Joe Dinius, PhD

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Summary Statement

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

Professional Experience

inVia Robotics Westlake Village, CA
Staff Research Scientist - Perception & Controls December 2017 – Present

- Responsible for development of control, navigation, and localization algorithms for wheeled mobile robots for a warehouse automation application
- Increased coarse navigation speed 2.5x in 2 months through a novel method
- Increased navigation accuracy on precision maneuvers by over 2x while simultaneously increasing speed by 2x
- Organize ongoing efforts for personal and professional growth of development team members
- Other responsibilities include cycle-time reduction, build management (CI and configuration control), system 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
- Conceptualized and developed a collision avoidance algorithm to ensure passenger safety
- Developed graphical frontend to allow automated ride operation and safety monitoring

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

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
- Technologies Used: C++, JUCE

Single Shot Detection using Sliding Windows April 2017

- Built a support vector machine classifier to detect cars in a monocular video stream
- Performed feature extraction using OpenCV to increase classifier accuracy
- Developed a blob detector to find minimal bounding boxes around detected objects
- Implemented a Kalman filter to smoothly track bounding boxes
- Technologies Used: Python, OpenCV, Scikit-learn

Traffic Sign Classification Using Convolutional Neural Networks March 2017

- Implemented an image classifier using deep convolutional neural networks to classify signs from the German traffic sign database
- Classifier achieved an accuracy of over 93% on a dataset with over 40 different possible classifications for each feature vector
- Technologies Used: Python, Tensorflow, OpenCV

Skills

OS : Windows, OS X, Ubuntu
Languages: C++ (mostly post-11 standard), Python (2.7+), Fortran (77,90/95)
Software : Eigen, Scikit-image, Scikit-learn, Tensorflow, Keras, OpenCV, Matlab/Simulink, git, gdb(pdb), cmake, valgrind, numpy, scipy, pandas, LaTeX, Boost, IPOPT
Other : Kalman filtering, particle filtering, localization, computer vision, machine learning, state-space control design, optimal control, design-of-experiments (DoE), data exploration & visualization

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.