# Brandon Yifan Yang

Curriculum Vitae

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## EDUCATION

# o University of Virginia

Charlottesville, VA

B.S. in Computer Science; Major GPA: 3.98/4.00; Cumulative GPA: 3.91/4.00

August 2021 - May 2025

o Relevant Coursework: Machine Learning (ML), Reinforcement Learning (RL)\*, Natural Language Processing (NLP)\*, Probabilistic ML\*, Human-Robot Interaction\*, Optimization, Data Structures & Algorithms, Theory of Computation, Computer Systems Organization, Software Engineering \*Graduate-level courses.

# Research Experience

# Research Assistant, Learning and Interactive Robotics, University of Virginia

Charlottesville, VA Aug 2024 - Present

Advisor: Prof. Yen-Ling Kuo

#### • Interpretable Vision-Language-Action Models via Skill Conditioning

- \* Leading project on Vision-Language-Action (VLA) models with focus on action interpretability for robotic manipulation tasks by integrating skill-conditioned action priors.
- \* Developing SkillVLA, a novel VLA model aiming to improve long-horizon language-conditioned robotic policies and interpretability by grounding action outputs with synthesized subgoal instructions and learned skill library.
- \* Delivered Oral Lightning Talk at 2024 UVA LLM Workshop, earning Audience Choice Award (top 3 out of 28 presentations).
- \* Participating in weekly reading groups with 10+ members to discuss recent advancements in robotics, ML, and NLP.

#### Research Assistant, University of Maryland

College Park, MD

Advisor: Prof. Jia-Bin Huang

May 2024 - September 2024

#### • Semantically Aware 3D Gaussian Splatting

- \* Researched methods to enhance robotic scene understanding using 3D Gaussian Splatting (3DGS) in collaboration with MIT, injecting semantically aware language embeddings to improve accuracy and stability in 3D representations.
- \* Developed approaches enabling downstream language-conditioned robotic interaction with objects, leveraging enriched 3DGS scenes for more precise and stable robotic behaviors.
- \* Investigated video segmentation techniques (SAMv2) to maintain temporal consistency when integrating 2D training data into 3D scenes, ensuring reliable 3D embeddings for robotic perception and interaction.

# Research Assistant, Collaborative Robotics Lab, University of Virginia

Charlottesville, VA May 2022 - May 2024

Advisor: Prof. Tariq Iqbal

# • Grounded Location for Object Manipulation (GLOMA) [code]

- \* Led team of 3 to develop zero-shot image-editing model grounded by language instructions for object relocation and manipulation tasks, designed for downstream robotic applications using goal-conditioned RL and Behavioral Cloning (BC).
- \* Integrated language grounding with visual perception by using bounding box guidance from pre-trained language models, enabling precise object relocation without external supervision and improving baseline performance by 65%.
- \* Collected and annotated custom dataset for fine-tuning pre-trained language and vision models.
- \* Presented poster at 3 conferences and symposiums.
- Centralized multi-agent RL for Collaborative Tasks [code]

- \* Developed long-horizon on/offline centralized MARL for robotic bolt screwing tasks with team of 4 (1 grad + 3 undergrads).
- \* Designed and optimized custom reward functions in multi-agent framework for task completion and agent collaboration, improving task success rate by 20%.
- \* Deployed and tested custom simulated environments in IsaacGym for training and evaluation.

# Honors

#### Audience's Choice Award (Top 3 of 28)

October 2024

University of Virginia Large Language Model (LLM) Workshop

# University of Virginia Research Computing Exhibition Finalist (Top 5 of 25)

April 2024

University of Virginia Research Computing

#### Dean's Engineering Research Scholarship (\$5000 stipend)

May 2023

University of Virginia School of Engineering and Applied Science

#### Entrepreneurship Cup Winner (Received \$1000 in funding)

November 2023

University of Virginia Darden School of Business

Dean's List

University of Virginia

#### Talks & Presentations

# Interpretable Vision-Language-Action Models via Skill Conditioning [slides]

o University of Virginia Large Language Model (LLM) Workshop, Charlottesville, VA

October 2024

# Using Synthetic Data and Sparse Autoencoders To Interpret Large Language Models [poster]

o University of Virginia Research Computing Exhibition, Charlottesville, VA

April 2024

#### GLOMA: Grounded Location for Object Manipulation [poster]

o University of Virginia Fall Engineering Research Expo, Charlottesville, VA

October 2023 September 2023

o University of Virginia Spring Thornton Society Dinner, Charlottesville, VA

7.1.000

o University of Virginia Summer Research Symposium, Charlottesville, VA

July 2023

#### Robot Tool Grasping with AprilTag

o University of Virginia Engineering Open House, Charlottesville, VA

November 2023

o University of Virginia Engineering Open House, Charlottesville, VA

November 2022

# TEACHING EXPERIENCE

#### Teaching Assistant

University of Virginia

August 2024 - Present

Machine Learning

- Authored comprehensive course notes with interactive visualizations to support student learning and understanding. [link]
- o Collaborated with course staff to develop and grade assignments, exams, and projects.
- Mentored 20+ students throughout semester-long ML projects, providing guidance on research methodology and implementation.

#### Teaching Assistant

University of Virginia

Theory of Computation

Jan 2024 - May 2024

• Held weekly office hours, one-on-one tutoring, and review sessions to assist students with course material.

## Lab Lead Teaching Assistant

University of Virginia

Computer Systems Organization

Jan 2023 - May 2023

- Led and co-lectured weekly lab sections on computer systems topics with interactive activities for 70+ students.
- Supervised and coordinated team of 6 TAs to facilitate effective learning and lab management.
- Held office hours and whiteboard sessions to provide additional support for students.

## SOFTWARE PROJECTS

**notie-markdown** [code, course notes, blog posts]: Developed open-source React component for Markdown rendering using TypeScript. Used notie-markdown to create course notes and blog posts on computer science and ML topics.

**SmartOH** [code]: Developed AI-assisted office hour queueing system, built with Python, PyTorch, and TypeScript. Placed 3rd overall at VTHacks11 (Hackathon held at Virginia Tech) (3/393).

**Voy**: Collaborated with 7 non-profits to develop Voy, a volunteer and driver management platform using Python and TypeScript; received \$1000 in funding from UVA's Entrepreneurship Cup.

# Programming Skills

Programming Languages: Python, C/C++, CUDA, Java, JavaScript, TypeScript, Bash, HTML/CSS ML + Robotics: PyTorch, TensorFlow, OpenCV, MuJoCo, ROS, IsaacGym, Habitat, RLBench, Maniskill

Other Tools & Frameworks: Git, Docker, Slurm, Linux, LATEX, React, Node.js, Express, Django

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