YIRAN ZHANG

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Department of Computer Science, Purdue University, West Lafayette, IN 47907

EDUCATION

Purdue University — West Lafayette, IN
Ph.D. in Computer Science — *Sept. 2023 - Present*
Research Advisor: Dr. Aniket Bera

Northwestern University — Evanston, IL
M.S.in Computer Science — *Aug. 2021 - Jun. 2023*
GPA: 3.8/4.0
Research Advisor: Dr. Emma Alexander

Union College — Schenectady. NY
B.S and B.A in Computer Science and Visual Art — *Sept. 2017 - Jun. 2021*
GPA: 3.5/4.0

PUBLICATIONS

[1] Xingpeng Sun, **Yiran Zhang**, Xindi Tang, Amrit Singh Bedi, Aniket Bera. "***TrustNavGPT:* Modeling Uncertainty to Improve Trustworthiness of Audio-Guided LLM-Based Robot Navigation**", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024.

RESEARCH EXPERIENCE

IDEAS Lab, Purdue University
Advisor: **Dr. Aniket Bera** — *Sept. 2023 - Present*

- *ENI-driven Virtual Room Layout Generation*
  Project Outline: This VR locomotion project generates visually appealing virtual scenes that allow users to naturally walk without colliding with physical objects.
  - Improved the Environment Navigation Incompatibility (ENI) algorithm which describes the compatibility between a physical and virtual scene.
  - Designed a novel ENI metric that allows objects to be generated based on user prompts and is placed into an environment with natural walking.
  - Running virtual and physical scenarios for user tests and targeting for IEEE VR 2025.
- *Face Image to Human Head Generation*
  Project Outline: Our model generates a 360 degree 3D high-fidelity head model of a given front face image.
  - Constructed a model for conditional 3D face generation with a built-in default head mesh.
  - Utilized fourier neural operator (FNO) layers for general diffusion layers and graph neural operator (GNO) for mesh grid generation that can result in a high resolution model with faster generation speed.
  - Implementing GNOs and competing results with PanoHead and EG3D and other object focus models for CVPR 2025 submission.
- *Meta Aria Data Collection*
  Project Outline: Collecting and processing dataset for multimodal AI training with Meta Aria.
  - Received an Aria research usage device and worked on data collection for home scenerio related dataset.
  - Collected dataset for Multimodal AI recommendation system training.
  - Recording a dataset of cooking eggs so that we can process and train on that dataset in order to give behavior predictions and suggestions in this scenario.

Center for Deep Learning, Northwestern University, *Graduate Research Assistant* *May. 2023 - Sept. 2023*
Advisor: **Dr. Diego Klabjan**

- *VR Data Visualizer*
  Project Outline: Built a data visualization VR platform on Unity for time sensitive datasets and first round tested in the *MSDS 413-DL Time Series Analysis and Forecasting* course of Northwestern University.
  - Designed a VR data visualizer for data analysis operations, such as outliers detection and data-cleaning process.
  - Open-sourced for data science community on learning data science knowledge.
  - Extended into an anti-occulusion display version based on frustum projection to enhance the visualization.

Bio Inspired Vision Lab, Northwestern University, *Graduate Research Assistant* *July. 2022 - Mar. 2023*
Advisor: **Dr. Emma Alexander**

- *Jumping Spider Inspired Mobile Camera Design*
  Project Outline: Investigated different spiders vision systems and combined the advantages of stereo and Depth from Differential Defocus (DFDD) depth perception methods for a novel mobile camera design algorithm.
  - Observed the strong correlation between the hunting behavior and vision system of three categories of spiders: crab, wolf, and jumping spiders, where crab and wolf spiders use stereo vision and jumping spiders uses DFDD.
  - Created a learning model that combined both advantages for determining the best arrangement of a specific number of mobile lenses while viewing targets in certain depth ranges.
  - Open-sourced for the spider vision community for future vision research use.

SELECTED PROJECTS

- **ROS SLAM Moving Robot**
  - Implemented kinematics with ROS that can make a turtlebot spin and walk around in an open area with obstacles through the use of deep learning vision recognition algorithm.
  - Visualized the learning process of different kinds of errors on the map to see the enhancement on the prediction of the obstacles' sizes and positions at each step.
- **Detailed Light-sensitive Rendering on Materials**
  - Created several scenes of animated objects with different textures, lighting, and colors for visualization.
  - Built a particle system that includes boids, fire flames, bouncing balls, and springs with five kinds of solvers.
  - Designed toggle bars for changing animation, texture, ray-tracing, and lighting parameters.

SKILLS

- **Coding:** Python, PyTorch, TensorFlow, Matlab, C/C++, C#, JavaScript, Git, LaTeX.
- **Language:** English (Fluent), Mandarin (Native), French (Intermediate).