Kevin Robb

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EDUCATION

Northeastern University, Boston, MA   2021–2023
  M.S. Robotics, with Computer Science concentration
  Thesis: Mobile Robot Localization and Navigation Using Hand-Drawn Maps
  Related courses: Mobile Robotics, Robot Sensing & Navigation

The University of Oklahoma, Norman, OK   2017–2021
  B.S. Engineering Physics and B.S. Mathematics (dual degree) | Summa cum Laude
  Related courses: Applied Statistical Methods, Abstract Linear Algebra

SKILLS

C++, Python, MATLAB, Bash, Ubuntu Linux, Git, ROS, LaTeX, Probabilistic Robotics, SLAM,
Bayesian Filtering (Kalman Filter, EKF, UKF, Particle Filter), Localization, Sensor Fusion,
Computer Vision, Motion Planning, Genetic Algorithms, Linear Algebra, GTSAM, Pose-Graphs,
Sensor Characterization, RealSense, Point Clouds, LiDAR, Embedded Systems, Multithreading

EXPERIENCE

Piaggio Fast Forward (PFF)
Robotics Software Engineer   May 2023–Present
Robotics Software Engineering Intern   Jul 2022–May 2023
  - Developed dynamic localization, path-planning, and control components from the ground-up
    for a new autonomous behavior on the *gitamini* mobile robot and other platforms. (C++)
  - Integrated new features into a large existing software architecture with multiple contributors.
  - Generalized usage of "ground truth" data from OptiTrack motion capture studio into
    visualizations of robot data for simulating & evaluating new algorithms. (Python)

Generalizable Robotics and Artificial Intelligence Laboratory (GRAIL)
M.S. Thesis with Dr. Lawson L.S. Wong   2023
  - Implemented discrete Coarse Map Navigation (CMN) pipeline on a physical robot.
  - Used scale-invariant topological localization techniques to perform navigation tasks
    in the real world using only rough hand-drawn maps. (Python)
  - Implemented perception stage for RGB, depth cloud, and LiDAR data to compare
    effectiveness of each sensor source.
  - Extended CMN to fully continuous state/action-space using a particle filter.

Robotics, Evolution, Adaptation, and Learning Laboratory (REAL Lab)
Engineering Physics Capstone with Dr. Dean Hougen   2020–2021
  - Applied evolutionary computation techniques to optimize Kalman Filter parameters for a
    simulated mobile robot in random environments (outperforming manual tuning). (Python)
NSF Research Assistant with Dr. Dean Hougen   2018–2019
  - Characterized the relationship between nurturing and the evolution of risk aversion vs.
    risk neutrality in a simulated population with a custom genetic algorithm. (Java)
  - Published ⌁ in THURJ, a student journal at the University of Oklahoma.

Office of Admissions & Recruitment, University of Oklahoma
Campus Tour Guide | Team Lead   2018–2021
  - Led general walking tours and personalized visits for prospective students and families.
  - Delegated tasks on shift, oversaw interviews, and trained new guides.

PROJECTS ....

EKF-SLAM Implementation
Personal Project   May 2022
- Created custom simulator for a 2D mobile robot in ROS Noetic, with a path-planning & control architecture to provide a base for testing various filters. (Python)
- Derived & implemented EKF & UKF to perform online landmark-based SLAM. (C++)

Course Project for Riemannian Optimization w/ Dr. David Rosen   April 2023
- Implemented pose-graph SLAM using GTSAM and SE-Sync, numerically demonstrating superior performance to EKF-SLAM in full pose-history-estimation. (C++)

Intelligent Ground Vehicle Competition (IGVC), Auto-Nav Challenge   2020–2021
- Led a team of students in building a 2'×3'×3' autonomous vehicle.
- Developed an EKF to fuse GPS, IMU, encoder data, and motor commands to perform online mobile robot localization and allow waypoint navigation. (C++)
- Detected safe drivable area (free of lanes & obstacles) with RGB camera and LiDAR.
- Planned physical chassis to be extremely modular to allow full disassembly for transport.
- Designed several 3D-printed parts (e.g., sensor mounts) for use on the robot.
- Won 1st place and Rookie of the Year at the 2021 IGVC.