Karen Li

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EDUCATION

Lehigh University, Bethlehem, PA — Enrolled: Aug 2020 — Expected: May 2024
B.S. in Integrated Business & Engineering (Honors Program) — Overall GPA: 3.8
B.S. in Computer Science — Dean's Honor List

RESEARCH EXPERIENCE

Autonomous and Intelligent Robotics Lab (AIRLab), Lehigh University — Bethlehem, PA
Undergraduate Researcher — May 2022 - Present

- Implemented embedded soft real-time systems for sensor-based autonomous ground and aerial robotics
- Implemented hardware design, including schematic capture, PCB layout, and iterative prototyping
- Conducted comprehensive testing, troubleshooting, and debugging of autonomous vehicles, ensuring robust software performance and hardware reliability
- Performed research and analysis to explore new techniques, components, and methodologies

Office of Creative Inquiry, Lehigh University — Bethlehem, PA
Global Social Impact Fellowship — Jan 2022 - Present

- Co-developed drone technologies to address issues of accessibility and deliver solutions for remote areas
- Led fieldwork in the Philippines, establishing strategic partnerships with local schools and government
- Engaged local communities through interactive demonstrations and workshops, fostering awareness and skill development in drone technology
- Executed in-depth interviews with key local stakeholders to understand their needs and assess the feasibility of the proposed solution

PROJECTS

Autonomous Blimp Robot | *Python, Arduino* — May 2022 - Present

- Developed a robust perception algorithm adaptable to varying lighting and environmental conditions
- Deployed smooth data processing techniques for real-time environmental analysis to eliminate noise
- Implemented serial communication protocols - I2C and UART - to enhance vehicle functionality
- Worked extensively with microelectronics and circuitry, focusing on sensor fusion and integration

Robot Imitation Learning | *Python, OpenCV* — May 2023 - Sep 2023

- Designed, developed, and implemented an autonomous robot navigation method using ORB-Keypoint timeline-based imitation learning on both ground and aerial vehicle
- Developed an advanced control policy and analyzed the pattern of extracted key features from camera-captured images using covariance distribution methods
- Conducted numerous trials and visualized data to refine and enhance the robot performance

Autonomous Ground Robot | *Python, C/C++, OpenCV* — May 2022 - May 2023

- Implemented image processing techniques using OpenCV, including contour detection, convolution kernels, and feature matching, to enhance real-time object tracking
- Developed object detection and localization algorithms for sensor-based robot perception, utilizing cameras and LiDAR technology
- Utilized OptiTrack technology for advanced path planning, enabling movement optimization
- Engineered a robot capable of detecting, interacting with, and performing tasks involving physical objects, leveraging sensor feedback for dynamic environmental responsiveness and adaptability

RESEARCH ITEMS

Publications

- **Karen Li**, Shuhang Hou, Jiawei Xu, Edward Jeffs, Diego S. D'Antonio, and David Saldaña. "A Novel Low-Cost, Recyclable, Easy-to-Build Robot Blimp For Transporting Supplies in Hard-to-Reach Locations", in *Proc. IEEE Global Humanitarian Technology Conference (GHTC) 2023*

Under Review

- **Karen Li**, Hanqing Qi, Jiawei Xu, Edward Jeffs, and David Saldaña "KT-Imitation: Efficient Visual Imitation for Autonomous Navigation Based on Keypoint Timeline", in *IEEE International Conference on Robotics and Automation (ICRA) 2024*

PROFESSIONAL EXPERIENCE

Lehigh Aerial Swarms Club — Lehigh University
Founder & President — May 2023 - Present

- Delivered interactive presentations, organized and conducted outreach events and hands-on workshops, significantly increasing undergraduate participation in the club sevenfold
- Managed club operations, encompassing coordination with supervisors, effective resource allocation, and fundraising efforts, while successfully advocating for club members' interests
- Represented the club in school hosted contest in November 2023, delivered a speech in the Lehigh News about the team's journey and achievements

Philharmonic Orchestra — Lehigh University
2nd Violin Player — Aug 2020 - Present

- Served in the orchestra and performed in semi-annual concerts

Academic Success Center — Lehigh University
Computer Science Tutor — Aug 2021 - May 2022

- Tutored 5-10 students in Programming and Data Structures and Systems Software class and created individualized lesson plans

SKILLS

- **Languages:** Python, C/C++, Java, SQL, R, LaTeX
- **Field of Interests:** General Autonomy, Aerial Vehicle Design, Computer Vision, Control Theory, Reinforcement Learning, Parallel Programming

ACHIEVEMENTS

Mountaintop Summer Experience (MTSE) Research Fellowship	May 2023 - Aug 2023
Mountaintop Summer Experience (MTSE) Research Fellowship	May 2022 - Aug 2022
Tau Beta Pi Engineering Honor Society nominated by Lehigh University	Nov 2021