Anar Nurizada

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Education

Jan 2021 – Present
Ph.D. in Mechanical Engineering, Minor in Computer Science, *Stony Brook University*, NY, USA.

Experience

Sep 2020 – Present
Graduate Research Assistant, *Stony Brook University*, Stony Brook, NY.
- Developed and deployed four advanced multi-modal generative models for path synthesis in mechanical engineering, implemented on the website motiongen.io.
  1. Transformer-based LLM model incorporating LLaMa2 features for precise mechanism synthesis.
  2. Conditional beta and graph VAE models with Classifier-Free Guidance for flexible and accurate mechanism generation.
  3. Image-based VAE combined with MLP for streamlined mapping between latent space and mechanism representation.
- Optimized object detection and post-processing for sketch-to-digital conversion by fine-tuning YOLOv4.
- Directed complex research initiatives from conceptualization to finalization, overseeing dataset creation, pre-processing, model validation, and augmentation over multiple years.
- Expertly utilized neural network architectures, custom loss functions, and data manipulation tools including PyTorch (Lightning), Tensorflow, NumPy, SciPy, Matplotlib, and scikit-learn.
- Maintained continuous dataset updates on Kaggle, leveraged cloud GPU clusters and SLURM for training (SSH, Lambda, VAST.AI), and presented findings at annual ASME conferences from 2021 to 2024.
- Provided mentorship to junior researchers, delivered key project milestones, and effectively communicated technical insights to stakeholders.

Jan 2024 – Present
President of House Board, *Brooklyn, NY*.
- Led and managed a diverse group of house members, ensuring responsibilities and tasks were delegated efficiently.
- Oversaw the smooth operation of the household, including budgeting, maintenance coordination, and conflict resolution.
- Fostered a collaborative environment by facilitating open communication, aligning members' efforts, and implementing strategic improvements for the house's long-term success.
- Developed leadership, problem-solving, and decision-making skills through effective management of both day-to-day operations and long-term planning.

Aug 2024 – Present
Machine Learning Engineer, *Zortag*, St. James, NY.
- Programmed and automated the myCobot 280 PI robotic arm to capture images for dataset creation, significantly reducing manual effort by mimicking human-like motion during the image capture process.
- Fine-tuned YOLOv8 on a newly generated dataset, enhancing object detection accuracy from 90% to near 100%, demonstrating expertise in model optimization and real-world implementation.
- Streamlined the labeling process by removing the need for manual input, improving efficiency and reducing human error in the dataset preparation pipeline.

Oct 2019 – Dec 2020
Mechanical Engineer Intern, *Flower Turbines LLC*, Stony Brook, NY.
- Modeled wind turbines' interactions with rooftops through advanced simulations, enhancing reliability and performance.
- Conducted comprehensive cost-benefit analysis for data-driven project profitability and sustainability decisions.
- Validated structural integrity of designs with rigorous wind load simulations using Ansys.
- Designed novel rooftop installations for wind turbines with Autodesk Inventor CAD.

Jun 2019 – Sep 2019
Summer Mechanical Engineer Intern, *BP*, Baku, Azerbaijan.
- Supported onshore operations for seamless project execution with contractors.
- Expert in materials management, coordination, and standards compliance.
- Oversaw valve sizing, certification, and repairs to enhance efficiency and safety.
- Skilled in piping design, stress analysis, and optimizing installations for better performance and integrity.

Publications

2024 **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 Deep Generative Path Synthesis." *ASME JMD*. Accepted.

2024 **Nurizada, A.**, Lyu, Z., Purwar, A.. "Path Generative Model based on Conditional β- Variational Auto Encoder for Mechanism Design." *ASME JMR*. Accepted.

2023 **Nurizada, A.**, Purwar, A.. "An invariant representation of coupler curves using a variational AutoEncoder: Application to path synthesis of four-bar mechanisms." *ASME JCISE*, doi:10.1115/1.4063726.

2022 **Nurizada, A.**, Purwar, A.. "Transforming hand-drawn sketches of linkage mechanisms into their digital representation." *ASME JCISE*, doi:10. 1115/1.4064037

2021 **Nurizada, A.**, Kirane, K.. "Induced anisotropy in the fracturing behavior of 3d printed parts analyzed by the size effect method." *Engineering Fracture Mechanics*, 239, 107304. doi:https://doi.org/10.1016/j.engfracmech.2020.107304