Nihal Gunukula

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Technical Skills

Programming Languages: Python, Java, C/C++, SQL, JavaScript, R
Machine Learning Frameworks: PyTorch, TensorFlow, Keras, scikit-learn
Generative AI Models: LLAMA, GPT, BERT, DALL-E
Data Manipulation: pandas, NumPy, SciPy, Matplotlib, seaborn
Computer Vision Libraries: OpenCV, PIL, ImageAI
Natural Language Processing: spaCy, NLTK, Transformers
Public Cloud: Amazon Web Services (Bedrock, EC2, Lambda, S3, SageMaker, RDS)
DevOps Tools: Docker, Git, Grafana, Kubernetes, Prometheus

Education

Purdue University West Lafayette, IN
Bachelor of Science in Computer Science, Minor in Math, Certificate in Entrepreneurship *Aug. 2023 – May 2026*

- Scholarships & Recognition: CS Outstanding Student Freshmen Award, 2x Dean's List, 2x Semester Honors
- Leaadership Positions: 2x Project Manager at ML@Purdue, Tech Lead at GDSC, Director of CAST at Anvil

Machine Learning Experience

Project Lead October 2023 – Present
Purdue Fusion Studio for Entertainment and Engineering *West Lafayette, IN*

- Spearheaded two pioneering projects integrating Machine Learning with Systems Engineering in Theatre, leading teams of 4 under the guidance of Professor Rich Dionne.
- Developed a MDP-based platform for intelligent stage navigation, enhancing stage direction efficiency.
- Utilization of an object detection framework to recognize theatre props and sets within a theatre blueprint.
- Implemented LIDAR positioning to visualize the stage director's vision for robotic movements dynamically.

Undergraduate Researcher June 2023 – Present
Purdue (IDEAS) Intelligent Design for Empathetic & Augmented Systems Lab *West Lafayette, IN*

- Innovating to make a significant breakthrough in crowd navigation within deeply crowded environments.
- Working closely with Professor Bera, to collect data on models and compare their performance.
- Building my MoonShot Pitch Competition Finalist project, an innovative indoor navigation system for disabled ChairCare individuals

Research Papers

Evaluating MEDIRL: | *A Replication and Ablation Study...* October 2023 – December 2023

- Replicated a Maximum Entropy Deep Inverse Reinforcement Learning model for Human Social Navigation, demonstrating accuracy within 2 meters of the original in TensorFlow with $< 25\%$ of the computational power.
- Co-lead author of a paper conducting ablation studies which is in progress for Re: Science publication:

MIRACLE | *Inverse Reinforcement and Curriculum Learning Model...* June 2023 – September 2023

- Collaborated with Professors Aniket Bera and Kshitij Tiwari on a cutting-edge deep maximum entropy inverse reinforcement model, achieving a significant breakthrough with a loss of 2.33 in 400 space.
- Designed a Unity Engine virtual environment using C# and Steam VR for collecting human navigational data, contributing to groundbreaking research in the field.

Integrated Projects

VirtualYou | *Next.js, Python, Prometheus, Grafana, Kubernetes* June 2024 – Present

- Engineered a full-stack web application using Next.js and Python, providing users with an email assistant.
- Fine-tuned a T-5 model to generate auto-replies, summarizes, and auto-categorize emails for a user.
- Implemented Grafana and Prometheus for real-time alerts and monitoring of emails, improving user experience.
- Deployed Kubernetes to create a continuous data pipeline, training the T-5 model on users' emails.

Fred. | *Flutter, Firebase, Python* June 2024 – Present

- Developed a full-stack Flutter application enabling users to manage workflows and reflect on daily activities.
- Animated and developed a 3-D robot that utilizes Gemini to allow users to interact and make requests.
- Implemented federated learning to continuously train the model with new data while ensuring user privacy.