Anar Nurizada

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Experience

Richtech Robotics **USA**
Robotics Engineer *Dec 2025 – Present*

- Owned high-fidelity simulation workflows in **Isaac Sim / Isaac Lab (PhysX)** for importing and validating **URDF and CAD-based robot models**, ensuring accurate kinematics, rigid-body dynamics, and collision behavior.
- Tuned physics parameters (contact, friction, restitution, solver settings) for stable, contact-rich manipulation and deformable interaction scenarios.
- Developed scalable, vectorized simulation pipelines for grasp generation, expert demonstrations, and large-scale dataset creation for imitation and reinforcement learning.
- Integrated **cuRobo** for collision-aware motion planning within PhysX-based environments to support robust control in constrained settings.
- Fine-tuned **pi0.5** policies in simulation using domain-randomized datasets to improve policy performance and generalization.
- Modeled suction-based end-effectors and simulated deformable objects (cloth, plastic bags) for contact-driven manipulation tasks.
- Preprocessed and optimized CAD/STL assets in **Blender** (STL → OBJ, materials, geometry cleanup) for simulation compatibility.
- Built a **VR teleoperation pipeline** for real-robot control, enabling immersive teleop and data collection on physical systems (**ROS**-based integration where applicable).
- Developed control interfaces and gesture logic for **hand grippers** and **parallel grippers** on real robots, supporting diverse manipulation primitives (pinch, peace, rock-n-roll, etc.) from VR or desktop.

DL-RL **Brooklyn, NY**
Robotics Engineer Intern *April 2025 – Dec 2025*

- Built large-scale synthetic datasets in **Isaac Sim** for the **SO 100 & Trossen** arms using IK-driven rollouts, domain randomization, and multi-sensor pipelines; published datasets on **Hugging Face** (1k+ monthly downloads).
- Developed end-to-end **Isaac Sim/Omniverse workflows** — scene/physics setup, USD stage management, CAD/URDF asset integration, camera rigs, and **auto-annotation pipelines** via the replicator graph for fully labeled synthetic datasets. Designed and executed robotics simulation tasks — **manipulation, grasping, and pick-and-place** — to validate policies before deployment to real hardware.
- Fine-tuned **Gr00t** & **pi0** models with PyTorch using both synthetic and real data; performed closed-loop testing on the physical **SO 100** arm, achieving **90–100%** task success.

Stony Brook University **Stony Brook, NY**
Graduate Research Assistant *Sep 2020 – Dec 2025*

- Designed and trained **state-of-the-art multi-modal LLM models with Mixture-of-Experts (MoE)** for path synthesis, built **entirely from scratch** using a hybrid **ViT + decoder** architecture. Employed **CLIP-based contrastive learning** and **Gaussian soft loss**, achieving **15% accuracy gains** over strong baselines with **200 ms** inference latency.
- Improved training efficiency and stability via **Classifier-Free Guidance** and **LoRA**, reducing compute by ~**30%**; integrated gradient tracking, adaptive clipping, and CLIP-aligned objectives to enhance cross-modal consistency and convergence.
- Developed and trained β-**VAE and graph-based VAE models** to learn structured latent representations supporting multi-modal generative modeling and downstream reasoning tasks.
- Led the end-to-end ML pipeline, including curation and preprocessing of **12M+** multi-modal samples, distributed training of sub-**1B**-parameter transformer models on **multi-GPU HPC clusters** (SLURM-managed), scaling experiments across cloud GPU platforms, and tracking **200+** experiments using **PyTorch (Lightning), Hugging Face, and Weights & Biases**.

Zortag **St. James, NY**
Computer Vision Engineer *Aug 2024 – Aug 2025*

- Fine-tuned **object detector YOLOv11**, boosting detection accuracy to nearly **100%** while cutting inference latency by removing a two-step pipeline and replacing it with a single optimized model.
- Automated **myCobot 280 PI**-based video/image capture pipeline, reducing manual workload **60%** and tripling labeling throughput. Integrated automated AWS S3 uploads for dataset expansion.
- Built real-time iPhone QR detection system using **SwiftUI** + **CoreML** with minimal latency; containerized via **Docker** for scalable deployment.
- Developed real-time screen detection system using **CLIP ViT-L/14@336px** + **MLP classifier**, streaming iPhone camera frames over **WebSocket** with **5-crop TTA**, EMA smoothing, and 3-frame hysteresis for robust live inference at **<1s latency**.
- Built training pipeline with **albumentations** augmentation, batched GPU feature extraction, stratified splits, and disk-level caching using **scikit-learn** and **PyTorch**, enabling rapid iteration across multiple classifier architectures.

Education

Stony Brook University **NY, USA**
Ph.D. in Mechanical Engineering / Computer Science *2022 – 2025*

Publications

2025: **Nurizada, A.**, Dhaipule, R., Lyu, Z., Purwar, A.. "A Dataset of 3M Single-DOF Planar 4-, 6-, and 8-bar Linkage Mechanisms with Open and Closed Coupler Curves for Machine Learning-Driven Path Synthesis." *ASME Journal of Mechanical Design*, 1-16. doi:10.1115/1.4067014.

2025: **Nurizada, A.**, Lyu, Z., Purwar, A.. "Path Generative Model based on Conditional β- Variational Auto Encoder for Mechanism Design." *ASME Journal of Mechanisms and Robotics*, 1-14. doi:10.1115/1.4067169.