Brandon Yifan Yang

Curriculum Vitae

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Education

- **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*
- **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
Advisor: Prof. Yen-Ling Kuo — *Aug 2024 - Present*

- **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
Advisor: Prof. Tariq Iqbal — *May 2022 - May 2024*

- **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]

- University of Virginia Large Language Model (LLM) Workshop, Charlottesville, VA *October 2024*

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

- University of Virginia Research Computing Exhibition, Charlottesville, VA *April 2024*

GLOMA: Grounded Location for Object Manipulation [poster]

- University of Virginia Fall Engineering Research Expo, Charlottesville, VA *October 2023*
- University of Virginia Spring Thornton Society Dinner, Charlottesville, VA *September 2023*
- University of Virginia Summer Research Symposium, Charlottesville, VA *July 2023*

Robot Tool Grasping with AprilTag

- University of Virginia Engineering Open House, Charlottesville, VA *November 2023*
- University of Virginia Engineering Open House, Charlottesville, VA *November 2022*

Teaching Experience

Teaching Assistant University of Virginia
Machine Learning *August 2024 - Present*

- Authored comprehensive course notes with interactive visualizations to support student learning and understanding. [link]
- 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

Last Updated: November 4, 2024