

Alexiy Buynitsky

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GOAL

I'm a CS Master's student at UCSD and I love learning anything new. I want to apply my experiences and knowledge to cutting-edge projects. I'm confident my drive, passion, work ethic, and curiosity will help me make valuable contributions.

EDUCATION

- UC San Diego** *La Jolla, CA* Sept 2025 – Jun 2027
Master of Science in Computer Science **GPA: 4.00/4.00**
Courses: Generative AI, Parallel Computing
- Purdue University** *West Lafayette, IN* Aug 2022 – May 2025
Bachelors of Science in Computer Science, Bachelors of Science in Mathematics **GPA: 3.99/4.00**
Graduate Courses: Robot Learning, Robot Manipulation, Deep Learning, Compilers, Datamining & ML
Undergraduate Courses: Analysis of Algorithms, Complex Analysis, Abstract Algebra, Linear Algebra II, Elementary Linear Algebra, Artificial Intelligence, Probability, Statistics, Real Analysis, Systems Programming, Data Structures & Algorithms, C Programming, Discrete Math, Computer Architecture, Physics E&M
- De Anza College** *Cupertino, CA* Jun 2021 – Jun 2022
Dual Enrolling HS Student **GPA: 4.00/4.00**
Courses: Differential Equations, Multivariable Calculus, C++ Programming, x86 Programming, Python Programming

EXPERIENCE

- ML Engineering Intern | Persona AI | Houston, TX** May 2025 - Aug 2025
- Engineered architectural & training improvements for learning tasks using visuomotor policies and VLAs
 - Built teleoperation pipeline with Gello & SpaceMouse for large-scale data collection on bimanual manipulators
 - Designed data processing pipeline, converting raw data into frequency-synchronized, model-agnostic datasets and generating model-specific datasets for training
 - Created evaluation pipelines using digital twins in NVIDIA Isaac Lab and quantitative metrics
- Graduate Robotics Researcher | CoMMA Lab | Purdue** Oct 2024 - May 2025
- Research Active Vision & Behavioral Cloning for manipulators under the supervision of Prof. Zachary Kingston
 - Achieve 250x speedup in generating expert trajectories for point-to-point motion planning in tabletop environments using RRT-Connect with hardware-accelerated planning (VAMP)
 - Extended M π Nets to learn point-to-point motion planning via Behavioral Cloning from expert trajectories generated by VAMP
- AI Engineering Intern | Armada AI | Remote** Oct 2023 - May 2025
- Develop spatially-aware Code-as-Policies methods for controlling PTZ Cameras on the edge
 - Perform model distillation by generating synthetic data and finetuning LLMs using SFT and DPO
 - Developed VLM/LLM VideoQA agent for real-time video Q&A for security camera footage
- Undergraduate Robotics Researcher | CoRAL Lab | Purdue** Aug 2023 - Sept 2024
- Conduct research on robotic learning under the supervision of Prof. Ahmed Qureshi
 - Extended Unitree simulator to support Unitree B1 Quadruped Robot in Gazebo and PyBullet
 - Advance Motion Planning in dynamic environments via Network Time Fields and Sign Distance Fields
 - Teach robots to navigate through Purdue with custom knowledge using LLMs, RAG, and vector databases
- Engineering Intern | SpaceX | Redmond, WA** May 2023 - Aug 2023
- Develop mechatronic / software solutions for quicker manufacturing and assembly of Starlink Satellites
 - Prototype satellite assembly cells, working with 6-axis robotics arms, CV, actuators, sensors, & safety hardware
 - Achieve 80x speedup between PLC & CV software by developing an IP-style communication library
- Undergraduate ML Researcher | Duality Lab x Google | Purdue** Jan 2023 - May 2023
- Build data pipeline for MaskFormer and Mask2Former for TensorFlow 2's Model Garden
 - Generate, and load TFRecords for panoptic segmentation, adding data augmentations, configs and dataloaders

PUBLICATIONS AND PATENTS

Liu, Y., **Buynitsky, A.**, Ni, R., and Qureshi, A.H., 2025. Physics-informed Neural Motion Planning via Domain Decomposition in Large Environments. Published in *2025 IEEE International Conference on Intelligent Robots & Systems (IROS)*

Chen, W., Liu, Y., **Buynitsky, A.**, and Qureshi, A.H., 2025. Self-supervised Hierarchical Robot Navigation Policy Learning using Physics Priors in Unknown Environments. Published in *2025 IEEE International Conference on Intelligent Robots & Systems (IROS)*

Buynitsky, A., and Kingston, Z., 2025. Faster Behavioral Cloning with Hardware-Accelerated Motion Planning. Published in RoboARCH Workshop at *2025 IEEE International Conference on Robotics & Automation (ICRA)*

Buynitsky, A., Ehsani, S. and Mishra, P.K., Armada Systems Inc, 2025. *Robotic Control Using Natural Language Commands* U.S. Patent 12289517 B1.

Buynitsky, A., Ehsani, S. and Mishra, P.K., 2024. Camera Control at the Edge with Language Models for Scene Understanding. Published in *11th International Conference on Control, Automation and Robotics (ICCAR)*

PROJECTS

Edge Probing for Decoder-only Transformers | *Pytorch, Python, NLP* Mar 2025 – June 2025

- Developed a two-stage interpretability framework (Block Pruning and Edge Probing) to identify which transformer blocks contain NLP-Related Information on 7 NLP tasks (POS, NER, CP, SR, UD, SRL, CR), achieving up to 92% sparsity in hidden block embeddings while maintaining comparable performance on NLP tasks
- Finetune GPT-2 on auxiliary NLP objectives, reducing perplexity by 9% compared to finetuning only on self-supervised objective using OWT

Predicting Student Dropout | *Pytorch, Python* Oct 2024 – Dec 2025

- Achieve a 89% accuracy in predicting student dropout using an ensemble voting classifier composed of KAN, MLP, Decision Trees, Logistic Regression, SVM, XGBoost, Naive Bayes, and Random Forest
- Perform EDA and feature selection by removing non-critical features using permutation feature importance

Gesture Controlled HCI | *Pytorch, Flask, MongoDB* Jan 2024 – Mar 2024

- Built a continuous learning model to detect hand poses at 30FPS allowing for customizable hand poses
- Categorized hand gestures through VLMs and vector databases and create custom actions using open-interpreter

Robotics Mini-Projects | *Pytorch, Gazebo, PyBullet, ROS* Jan 2024 – May 2024

- Implement RRTConnect, RRT* for cars and 6-DOF arms; Iterative/Analytic PID for Quadruped robots and 2-DOF arms; MPNet in 2D/3D environments; VPG for 2-DOF arm

1st Place Purdue BoilerMake X Hackathon Dagshub | *Pytorch, MLFlow, DVC, Dagshub* Jan 2023

- Used seq2seq model to study key factors affecting air quality. Created a robust, modular testing environment for time-series forecasting with any data through MLFlow, DVC, and git using DagsHub

Image Processing | *Pytorch* Oct 2022

- 1st place in ML@Purdue Pokémon Classifier Competition using VGG16s, and transfer learning with ResNets
- Tracked objects with K-means clustering, and created image masks and filters

TECHNICAL SKILLS

Languages: Python, C/C++, Java, Twincat3, C#, Bash, x86 Assembly, SQL

Frameworks: Pytorch, ROS, Tensorflow

Platforms/Tools: Docker, Conda, Linux, VIM, Git/Github, Dagshub, Onshape