Alan Papalia

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Education

Massachusetts Institute of Technology — Cambridge, MA
PhD Robotics, Advisor: John Leonard — 2019–2024 (est)

University of Illinois at Urbana-Champaign — Urbana, IL
BS Mechanical Engineering; Focus: Computer Science — 2015–2019

Experience

Massachusetts Institute of Technology — Cambridge, MA
Graduate Research Assistant, Simultaneous Localization and Mapping (SLAM) — Fall 2019 - Current

- Leveraged Lagrangian duality to invent optimality certification algorithm for range-only SLAM
- Designed information theoretic, multi-agent path-planning algorithms, reducing localization error when compared to SOTA by up to 48% [1]
- Developed nonlinear least-squares SLAM library for multi-robot systems with inter-robot ranging
- Implemented metric embedding and semidefinite optimization algorithms for network localization to investigate application of inference algorithms in wireless contact tracing [2]

Oregon State University — Corvallis, OR
Undergraduate Robotics Researcher — Summer 2018

- Implemented object pose-tracking systems for robotic grasping experiments
- Developed library for automated collection and processing of RGB-D images

Publications

[1] **A. Papalia** and J. Leonard, "Network localization based planning for autonomous underwater vehicles with inter-vehicle ranging", in *2020 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV)*, IEEE.

[2] L. Clark, **A. Papalia**, J. T. Carvalho, L. Mastrostefano, and B. Krishnamachari, "Inter-mobile-device distance estimation using network localization algorithms for digital contact logging applications", *Smart Health*, vol. 19, 2021.

Projects

Outlier Resilient Point Cloud Registration

- Developed full pipeline for outlier resilient point cloud rejection, capable of running in under 100 ms
- Integrated state-of-the-art outlier rejection, up to 43% rejection rate under Gaussian noise

Low-Cost Collaborative Robot Localization

- Constructed low-cost robot ($1200) for testing of collaborative range-only SLAM algorithms
- Benchmarked and integrated several state-of-the-art (SOTA) SLAM systems into low-cost robot network for research in feature-sparse localization

Skills

- **Robotics:** SLAM, Optimization, Planning
- **Programming:** C++, Python, Julia, MATLAB
- **Libraries:** ROS, OpenCV, Pandas, CVX, GTSAM

Scholarships and Awards

- WHOI Next Wave Fellowship (1 year full tuition)
- Illinois Engineering Achievement Scholarship
- GM Society of Automative Engineers Award