Alexiy Buynitsky

669-246-0140 | abuynits@gmail.com | abuynits.github.io | linkedin.com/in/alexiybuynitsky | github.com/abuynits

Goal

I am a CS and Math double major and I love learning anything new. I want to apply my experiences and knowledge to cutting-edge projects that leverage the forefront of CS. 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 and Engineering

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: Robotic Learning, Robot Manipulation, Datamining & Machine Learning, Deep Learning, Compilers
Undergraduate Courses: Algorithms, Elementary Linear Algebra, Abstract Algebra, Linear Algebra II, Complex Analysis, Artificial Intelligence, Probability, Statistics, C Programming, Systems Programming, Data Structures & Algorithms, Real Analysis, Discrete Math, Computer Architecture, Physics E&M

De Anza College *Cupertino, CA* Jun 2021 – Jun 2022
Double Enrolling HS Student **GPA: 4.00/4.00**
Courses: Differential Equations, Multivariable Calculus, C++ Programming, x86 Programming, Python Programming

Experience

Incoming ML Engineer Intern | **Persona AI** | *Houston, TX* May 2025

Undergraduate Robotics Researcher | **CoMMA Lab** | *Purdue* Oct 2024 - Present
- Research Active Vision & Behavioral Cloning for manipulators under the supervision of Prof. Zachary Kingston
- Achieve 200× speedup in generating expert trajectories for point-to-point motion planning in tabletop environments using RRT-Connect with hardware-accelerated planning (VAMP)
- Extended MπNets to learn point-to-point motion planning via Behavioral Cloning from expert trajectories generated by VAMP

AI Engineer Intern | **Armada AI** | *Remote* Oct 2023 - Present
- First Intern at Armada AI building Edge AI Applications for remote compute hardware
- 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
- Create automation scripts using Python, TypeScript, C/Cpp, and C# / .Net, saving $200k on one instance

Tensorflow Model Developer | **Duality Lab x Google** | *Purdue* Jan 2023 - May 2023
- Build data pipeline for MaskFormer and Mask2Former using Google DeepLab2 and Tensorflow
- Generate, decode, and load TFRecords for panoptic segmentation

TE AI Cup | **ML @ Purdue x Te Connectivity** | *Purdue* Nov 2023 - May 2023
- Achieve 83% accuracy in forecasting sales for 1300+ products using LSTMs, and Time Series Transformers
- Build framework to study the effects of external economic indicators on model prediction for any time-series data

Publications and Patents

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 – Present

- 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, RPC
Platforms/Tools: Docker, Conda, Catkin, Linux, VIM, Github, Dagshub, Onshape