TEERATHAM (TJ) VITCHUTRIPOP

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EDUCATION

Yale University — New Haven, CT
Ph.D. in Computer Science — 2024 – Present
Advisor: Daniel Rakita

University of Virginia — Charlottesville, VA
B.S. Computer Science and B.A. Philosophy — 2020 – 2024
GPA: 3.885 | *Honors*: Highest Distinction, Raven Society

RESEARCH EXPERIENCE

Yale University, Department of Computer Science — New Haven, CT
Graduate Research Assistant – Applied Planning, Learning, and Optimization (APOLLO) Lab — Aug. 2024 – Present
Advised by **Daniel Raktia**

- Proposing and developing imitation and reinforcement learning algorithms for multi-agent mobile manipulation systems.
- Brainstorming computer vision approaches for 3D view reconstruction to assist surgeons in robotic surgery.

Carnegie Mellon University, Robotics Institute — Pittsburgh, PA
RI Summer Scholar (RISS) – Robots Perceiving and Doing (R-PAD) Lab — Jun. 2023 – June 2024
Advised by **David Held**

- Proposed and developed novel unsupervised architecture, *TaskSeg*, for segmenting task-relevant objects in robot manipulation tasks through video demonstrations.
- Applied optical flow on video demonstration frames to generate pseudo-label masks used to train a segmentation model for a downstream robot manipulation policy.
- Performed comparative experiments with a model trained on ground truth data, showing comparable results (~5% mIoU difference on most tasks), and ablation studies on different flow aggregation methods.

University of Virginia, Link Lab — Charlottesville, VA
Undergraduate Research Assistant – Collaborative Robotics Lab — Aug. 2021 – May 2024
Advised by **Tariq Iqbal**

- Proposed and developed novel deep reinforcement learning algorithm, *LASSO*, to tackle dynamic goal manipulation tasks using an autoencoder and contrastive learning-based architecture, addressing the representation learning bottleneck of RL algorithms and improving upon state-of-the-art performance.
- Conducted experiments in custom OpenAI Gym MuJoCo environments to benchmark task performance.
- Developed behavior trees in ROS using PyTrees for robotic control in human-robot demonstrations.

PUBLICATIONS

2024

B. Eisner, E. Cai, O. Donca, **T. Vitchutripop**, and D. Held, *Sequential Object-Centric Relative Placement Prediction for Long-Horizon Imitation Learning*, Learning Effective Abstractions for Planning (LEAP) Workshop @ Conference on Robot Learning 2024 [paper]

J. Brown*, **T. Vitchutripop***, E. Cai, J. Wang, and D. Held, *Unsupervised Deep Instruction Tuning for Few Shot Object Segmentation* (Submitted) [website]

M. S. Yasar, **T. Vitchutripop**, and T. Iqbal, *LASSO: Learning Latent Policies via State Space Modeling* (Submitted)

R. Klein-Seetharaman, R. Xue, B. Li, R. Tsai, B. Goldstein, C. Liang, **T. Vitchutripop**, Q. Wang, L. Merz Hoffmeister, X. Sun, D. Rakita, *APOLLO Toolbox: A Flexible, Multi-language Planning, Learning, and Optimization Software Suite* (Submitted)

2023

T. Vitchutripop, J. Wang, and D. Held, *TaskSeg: Task-Specific Object Segmentation Through Demonstration*, **RISS Working Papers Journal 2023** [paper] [video] [poster]

PRESENTATIONS

TaskSeg: Task-Specific Object Segmentation Through Demonstration [poster] August 2023
Poster Presentation, Robotics Institute Summer Scholar Showcase, Carnegie Mellon University

LASSO: Learning Latent Policies via State Space Modeling [slides] April 2023
Oral Presentation, Undergraduate Engineering Research and Design Symposium, University of Virginia (Awarded Best Oral Presentation)

LASSO: Learning Latent Policies via State Space Modeling [slides] March 2023
ACC Meeting of the Minds Conference, Virginia Tech (1 of only 5 selected to represent UVA)

HONORS & GRANTS

Louis T. Rader Outstanding Undergraduate Research Award 2024, 2023
Department of Computer Science, University of Virginia

CRA 2024 Outstanding Undergraduate Researcher Award (*Honorable Mention*) 2024
Computing Research Association

Robotics Institute Summer Scholar (RISS) [NSF REU Program] *(7.8% acceptance rate)* 2023
Robotics Institute, Carnegie Mellon University

Best Oral Presentation *(1st place)* 2023
2023 Undergraduate Engineering Research and Design Symposium, University of Virginia

Double Hoo Research Grant Award 2022
Office of Citizen Scholar Development, University of Virginia

SKILLS & LANGUAGES

Programming Languages: Python, Java, C++, C, JavaScript, TypeScript, Assembly
Machine Learning and Robotics Frameworks: PyTorch, TensorFlow & Keras, OpenAI Gym, MuJoCo, ROS, OpenCV, Scikit-Learn, NumPy, Pandas, PyTrees, PyTorch Lightning, RLBench
Other Tools and Frameworks: GitHub, Bitbucket, Docker, Weights and Biases, Singularity, Slurm, Visual Studio Code, JupyterLab, Linux, React, Node.js, Airtable, Excel, MATLAB, Autodesk Fusion 360

PROFESSIONAL EXPERIENCE

National Science Foundation Alexandria, VA
Policy and Data Science Intern – UVA-MIT Policy Internship Program June 2022 – Feb 2023

- Contributed towards efforts to publish and open-source innovation and entrepreneurship application data for the NSF Engines program, developing data cleaning pipelines, data visualization prototypes, and a public-facing database for collaboration in Airtable used by 5000+ users and featured in multiple publications (e.g., Forbes, Heartland Forward, SSTI).
- Leveraged state-of-the-art large language models and natural language processing techniques to extract entities from records and reports, unveiling companies/startups spun off from NSF-funded research.

Interop.io (*formerly Cosaic*) Charlottesville, VA
Software Engineering Intern June 2021 – Aug. 2021

- Designed headless UI unit tests for React components (increasing coverage from 0% to 50%) and end-to-end regression tests for 2 different parts of the product.
- Refactored existing legacy React components, converting them to TypeScript for build-time type safety and importing them into Storybook to support modular testing.

TEACHING EXPERIENCE

CS 2120 Discrete Mathematics and Theory 1, University of Virginia — Charlottesville, VA
Teaching Assistant — Feb. 2021 – May 2024

- Planned and co-lectured classes on quantifier logic and entailment to 100+ students.
- Guide and support students on course content during in-class activities, office hours, and after lectures.
- Strategize with professors and other teaching assistants about optimal ways to deliver class content.

STS 3020 Science and Technology Policy for Interns, University of Virginia — Charlottesville, VA
Teaching Assistant — Aug. 2022 – May 2023

- Supported instructor in program recruitment and course design + operations.
- Coordinated and moderated alumni guest speaker panels.
- Developed and maintained UVA Policy Internship Program website.

LEADERSHIP & SERVICE

HooHacks, University of Virginia — Charlottesville, VA
Marketing Committee Co-Chair — Sept. 2020 – May 2024

- Lead committee members and collaborate with HooHacks executive board on planning marketing campaign and strategy for HooHacks, UVA's premier student-run hackathon with 1000+ participants.
- Established stronger relationships with organizations for underrepresented groups in STEM and minority serving institutions to make events more inclusive.

Charlottesville Debate League (CDL), University of Virginia — Charlottesville, VA
Teacher (2020-2023) | Head Teacher (2022) — Sept. 2020 – May 2023

- Mentored 30+ middle school students on extemporaneous speaking and public forum debate.
- Discuss with teachers on best ways to implement curriculum and maintain high student engagement.
- Analyze effective teaching strategies with other CDL teachers at 10+ schools.