Zijiao **Yang**

PhD Student · Computer Science Program

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Education

Oregon State University — *Corvallis, USA*

PhD Computer Science — *Sept. 2020 - present*

- Advisor: Dr. Stefan Lee
- GPA: 3.9/4.0
- Selected course list: High Performance Computer Architecture, Natural Language Processing with Deep Learning, Intro to Parallel Programming

University of Colorado Boulder — *Boulder, USA*

MS Computer Science — *Aug. 2018 - May. 2020*

- Advisor: Dr. James H. Martin
- GPA: 3.9/4.0
- Selected course list: Computational Lexical Semantics, Machine Learning, Convex Optimization, Bio-inspired Multi-Agent System, Statistical Data Analysis

Ritsumeikan University — *Kusatsu, Japan*

BE Information Science — *Sept. 2014 - July 2016*

- Undergrad research advisor: Dr. Eric W. Cooper
- GPA: 4.3/5.0

Dalian University of Technology — *Dalian, China*

BE Software Engineering — *Sept. 2012 - Aug. 2016*

Publications

Published

Zijiao Yang, Xiangxi Shi, Eric Slyman, Stefan Lee.
Hijacking Vision-and-Language Navigation Agents with Adversarial Environmental Attacks.
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2025)

Zijiao Yang, Arjun Majumdar, Stefan Lee.
Behavioral Analysis of Vision-and-Language Navigation Agents.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2023) (25%)

Research Experience

Conference Paper: Hijacking Vision-and-Language Navigation Agents with Adversarial Environmental Attacks. — *Corvallis, USA*

Supervisor: Dr. Stefan Lee; Collaborator: Xiangxi Shi — *Mar. 2023 - May 2024*

- Develop an adversarial attack framework for controlling the trajectories of VLN agents that uses differentiable rendering to modify the appearance of 3D scene objects.
- Demonstrate that the resulting attacks are effective at altering the behavior (stop attack, trajectory following attack success at **75%**, **20%** respectively) and performance of a representative VLN model when generalizing to new instruction-trajectory instances in the attacked scene on representative VLN datasets.(success rate reduced by **35%**)
- Present statistical analysis (linear mixed effect regression) to better understand what factors influence the success of these attacks.
- Technical Highlight: Reduce rendering time cost by fragment-caching and selecting key views. (**10x** speed up)

Conference Paper: Behavioral Analysis of Vision-and-Language Navigation Agents *Corvallis, USA*

Supervisor: Dr. Stefan Lee; Collaborator: Arjun Majumdar *Mar. 2022 - Oct. 2022*

- Formulated an model agnostic intervention-based paradigm for analyzing VLN agents, identifying competencies and biases. (existing agents are able to ground simple referring expressions but biases from training have last effects: move forward bias.
- Conducted case studies on three VLN agents, utilizing hierarchical bootstrapping and linear mixed-effect regression to analyze results, and presented findings in easily interpretable figure for stop, turn, object and room finding skills, and leading to the proposal of skill-specific competency scores.
- Investigated the correlation between skill-specific metrics and overall VLN task performance.

Project: Generating Navigation Natural Language Instructions. *Corvallis, USA*

Supervisor: Dr. Stefan Lee; Collaborator: Arjun Majumdar *Sept. 2021 - Feb. 2022*

- Evaluated various VLN instruction generation models, training a Prevalent-Speaker model that leverages pre-training on vision-language models (e.g., Prevalent, LXMERT).
- Devise different model architectures and achieve a reasonable qualitative result compared to previous speaker models. Conduct qualitative analysis on resulted models.

Project: Data Augmentation for VLN Agent Training with Templated Instructions. *Corvallis, USA*

Supervisor: Dr. Stefan Lee *June. 2021 - Sept. 2021*

- Developed templated instructions for R2R and RxR datasets, performing linguistic analyses to enhance data augmentation methods.
- Enhanced the Recurrent-VLN-BERT accommodating RxR's path property, explored reward shaping to obtain a SR of **47.5%** for English-only val-unseen setting, reaching near 2nd place's performance on RxR Challenge Leaderboard (at the time), achieved without using external data source or adding special model design.
- Applied adversarial discriminative domain adaptation to bridge linguistic disparities between datasets, augmenting VLN training efficacy.

Academic Service

Served as Reviewer for

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2023
Neural Information Processing System (NeurIPS), 2021-2024
Transactions on Machine Learning Research (TMLR)
International Conference on Learning Representations (ICLR) 2025

Professional Experience

2020-2024 **Graduate Research Assistant**, EECS dept., Oregon State University
2024 **Graduate Teaching Assistant**, *CS 581 – Programming Languages*, EECS dept., Oregon State University
2024 **Graduate Teaching Assistant**, *CS 325 – Analysis of Algorithms*, EECS dept., Oregon State University
2024 **Mentor**, *AI Application Support Program*, Oregon State University

Awards

2020 **Lloyd Botway Fellowship**, University of Colorado Boulder

2015 **Special Encouragement Scholarship**, Ritsumeikan University *Full tuition waiver*

Skills

Programming Languages
Python, C, MATLAB, Ruby, R, HTML

Machine Learning
Pytorch, Huggingface, scikit-learn, Wandb, Pytorch3D, Open3D

Statistical Tools
Statistical Tests, Linear Mixed Effect Models, Hierarchical Bootstrapping

Languages
Chinese, English, Japanese