

BLAKE WARREN WULFE

PERSONAL INFORMATION

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PROFESSIONAL EXPERIENCE

Toyota Research Institute, Los Altos, California

April 2018 - Present

Research Software Engineer, Prediction

- ◇ Led the design and implementation of the prediction system (C++)
- ◇ Defined performance metrics for prediction, and implemented a system for computing them (C++)
- ◇ Deployed a neural network model for predicting the intent of other agents, which involved (i) dataset collection, (ii) model design, implementation, and training, (iii) run-time performance optimization, and (iv) deployment on vehicle as the primary intent prediction algorithm (Python / C++)
- ◇ Led a team in developing decision making features relying on the intent-prediction model (C++)
- ◇ Worked with other researchers to define the long-term research direction of the prediction team, which included identifying and defining research projects, hiring and mentoring research interns, and co-leading a planning / prediction literature review
- ◇ Served as a mentor to newer members of the prediction team

Stanford Intelligent Systems Lab, Stanford University

April 2016 - December 2017

Research Assistant

Automotive Scene Risk Prediction

- ◇ Implemented a framework for deriving risk estimates of simulated automotive scenes (Julia)
- ◇ Addressed collision rarity challenges through importance sampling of a Bayesian network (Julia)
- ◇ Trained domain adaptation, neural network models to predict collision risk (Python)

Multi-Agent Human Driver Modeling

- ◇ Implemented a multi-agent driving environment (Julia)
- ◇ Developed a multi-agent, generative adversarial imitation learning variant, which produced agents capable of driving realistically on a highway for approximately 20 seconds (Python)

Deep Reinforcement Learning of Collision Avoidance Policies

- ◇ Developed a deep reinforcement learning system (using a Deep Q-Network) that solves for policies twice as fast as a baseline dynamic programming method while maintaining performance (Python)
- ◇ Built an interface to an aircraft encounter model to serve as the training environment (C++)

Intelligent Agent Action Coordination

- ◇ Implemented a novel method for coordinating UAV actions that reduced collisions 25%-75%
- ◇ Developed an aircraft encounter simulation framework for evaluating agent policies (Julia)

Adobe Research, San Jose, California

June 2017 - September 2017

Research Intern

Adversarial Imitation Learning of Drawing Policies

- ◇ Applied generative adversarial imitation learning to the task of learning to draw sketches from human examples, demonstrating improved sample efficiency over baseline methods (Python)

Accenture, Austin, TX

August 2014 - August 2015

Business and Systems Integration Analyst

EDUCATION

Stanford University

August 2015 - December 2017

M.S. Computer Science, Specialization in Artificial Intelligence

GPA: 3.94 / 4.0

Vanderbilt University

August 2010 - May 2014

B.S Computer Science, Cum Laude & Honors

Minors in Mathematics & Engineering Management

GPA: 3.77 / 4.0

COMPUTER & TECHNICAL SKILLS

Programming Languages: Python, C++, experience with Julia

Software: Deep learning frameworks (Pytorch, TensorFlow)

PUBLICATIONS

- ◇ Bhattacharyya, R. P., Phillips, D. J., Wulfe, B., Morton, J., Kuefler, A., and Kochenderfer, M. J. "Multi-agent imitation learning for driving simulation", in *International Conference on Intelligent Robots and Systems*, 2018.
- ◇ Wulfe, B., Chintakindi, S., Choi, S. C. T., Hartong-Redden, R., Kodali, A., and Kochenderfer, M. J. "Real-time prediction of intermediate-horizon automotive collision risk", in *International Conference on Autonomous Agents and Multi-Agent Systems*, 2018.
- ◇ Tompa, R. E., Wulfe, B., Kochenderfer, M. J., and Owen, M. P. "Horizontal maneuver coordination for aircraft collision-avoidance systems", in *Journal of Aerospace Information Systems*, 2018.
- ◇ Tompa, R. E., Wulfe, B., Owen, M. P., and Kochenderfer, M. J. "Collision avoidance for unmanned aircraft using coordination tables", in *Digital Avionics Systems Conference*, 2016.