

Andrew Tu

ROBOTICS SOFTWARE ENGINEER | MAPPING AND LOCALIZATION

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Education

Northeastern University | Boston, MA

May 2020

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING, MINORS IN COMPUTER SCIENCE AND ROBOTICS

GPA: 3.8/4.0

- Coursework: Autonomous Field Robotics (Grad), Mobile Robotics (Grad), Robotics Sensing and Navigation (Grad), Computer Vision (Grad), High Performance Computing (Grad), AI, Object Oriented Design
- Involvement: MIT Ballroom Dance Team, undergraduate research, **HKN**, **TBII**, numerous hackathons, IEEE, Toastmasters, SASE

Skills

Interests Autonomous Robotics, Mapping, Localization, Factor Graphs, Computer Vision

Languages C++, Python, C, CUDA, Java

Technologies ROS, PCL, GTSAM, OpenMP, MPI, OpenCV, MATLAB, LCM, \LaTeX , QT

Hardware LIDAR, GPS, IMU, Camera, Ethereum Miners

Technical Experience

Optimus Ride

Boston, MA

ROBOTICS SOFTWARE ENGINEER | MAPPING AND LOCALIZATION

Aug. 2019 - Present

- One of six ICs developing the mapping and localization stack for autonomous shuttle service deployed across 7(+) sites across the US.
- One of two ICs primarily responsible for scaling factor graph based mapping algorithms, robustifying point cloud alignment strategies, and improving online state estimation. Work is directly responsible for generating maps 5X larger than our previous maps with minimal human intervention. Mapping stack is capable of processing hundreds of GBs of sensor data across tens of miles of roadway.
- Co-run a team wide journal club focusing on mapping localization topics that are of interest to the team.
- Working extensively with modern C++, PCL, GTSAM, and QT.

Amazon

Palo Alto, CA

SOFTWARE DEVELOPMENT ENGINEER INTERN | PERSONALIZED ALEXA CONVERSATION

May 2019 - Aug. 2019

- Designed and implemented Java based micro-service to enable personalized notifications for S-Team goal to personalize Alexa UX. Built VUI using Alexa Skills Kit to trigger enrollment process. Feature went live 2019 Q4.
- Utilized AWS CloudFormation templates to configure serverless backend for skill using AWS Lambda. Utilized Google Guice and Lombok to develop highly modular code and Junit and Mockito for unit testing. Captured system architecture using modeling tools like PlantUML and DrawIO. Participated extensively with remote teams in project design reviews.

Flex Innovation and Design Labs

Milpitas, CA

ROBOTICS SOFTWARE CO-OP

Jul. 2018 - Dec. 2018

- Primary software architect and developer of ROS based mobile robot in team of seven software and test engineers; project utilized six different languages, for seven unique pieces of hardware and ten different I/O peripherals. Full project writeup on andrewtu.me.
- Integrated commercial SLAM system, fusing data from LIDAR, sonar, wheel encoders, and IMU. PoC for sensing and navigation software.

MIT Lincoln Laboratory

Lexington, MA

CO-OP TECHNICAL ASSISTANT, INTERIM SECRET CLEARANCE | GROUP 102 - OPEN AND EMBEDDED SYSTEMS

Jan. 2017 - Aug. 2017

- Independently parallelized radar signal processing chain in C++ using OpenMP and MPI to run in distributed multi-core/multi-node Linux environments. Optimizations resulted in a **1700%** speedup and demonstrated hybridized MPI and OpenMP parallelizations met stringent performance requirements and reduced development costs.
- Automated benchmarking efforts through python and bash scripts to rapidly test and compare over **350** configurations.

Northeastern University Marine Observatory Network

Boston, MA

UNDERGRADUATE RESEARCH ASSISTANT (NSF REU)

Oct. 2015 - Jan. 2017

- Designed and implemented smart buoy and GUI control system using C++, QT framework, and XBee Radio modules to bridge above water radio network with subsea acoustic network.
- Implemented MAC protocols in MATLAB on Teledyne Benthos SM-975 Acoustic Smart Modems to advance understanding of modem interactions and compare efficacy of MAC protocols over acoustic channel.
- **Co-authored two papers and gave two major presentations** (see andrewtu.me for links)

