Ethan Villalovoz

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Education

Georgia Institute of Technology **Jan 2026 - Dec 2027**
Master of Science in Computer Science — Computational Perception and Robotics, GPA: 4.0/4.0 Atlanta, GA

Washington State University **Aug 2021 - May 2025**
Bachelor of Science in Computer Science — Minor in Mathematics, GPA: 3.94/4.0 Pullman, WA

- Senior Design Project: Retrieval-Augmented Generation Application Using Knowledge Graph and Vector Search

Technical Skills

Languages: Python, C/C++, SQL, JavaScript, TypeScript, HTML/CSS, C#, MATLAB, R, Haskell, Swift

Developer Tools: Git, GitHub, GitHub Actions, Docker, Bash, Conda, AWS, Postman, Jupyter, MLflow, DVC, MySQL

Libraries/Frameworks: React, Next.js, FastAPI, PyTorch, Pandas, LangChain, Hugging Face Transformers, OpenCV

Work Experience

Washington State University **Jan 2024 - May 2025**
Undergraduate Research Assistant Pullman, WA

- Executed large-scale empirical evaluations of a **Bayesian Optimization–based prompt search** method for LLM-driven code generation, measuring functional correctness across **164 HumanEval+ tasks** and multiple models
- Built and ran reproducible experiment pipelines for **test-driven code synthesis**, benchmarking prompt optimization against **Chain-of-Thought** and **OPRO** baselines using pass@1 accuracy across HumanEval+ tasks
- Analyzed performance trends across optimization iterations, demonstrating **sample-efficient improvements** in code correctness through continuous embedding-space search with **Gaussian Process** surrogate models

Carnegie Mellon University **Jun 2024 - Aug 2024**
Robotics Institute Summer Scholar Pittsburgh, PA

- Developed a novel hierarchical **reward learning framework** using **Bayesian inference** to align robotic actions with human preferences from iterative **state corrections**, significantly enhancing robot adaptability
- Implemented a **proactive clarification dialogue** system that improved task accuracy by **30%** by resolving uncertainty through targeted human queries, reducing errors and advancing interactive human-robot collaboration
- Engineered a modular, extensible **Python**-based simulation environment using **Markov Decision Processes (MDP)**, supporting robust evaluation and iterative development of learning algorithms in simulated robotics tasks

Google **May 2023 - Aug 2023**
Software Engineering Intern (STEP) Sunnyvale, CA

- Developed and deployed **5 C++ and SQL**-based analytics jobs for internal database queue metrics, significantly reducing operational costs and enabling data-driven decision-making in collaboration with engineering stakeholders
- Optimized data sampling strategies to scale job execution from **1%** to **100%** dataset coverage within **4 hours**, achieving a **66%** reduction in runtime and improving the scalability, accuracy, and efficiency of internal analytics workflows
- Built interactive, real-time dashboards using **HTML** and **SQL**-based queries, delivering actionable insights to internal teams across engineering and operations, and enabling faster decision-making through intuitive visualizations
- Implemented live-update statistical features on client dashboards with **HTML** and database-driven queries, enhancing stakeholder visibility into queue activity, reducing detection latency, and enabling more responsive system oversight

Oregon State University **June 2022 – Aug 2022**
NSF REU Fellow Corvallis, OR

- Designed geometric motion primitives for multi-robot expressive behaviors by integrating techniques from the performing arts, enhancing robot character, emotional expressivity, and perceived intelligence in human-robot interaction settings
- Engineered a modular **Python** script to compute final geometric formation coordinates from user-defined inputs, enabling seamless, real-time deployment of expressive motion sequences on Pioneer 3DX robots used in HRI studies
- Developed a user-friendly **Tkinter GUI** to simplify interaction with the geometry scripting tool, increasing accessibility and enabling efficient setup and execution of complex robot formations without requiring command-line knowledge

Publications

An Exploratory Study of Bayesian Prompt Optimization for Test-Driven Code Generation with Large Language Models. S. Tomar, A. Deshwal, E. Villalovoz, M. Fazzini, H. Cai, J.R. Doppa. *arXiv*, 2025.

Social Triangles and Aggressive Lines: Multi-Robot Formations Impact Navigation and Approach. A. Bacula, E. Villalovoz, D. Flynn, A. Mehta, H. Knight. *International Conference on Intelligent Robots and Systems (IROS)*, 2023.