

Joe Dinius, PhD

Los Angeles, CA
520.904.8244

josephwdinius@gmail.com
<https://jwdinius.github.io>

Summary Statement

I am an experienced robotics engineer seeking opportunities for both personal and professional growth. I am a fast learner, a motivating force, and have led technical efforts in sensing and estimation, path planning, localization, and computer vision. On the technical side, I enjoy solving new problems creatively and timely. On the leadership side, I focus on regular interpersonal communication, making expectations plainly known, and on identifying and providing any support necessary for optimizing team output. In everything I do, I strive to communicate clearly, candidly, and respectfully.

Professional Experience

UBTECH Robotics North American R&D Center

Los Angeles, CA

Senior Research Engineer – Navigation & Control

April 2019 – Present

- Responsibilities include: software team recruiting, system requirements development, and navigation team oversight
- Developing SLAM algorithms for operation in dynamic environments
- Oversee ongoing software development efforts for initial prototype

inVia Robotics

Westlake Village, CA

Staff Research Scientist – Perception & Controls

December 2017 – April 2019

- Responsible for development of control, navigation, and localization algorithms for wheeled mobile robots deployed in a warehouse automation application
 - * Increased coarse navigation speed 2.5x in 2 months with a novel method
 - * Increased navigation accuracy on precision maneuvers by over 2x while simultaneously increasing speed by 2x
- Organized ongoing efforts for personal and professional growth of team members: book club, game nights, and technical journal club
- Other responsibilities included: cycle-time reduction, build management (CI and configuration control), system identification and test, and obstacle avoidance.

Walt Disney Imagineering R & D

Glendale, CA

Senior R & D Imagineer – Contract Position

July 2017 – October 2017

- Responsible for developing scene segmentation and state estimation algorithms for multiple object tracking using 2D laser rangefinders

Ford Motor Company

Dearborn, MI

Senior Research Engineer

December 2015 – June 2017

- Responsible for conceptualizing and interpreting advanced algorithms for multiple object tracking for the Next Generation Vehicle (NGV), including state estimation, data fusion, and data association

Raytheon Missile Systems

Tucson, AZ

Senior Systems Engineer II

June 2006 – December 2015

- Led teams in simulation, control, and signal/image processing disciplines
- Directed analyses of flight test failure, operational safety, requirements development, and system performance
- Designed and developed simulation architectures for new product development efforts (DARPA/MDA/etc)
- Developed guidance, navigation, and control (GNC) algorithms in simulation, Computer-in-the-Loop (CiL) and Hardware-in-the-Loop (HiL) environments

Sample Projects

Traffic Sign Recognition using Fastai

July 2019

- Built an end-to-end pipeline for performing classification on the German Traffic Sign Recognition Benchmark dataset
- Used modern techniques – including use of a residual network as the back-bone architecture and learning rate annealing
- Achieved SOTA accuracy on a holdout set – 99.95% vs. competition winning 99.46% of a few years ago
- Project Writeup, Github. Technologies Used: Python, PyTorch, fastai, docker

Pose Error Compensation Using Imprecise Visual Landmarks

March 2019

- Created and integrated a simple SLAM-inspired algorithm to increase precision navigation terminal accuracy 5x. The net effect was a 3-4x decrease in inventory drops.
- Visual landmarks imprecisely placed on stationary warehouse objects were used to create stable, robot-centric map markers for estimating accumulated robot localization error.
- Technologies Used: Python, OpenCV / AprilTags, Redis

Extended Object Tracking

April 2018

- Developed a performant representation of a cutting-edge algorithm for extended object tracking using elliptical primitive shapes
- Built a simulation and multi-threaded infrastructure layer for testing the algorithm in a representative environment
- Project Writeup, Github. Technologies Used: C++, JUCE

Skills

OS : Windows, OS X, Ubuntu

Languages: C++ (post 11), Python (2 & 3), Fortran (77 & 90/95)

Software : Eigen, Armadillo, Scikit-image, Scikit-learn, Tensorflow, Keras, OpenCV, Matlab/Simulink, git, gdb(pdb), cmake, valgrind, numpy, scipy, pandas, L^AT_EX, Boost, IPOPT, ROS, fastai, PyTorch, docker

Other : Kalman filtering, particle filtering, SLAM, computer vision, signal processing, optimization, machine learning (including deep learning), state-space control design, optimal control, design-of-experiments (DoE), data exploration & visualization

Selected Publications & Patents

- Sakai, A., D. Ingram, **J. Dinius**, K. Chawla, A. Raffin, A. Paques. PythonRobotics: a Python code collection of robotics algorithms. *arXiv e-print: submitted 31 Aug, 2018*. Available: <https://arxiv.org/abs/1808.10703>
- **Dinius, J.W.**, B.K. Pennington. Spatiotemporal Controller for Controlling Robot Operation. *U.S. Nonprovisional Pat. Ser. No. 16/044,344*, filed 24 July, 2018
- **Dinius, J.**, R. Furfaro, F. Topputo, and S. Selnick. Near Optimal Feedback Guidance Design and the Planar Restricted Three-Body Problem. In: *Proceedings of the AAS 24th Spaceflight Mechanics Meeting*, January 26–30, 2014.
- **Dinius, J.**, Adv. J. Lega. Dynamical Properties of a Generalized Collision Rule for Multi-Particle Systems. *Doctoral Dissertation*. Available: <http://arizona.openrepository.com/arizona/handle/10150/315858>.

Education

University of Arizona, MS/PhD Applied Mathematics

- Raytheon Advanced Scholar's Fellowship

Northern Arizona University, BS Mathematics and Physics

- University Honors Program
- Dean's List

Related Activities

Open-Source Projects

Contributor

2017 – Present

I regularly contribute to open-source projects, some of which include

- PythonRobotics
- Open Source Self Driving Car Initiative (OSSDC)

Check out my GitHub for more details.