

Xiatao Sun

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EDUCATION

University of Pennsylvania

Philadelphia, Pennsylvania

Master of Science in Engineering in Robotics

Aug. 2021 - May 2023

GPA: 3.90/4.0

Rensselaer Polytechnic Institute

Troy, New York

Bachelor of Science in Mechanical Engineering

Aug. 2017 - May 2021

GPA: 3.93/4.0

Honor: Summa Cum Laude, Dean's Honor List, Member of Tau Beta Pi

RESEARCH & WORKING EXPERIENCES

Vijay Kumar Lab

Philadelphia, PA

Research Assistant supervised by Dr. Vijay Kumar

May. 2022 – Present

- Researched multi-robot exploration for topological map construction using algebraic topology, multi-agent deep reinforcement learning, and curriculum learning.
- Developed simulation environments in Unity for training and benchmark comparison with a frontier-based method.
- Working on the master's thesis about imitation learning for quadrotor agile flight under the supervision of Dr. Kumar.

xLab

Philadelphia, PA

Research Assistant supervised by Dr. Rahul Mangharam

Nov. 2021 – Present

- Developed XR autonomous driving simulation using Unreal Engine 4 and Python based on CARLA and OpenXR framework and conducted a human study using the XR simulator.
- Implemented various imitation learning algorithms on the FITENTH platform for direct learning and bootstrapping reinforcement learning.
- Currently researching safe autonomous racing using learning-based methods.

Qingdao Tian Yi Data Tech Co., Ltd.

Qingdao, China

Co-Founder, CTO

May. 2021 – Jul. 2022

- Led the technological development of a healthcare platform, designed software architecture, created the roadmap, managed the development team, and assessed employees' performance.
- Developed the demo of the platform from scratch for venture capitals and potential customers using Python, MySQL, HTML, Bootstrap, JavaScript, jQuery, and other relevant back-end and front-end technologies.
- Deployed the application on AWS using CentOS as the operating system, uWSGI for multithreading and server interface, and GoDaddy for DNS hosting.

CeMSIM (Center for Modeling, Simulation, & Imaging in Medicine)

Troy, NY

Undergraduate Student Researcher supervised by Dr. Suvranu De

Jun. 2020 - Dec. 2020

- Developed a general-purpose interactable operating room simulator using Unity with High-Definition Rendering Pipeline and XR Framework.
- Developed agents using Unity ML-Agents based on PPO (proximal policy optimization) for a push block task.

School of Engineering at Rensselaer Polytechnic Institute

Troy, NY

AR/VR Developer supervised by Samuel Chiappone

Jan. 2020 - May 2020

- Built a VR environment of MILL (Manufacturing Innovation Learning Laboratory) and synchronized it with the actual MILL lab, using Unreal Engine 4, Blueprint and Maya.
- Developed continuous locomotion with dynamic collision detection, automatic height adjustment, and auto-alignment between player model and outside collider.

Department of MANE at Rensselaer Polytechnic Institute

Troy, NY

Course Development Assistant supervised by Dr. James Young

May 2019 - May 2020

- Developed a photorealistic interactable virtual environment as the front end for students in Propulsion Systems course using Unity3D, Blender, C#, and SteamVR.
- Derived the curve fit of thermal dynamics model using MATLAB and implemented the curve-fitted model into C# as the back

end.

Department of Chemical Engineering at Rensselaer Polytechnic Institute

Troy, NY

VR Developer supervised by Dr. Ronald Hedden

May 2019 - May 2020

- Developed a high-fidelity interactable virtual reality lab for students' practice in process control and thermodynamics, using Unity3D and C# for game logic and Blender for 3D modeling.
- Transformed existing flat screen simulator into virtual reality, developed VR interaction mechanics and teleportation locomotion system in this project based on SteamVR Plugin in Unity.

Liandessen Electrical Institution and Technology Co., Ltd.

Qingdao, China

Mechanical Engineer Intern

Sep. 2019 – Dec. 2019

- Selected and arranged modes, analyzed the structure of parts to identify undercut, and examined the types of sidestep.
- Determined the cooling method and pipe arrangement, clarified the quantity and position of inserts, and utilized CAD to draw and verify the part diagram.

Rensselaer Artificial Intelligence and Reasoning Lab

Troy, NY

Undergraduate Student Researcher supervised by Dr. Selmer Bringsjord

Sep. 2018 – Dec. 2018

- Researched the logical eastern-western culture differences and assisted in building prototyping NLP translating programs

Goertek Electronics

Qingdao, China

Embedded System Developer Intern

Jun. 2018 – Jul. 2018

- Tested and debugged the prototype of OPPO O-Free, a truly wireless earbud, using SDK from Snapdragon and GAIA

KNOWLEDGE & TECHNICAL SKILLS

Knowledge: Robotics, Machine Learning, Game Development, Web Development

Programming Language: C, C++, C#, Python, SQL, MATLAB, HTML, JavaScript

Robotics Tools: ROS, Gazebo, RViz, CARLA, AirSim, Flightmare, OpenCV, GTSAM, CVAT, Unity Robotics Hub

Machine Learning Frameworks: PyTorch, MXNet, ML-Agents, Tensorflow, Rey, Spark ML

Game and Simulation Engines: Unity, Unreal Engine 4 & 5, MuJoCo, Gym

CAD Software: NX Unigraphics, SpaceClaim, Rhino, SolidWorks

3D Modeling Software: Blender, Maya, ZBrush, Marvelous Designer, Substance Painter

Web Development Tools: Flask, SQLAlchemy, Vue.js, jQuery

Other Technical Skills: Docker, LaTeX, LabVIEW, Lathe, Vertical Drill, Welding, FL Studio, Piano

AWARDS & ACTIVITIES

- Winner of the ITS World Congress 2022 Student Essay and Video Competition
- Student volunteer at 2022 IEEE International Conference on Robotics and Automation (ICRA)
- Third prize of the Brain Bee 2020 Brain Challenge (China Division College Section)

PUBLICATIONS

- **X. Sun**, Y. Wu, S. Bhattacharya, and V. Kumar, "Multi-Agent Exploration of an Unknown Sparse Landmark Complex via Deep Reinforcement Learning," 2023 IEEE International Conference on Robotics and Automation (ICRA), submitted for review.
- **X. Sun**, M. Zhou, Z. Zhuang, S. Yang, J. Betz, and R. Mangharam, "A Benchmark Comparison of Imitation Learning-based Control Policies for Autonomous Racing," 2022 IEEE IROS Workshop on MiniRobots.
- Z. Qiao, **X. Sun**, H. Loeb, and R. Mangharam, "Drive Right: Shaping Public's Trust, Understanding, and Preference Towards Autonomous Vehicles Using a Virtual Reality Driving Simulator," Applied Ergonomics, submitted for review.
- Z. Qiao, **X. Sun**, H. Loeb, and R. Mangharam, "Drive Right: A Simulator Approach for Safe Autonomous Vehicle Demonstration and Education", 2022 IEEE ICRA Workshop on Human-in-the-loop Paradigm for Assistive Robotics.
- L. Lan, S. Cheng, **X. Sun**, W. Li, C. Yang, and F. Wang, "A Fast Singular Boundary Method for the Acoustic Design Sensitivity Analysis of Arbitrary Two-and Three-dimensional Structures," Mathematics.
- T. Lv, Z. Pan, W. Wei, G. Yang, J. Song, X. Wang, L. Sun, Q. Li, and **X. Sun**, "Iterative Deep Neural Networks Based on Proximal Gradient Descent for Image Restoration," PLOS ONE.