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**
    - Researching Vision-Language-Action (VLA) models with a focus on action interpretability for robotic manipulation tasks.
    - Developing *SkillVLA*, a novel VLA model that aims to improve long-horizon language-conditioned robotic policies and interpretability by grounding action outputs with synthesized subgoal instructions and a learned skill library.
- **Research Assistant, University of Maryland** — College Park, MD
  Advisor: Prof. Jia-Bin Huang — *May 2024 - Present*
  - **Semantically Aware 3D Gaussian Splatting**
    - Researched methods to enhance general robotic scene understanding through 3D Gaussian Splatting (3DGS) by injecting semantically aware language embeddings into 3DGS scenes. This approach aims to improve language-conditioned robotic interaction with objects by enabling more accurate and stable 3D representations.
    - Investigated video segmentation techniques, including SAMv2, to ensure temporal consistency in the integration of 2D training data into 3D scenes, facilitating reliable 3D embeddings for robotic perception and interaction tasks.
- **Research Assistant, Collaborative Robotics Lab, University of Virginia** — Charlottesville, VA
  Advisor: Prof. Tariq Iqbal — *May 2022 - May 2024*
  - **Grounded Location for Object Manipulation (GLOMA)**
    - Developed 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.
  - **Centralized multi-agent RL for Collaborative Tasks**
    - Developed long-horizon on/offline centralized MARL for robotic bolt screwing tasks.
    - 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** *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

Presentations

- **Interpretable Vision-Language-Action Models via Skill Conditioning**
  - University of Virginia Large Language Model (LLM) Workshop, Charlottesville, VA *October 2024*
- **Using Synthetic Data and Sparse Autoencoders To Interpret Large Language Models**
  - University of Virginia Research Computing Exhibition, Charlottesville, VA *April 2024*
- **GLOMA: Grounded Location for Object Manipulation**
  - 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 and interactive course notes to support student learning and understanding.
  - Collaborated with course staff to develop and grade assignments, exams, and projects.
- **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 a 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**: 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**: 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

- **Languages**: Python, C/C++, CUDA, Java, JavaScript, TypeScript, 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