Meher Shashwat Nigam

mehershashwat.nigam@gatech.edu | Linkedin | Github | Scholar | Website | +1(404)642-7588

Education

Master's in Computer Science (ML) | **Georgia Institute of Technology, USA** Aug 2022 – May 2024
TA for Perception and Robotics | GPA: 4/4

Bachelor's (Honors) in Computer Science | **IIIT Hyderabad, India** Aug 2017 – May 2021
Dean's list, Research Award | **TA for Digital Image Processing, Computer Vision** | GPA: 9/10

Skills

Languages: Python, C/C++, Javascript, Bash, MATLAB, SQL
Tools: PyTorch, Tensorflow, PyTorch3D, OpenCV, Git, Linux, Blender, Unity, React, Node, Express, Django, AWS, Docker

Experience

Software Analyst | **Goldman Sachs** July 2021 - Aug 2022
- **Systematic Trading Strategies** team: Responsible for implementing and maintaining **quantitative trading strategies** for a wide range of asset classes, optimizing exposure to target factors, ensuring consistency in implementation and minimizing downside risk.
- Worked on improving efficiency for computationally heavy strategies using parallelization, **bringing down run-time by ∼20%**.

Research Assistant | **Robotics Research Center, IIIT Hyderabad** May 2019 – Oct 2021
- Designed an encoder-decoder network using **PyTorch** that generates ego-centric bird's-eye view **2D semantic layouts** for warehouse rack shelves from monocular images which are further used to generate **3D reconstructions** (led to a publication).
- Developed a **procedural generation** framework for realistic **3D synthetic** warehouse scenes combined with **automated data capture and annotation** pipeline using **Unity**, for **domain randomization** enabling **sim2real** transfer.
- Compared results with 3D and 2D object detection methods like **PointRCNN** and **MaskRCNN**, performed ablation studies.

Computer Vision Engineer | **DreamVu** May 2019 – Jul 2019
- Benchmarked the product output on industry-standard **stereo-vision** applications and created an SDK for testing camera output.
- Developed an **image processing** tool that removes specularity from the omni-stereo image pairs using a novel heuristic.

Research Assistant | **Department of Architecture, Politecnico di Milano** Sep 2020 – Aug 2021
- Worked on applications of Geometric DL for AEC, developed a **3D synthetic data generation pipeline** for building models.

Coursework

Computer Vision/Robotics: Computer Vision, Robotic Vision and Path Planning, Digital Image Processing, Graphics
Artificial Intelligence: Statistical Methods in AI, Artificial Intelligence, Optimization Methods, Reinforcement Learning
Mathematics: Probability and Statistics, Calculus, Linear Algebra, Discrete Structures, Information Theory
Systems: Operating Systems, Computer System Organization, Networks, Database Systems, Formal Methods, Compilers

Projects

Planning and Navigation Algorithms | *Robotics*
- Implemented **RRT** and Model Predictive Control **Optimization** for an omni-wheel robot to reach a goal in a 2D environment. Implemented Velocity Obstacle/Collision Cone formulation for reaching a goal while avoiding moving obstacles, in **Python**.

Stereo Reconstruction and Pose Estimation | *Computer Vision*
- Generated a dense 3D point cloud reconstruction of a scene from a stereo image sequence by computing disparity maps, retrieved the pose of an arbitrary camera using iterative **PnP** and **Gauss-Newton minimization**, using **Python**.

EKF for Trajectory Estimation | *Robotics*
- Estimated the 2D pose and trajectory of a ground robot with noisy sensor measurements from a wheel odometer and laser rangefinder by applying an **Extended Kalman Filter**. implemented in **Python**

Research Paper Implementations | *Computer Vision*
- **MATLAB** implementation of paper titled "Reflection Removal using Ghosting Cues", CVPR 2015.
- **Python** implementation of SIGGRAPH 2004 paper titled, "GrabCut" for image foreground identification/extraction.

3D/2D Game/Simulator Development | *Graphics, Game Development*
- 3D aircraft simulator in **C++** using OpenGL. 2D Jetpack Joyride in in **C++** using OpenGL, Subway surfers clone using **Javascript** in WebGL. Implemented physics, motion control, collision detection, textures and lighting along with object modeling.

Ultimate Tic Tac Toe Bot | *Artificial Intelligence*
- Used a combination of search techniques (A* search, Minimax tree search, Alpha-Beta pruning) for lookup, searching and maximising winning chances for AI bot playing ultimate Tic-Tac-Toe (3x3 board, further divided into 3x3 blocks), in **Python**.

SkillWallet | *Blockchain, Recommendation Systems*
- Developed a platform for providing users with a blockchain-verified skill portfolio using **Solidity** along with personalized AI-based learning Recommendation system using **Python**. Runner up at the **World Blockchain Hackathon, 2020**.

Research Publications

- Monocular Multi-Layer Layout Estimation for Warehouse Racks | Computer Vision, Robotics ICVGIP '21
- Synthetic 3D Data Generation for Geometric DL in Architecture | Computer Vision, Architecture ISPRS '21
- Review of Geometric DL Algorithms for 3D Reconstruction in Architecture | Computer Vision, Architecture REAACH-ID '20
- Is Twitter Enough? Investigating Situational Awareness in Social and Print Media | AI for Social Computing ASONAM '22