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

Purdue University *West Lafayette, IN* Aug 2024 – May 2026
Masters of Science in Computer Science **GPA: 4.00**
Courses: Robotic Learning, Robot Manipulation, Machine Learning

Purdue University *West Lafayette, IN* Aug 2022 – May 2025
Bachelors of Science in Computer Science, Bachelors of Science in Mathematics **GPA: 4.00**
Courses: Algorithms, Linear Algebra I & II, Abstract Algebra, Systems Programming, Data Structures & Algorithms Real Analysis, Discrete Math, Computer Architecture, C Programming, Physics E&M, Statistics Complex Analysis, Artificial Intelligence, Probability

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

Experience

AI Engineer Intern @ Armada AI | *Remote* Oct 2023 - Present
- First Intern at Armada AI building Edge AI Applications for remote compute hardware
- Developing spatially aware CV and LLM robotic control methods by generating synthetic data and finetuning models using SFT and DPO
- Building VideoQA assistant for realtime video Q&A for security camera footage
- Build prompting library with support for customizable prompting formats, single / multi-shot prompting from variable datasets, open/closed source LLMs / custom checkpoints

Undergraduate Robotics Researcher @ CoRAL Lab | *Purdue* Aug 2023 - Present
- Conducting research on robotic learning under the supervision of Professor Ahmed Quresh
- Extended Unitree simulator to support Unitree B1 Quadruped Robot in Gazebo and PyBullet
- Researching Motion Planning in dynamic environments via Network Time Fields and Sign Distance Fields
- Teaching 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 @ Google x Duality Lab | *Purdue* Jan 2023 - May 2023
- Building data pipeline for Maskformer and Mask2former using Google Deeplab2 and Tensorflow
- Generate, decode, and load TFRecords for panoptic segmentation from COCO dataset with Bash and Python
- Apply random-cropping and color jitter to images/masks, create project config and data loaders

TE AI Cup @ Te Connectivity x ML @ Purdue | *Purdue* Nov 2023 - May 2023
- Achieved 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

IRL Rocket League @ Autonomous Robotics Club | *Purdue* Apr 2022 - Dec 2022
- Refactor sim to better reflect real-world conditions by randomizing physics dynamics, tuning car properties, and simulating latency with Rospy and ROS

Signal Procesing Intern @ The SunScool App | *Sunnyvale, CA* Apr 2022 - Oct 2022
- Trim, normalize, and denoise voiceovers from 80+ chapters with noise profiles, High and Low Pass filters
- Adjusted audio volume and determined parameters for audio voice overs with FFmpeg and SOX

Projects

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 VLLMs and vector databases and create custom actions using open-interpreter

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

- Implement (bi)RRT, (bi)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, TypeScript, C#, Bash, x86 Assembly, SQL
Frameworks: Pytorch, Tensorflow, RPC, ROS, RestFUL APIs
Platforms/Tools: Docker, Conda, Catkin, Linux, VIM, Github, Dagshub, Onshape