial learning.
- **Exploring GAN-Structured Pipeline:** Investigated the application of a GAN-structured pipeline in adversarial training.

PUBLICATIONS

[1] **Li Wenjun**, et al. Adaptive Tool Use in Large Language Models with Meta-Cognition Trigger. [preprint]
[2] **Li Wenjun**, Chen Changyu, Varakantham P. Unlocking Planning Capabilities of Large Language Models with Clustering-Based Maximum Diversity Sampling. [preprint]
[3] **Li Wenjun***, Sidney Tio*, Varakantham P. RL as a Surrogate: Teacher Algorithms for Human Learning. [preprint]
[4] Teoh Jayden*, **Li Wenjun***, Varakantham P. Improving Environment Novelty Quantification for Effective Unsupervised Environment Design. **[NeurIPS 2024 Oral]**
[5] **Li Wenjun**, Varakantham P. Unsupervised Training Sequence Design: Efficient and Generalizable Agent Training. **[AAAI 2024]**
[6] **Li Wenjun**, Varakantham P, Li D. Generalization through Diversity: Improving Unsupervised Environment Design. **[IJCAI 2023]**
[7] Li D, **Li Wenjun**, Varakantham P. Diversity Induced Environment Design via Self-Play[J]. [preprint]
[8] Ghosh S, Varakantham P, Bhatkhande A, **Li Wenjun**, Milind Tambe. Facilitating human-wildlife cohabitation through conflict prediction. **[AAAI 2022]**

LANGUAGES

- English, Mandarin, German

* Equal contribution