

Alexiy Buynitsky

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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 <i>La Jolla, CA</i> <i>Master of Science in Computer Science and Engineering</i>	Sept 2025 – Jun 2027
Purdue University <i>West Lafayette, IN</i> <i>Bachelors of Science in Computer Science, Bachelors of Science in Mathematics</i> Graduate Courses: Robot Learning, Robot Manipulation, Compilers, Deep Learning, Datamining & Machine Learning Undergraduate Courses: Analysis of 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	Aug 2022 – May 2025 GPA: 3.99/4.00
De Anza College <i>Cupertino, CA</i> <i>Double Enrolling HS Student</i> Courses: Differential Equations, Multivariable Calculus, C++ Programming, x86 Programming, Python Programming	Jun 2021 – Jun 2022 GPA: 4.00/4.00

EXPERIENCE

ML Engineer Intern Persona AI <i>Houston, TX</i>	May 2025 - Present
Undergraduate Robotics Researcher CoMMA Lab <i>Purdue</i> <ul style="list-style-type: none">Research Active Vision & Behavioral Cloning for manipulators under the supervision of Prof. Zachary KingstonAchieve 250× 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	Oct 2024 - Present
AI Engineer Intern Armada AI <i>Remote</i> <ul style="list-style-type: none">First Intern at Armada AI building Edge AI Applications for remote compute hardwareDevelop spatially-aware Code-as-Policies methods for controlling PTZ Cameras on the edgePerform model distillation by generating synthetic data and finetuning LLMs using SFT and DPODeveloped VLM/LLM VideoQA agent for real-time video Q&A for security camera footage	Oct 2023 - May 2025
Undergraduate Robotics Researcher CoRAL Lab <i>Purdue</i> <ul style="list-style-type: none">Conduct research on robotic learning under the supervision of Prof. Ahmed QureshiExtended Unitree simulator to support Unitree B1 Quadruped Robot in Gazebo and PyBulletAdvance Motion Planning in dynamic environments via Network Time Fields and Sign Distance FieldsTeach robots to navigate through Purdue with custom knowledge using LLMs, RAG, and vector databases	Aug 2023 - Sept 2024
Engineering Intern SpaceX <i>Redmond, WA</i> <ul style="list-style-type: none">Develop mechatronic / software solutions for quicker manufacturing and assembly of Starlink SatellitesPrototype satellite assembly cells, working with 6-axis robotics arms, CV, actuators, sensors, & safety hardwareAchieve 80x speedup between PLC & CV software by developing an IP-style communication libraryCreate automation scripts using Python, TypeScript, C/Cpp, and C# / .Net, saving \$200k on one instance	May 2023 - Aug 2023
Tensorflow Model Developer Duality Lab x Google <i>Purdue</i> <ul style="list-style-type: none">Build data pipeline for MaskFormer and Mask2Former using Google DeepLab2 and TensorflowGenerate, decode, and load TFRecords for panoptic segmentation	Jan 2023 - May 2023
TE AI Cup ML @ Purdue x Te Connectivity <i>Purdue</i> <ul style="list-style-type: none">Achieve 83% accuracy in forecasting sales for 1300+ products using LSTMs, and Time Series TransformersBuild framework to study the effects of external economic indicators on model prediction for any time-series data	Nov 2023 - May 2023

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 – 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