Tianxiang Lin

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Education

Carnegie Mellon University   **Aug. 2020 – Present**
M.S. in Information Networking   Pittsburgh, PA
Advisor: Prof. Michael Kaess   **GPA:** 4.0 / 4.0

- **Relevant Coursework:** 16-833 Robot Localization and Mapping, 11-785 Introduction to Deep Learning, 16-782 Planning and Decision-making in Robotics, 16-720 Computer Vision, 16-822 Geometry-Based Methods in Vision.

University of Electronic Science and Technology of China (UESTC)   **Sep. 2016 – Jun. 2020**
B.E. in Software Engineering (Elite Program)   Chengdu, Sichuan, China
Advisor: Prof. Yong Liao   **GPA:** 3.98 / 4.0

- **Ranking:** 1 / 27. **Graduated with honor.**
- **Relevant Coursework:** C Programming, Data Structures and Algorithms, Principles of Computer Organization and Architecture, Operating System, Software Engineering, Compiling Technique, Principles of Database and Application.

Research Interest

Simulclation Localization and Mapping (SLAM), Marine Robotics, Field Robotics, Underwater Occupancy Mapping, Computer Vision, Planning in Robotics.

Publications

Conditional GANs for Sonar Image Filtering with Applications to Underwater Occupancy Mapping
Tianxiang Lin, Akshay Hinduja, Mohamad Qadri, and Michael Kaess | 📄 Paper | ▶ Video
IEEE International Conference in Robotics and Automation (**ICRA**), London, UK, May 2023. (Submitted)

Research Experience

Research Assistant   **May. 2021 – Present**
Robot Perception Lab, Field Robotics Center   Pittsburgh, PA
The Robotics Institute, Carnegie Mellon University
Advisor: Prof. Michael Kaess

- Proposed a method to filter sonar images of imaging sonars using conditional GANs.
- Developed a robust underwater occupancy mapping algorithm under the real-world environment with data collected using Hovering AUV and Blueprint imaging sonar.

Research Assistant   **Aug. 2020 – Aug. 2021**
National Engineering Laboratory for Brain-Inspired Intelligence Technology and Application   Hefei, Anhui, China
University of Science and Technology of China (USTC)
Advisor: Prof. Xuejin Chen

- Developed a semantic Segmentation algorithm for indoor real-scene RGB-D images scanned by BundleFusion.
- Developed a 3D reconstruction framework for reconstructing semantic point clouds and filtering redundant and biased semantic information.

Research Assistant   **Jan. 2019 – Jun. 2020**
Embedded Real-time Computing Laboratory   Chengdu, Sichuan, China
University of Electronic Science and Technology of China
Advisor: Prof. Yong Liao

- Designed and Deployed a basic stereo visual SLAM system targeted at self-driving cars in outdoor scenes.
- Implemented Gauss–Newton Algorithm to optimize camera pose and trajectory and improve accuracy.

Teaching Experience

Graduate Teaching Assistant   **Aug. 2022 – Dec. 2022**
16-833 Robot Localization and Mapping | Fall 2022 | **Prof. Michael Kaess**   Pittsburgh, PA

- Held weekly office hours and answer questions about lectures and homeworks from students on Piazza.
- Finished grading and provided project guidance for 56 students.

Undergraduate Teaching Assistant   Jul. 2018 − Aug. 2018

H0900220 Computing Evolution | 2017-2018-3 | **Prof. Richard Decker**   Chengdu, Sichuan, China
- Took the responsibility for the official reception of the professor for one semester.
- Configured and built the VMware virtual system images for the experiments in the lab.
- Prepared experiment equipment (Freescale KL25Z, etc.) for students.
- Provided guidance to students to understand fundamental knowledge of RatSLAM.

Undergraduate Teaching Assistant   Jul. 2018 − Aug. 2018

F0919830 Embedded System Design | 2017-2018-2 | **Prof. Yong Liao**   Chengdu, Sichuan, China
- Held weekly lectures and recitations.
- Conducted code review regarding register pointer, stack, and priority resolution algorithm in μC/OS-II.
- Held mid-term and final review sessions for students to understand the concepts and problems.

Projects

Optimal Transport Based Domain Adaptation | 📄 Report | ▶ Video | ◯ Code   Sep. 2021 − Dec. 2021
- Focused on a large-scale optimal transport (OT) model to perform the alignment of the general representations in source and target domains of 2 diferent image datasets.
- Learnt an optimal transport plan and used a stochastic dual approach to enable OT scale to large datasets.
- Estimated a Monge map as a deep neural network learned by approximating the barycentric projection of the previously-obtained OT plan.

Analysis for Graph-Based SLAM Algorithms | 📄 Report | ◯ Code   Jan. 2021 − May 2021
- Analyzed optimization algorithm performance to poor initial estimates.
- Compared kernel performance to poor initial state estimates.
- Scrutinized robust kernel performance to outliers.

Information Visualization of Real Estates for Sale in Chengdu | ▶ Video | ◯ Code   Mar. 2018 − Jun. 2018
- Crawled 10,000+ pieces of house info. from Lianjia.com and the location info. from Baidu Map by Scrapy separately.
- Combined and stored the location of houses from Baidu Map and house prices in the database for visualization.
- Visualized the scraped data by interactive map implemented with JavaScript and Three.js.

Awards and Honors

INI Fellowship, *Information Networking Institute, Carnegie Mellon University*, **Apr. 2020**.

Outstanding Graduate Award, *University of Electronic Science and Technology of China*, **Oct. 2019**.

2018-2019 Outstanding Student Scholarship, *University of Electronic Science and Technology of China*, **Dec. 2019**.

2017-2018 Outstanding Student Scholarship, *University of Electronic Science and Technology of China*, **Dec. 2018**.

National Scholarship, *Ministry of Education of the People's Republic of China*, **Nov. 2018**.

Model Student of Academic Records, *University of Electronic Science and Technology of China*, **Sep. 2018**.

2016-2017 Outstanding Student Scholarship, *University of Electronic Science and Technology of China*, **Dec. 2017**.

Technical Skills

Languages: C/C++, Python, Java, JavaScript, SQL, x86 Assembly, ARM Assembly, HTML/CSS, SQL.

Developer Tools: CMake, Makefiles, Git, GCC, G++, GDB, Valgrind, UML.

Frameworks: OpenVDB, OpenCV, NumPy, CUDA, PCL, OpenGL, WebGL.

Integrated Development Environments: CLion, PyCharm, VSCode.

Operating Systems: Linux, μC/OS-II.

Extracurricular

Rutgers University   Sep. 2016 − Jun. 2020

Summer Session, *Packaging Engineering, School of Engineering*   New Brunswick, NJ
- **Relevant Coursework:** Packaging Engineering and 3D Modeling, Innovation and Leadership Training.
- **Project:** designed and fabricated clock components by SolidWorks and 3D printers