

Denis Osipychhev

Contact Information	Huntsville, AL 35808, USA	phone: <i>please email for details</i> e-mail: osipychhev@gmail.com web: www.denisos.com
Professional Area	Autonomous systems architecture and hierarchical artificial intelligence. Hybrid decision-making systems, control policy optimization, deep reinforcement learning. Machine learning under constraints, generative modeling, and synthetic data generation.	
Professional Experience	<p><i>Boeing Research & Technology, Huntsville, Alabama USA</i> <i>2018 – present</i> <i>AI Software Engineer at Center for Applied Simulation and Analytics (CASA)</i> Research in general autonomy, intelligent systems, and decision-making focusing on hierarchical architecture, autonomous reasoning and risk assessment. Consulting, architecting, and prototyping a broad range of AI activities:</p> <ul style="list-style-type: none">o Learning-enabled planning and control for fighter-jet dogfight Developed surrogate domain, training procedure, and evaluation metricso Synthetic data generation for visual perception pipeline Designed data distribution matching and transfer learning pipeline Architected active learning framework with synth data generationo Assurance guarantees for learning-enabled hybrid systems Developed evaluation metrics for regression, classification, policy models Architected hybrid deep-learning solution for mission critical componentso Local path-planning, collision avoidance, and navigation for airport taxiing Architected and integrated trajectory planner for dynamic environmento Defect analysis and process optimization for composite manufacturing Architected sequence optimization for fiber placement processo Defense against deception and adversarial attacks on cyber-physical systems Coordinated cybersecurity work for robust AI/ML agents <p><i>University of Illinois at Urbana-Champaign, Urbana, Illinois USA</i> <i>2016 – 2018</i> <i>Research Assistant at Coordinated Science Laboratory (CSL)</i> Decision-making algorithms for modern agricultural robotics. Precision agriculture. Reinforcement learning for multi-agent optimization.</p> <ul style="list-style-type: none">o Distributed decentralized cooperative policy planning for Capture the Flag problemo Policy optimization for agricultural swarm robotics <p><i>Oklahoma State University, Stillwater, Oklahoma USA</i> <i>2014 – 2016</i> <i>Graduate Research Assistant at Advanced Technology Research Center (ATRC)</i> Decision-making algorithms for autonomous driving vehicles and human-in-the-loop systems. Human-activity recognition, behavior modeling and classification. Learning from demonstration, imitation learning for robots.</p> <ul style="list-style-type: none">o Model-based collision avoidance for autonomous vehicleso Navigation, path-planning and control of autonomous vehicle prototype	
Education	<p><i>University of Illinois at Urbana-Champaign, Urbana, Illinois USA</i> PhD candidate, Ag and Bio Engineering & Computational Science Engineering Advisors: <i>Drs. G. Chowdhary, H. Tran, M. West, A. Davis</i></p>	

Education (cont.)	<p><i>Oklahoma State University, Stillwater, Oklahoma USA</i> M.S. in Electrical and Computer Engineering, Control Systems, 2015 “Collision avoidance for autonomous cars based on human intention”</p> <p><i>Moscow Power Engineering Institute, Moscow, Russia</i> M.S. in Electronic Equipment, February, 2006 B.E. in Electronics, May, 2004</p>
Publications	<p>Fremont D., Chiu J., Margineantu D., Osipychev D., Seshia S., Formal Analysis and Redesign of a Neural Network-Based Aircraft Taxiing System with VerifAI. Submitted CAV 2020.</p> <p>Osipychev D., Chowdhary G., Distributed Deep Policy Sharing for Competitive Adversarial Environment. 2018 Archived, NIPS Workshop “Deep Reinforcement Learning”.</p> <p>McAllister W., Osipychev D., Davis A., Agbots: Weeding a field with a team of autonomous robots. 2019 Elsevier.</p> <p>McAllister W.*, Osipychev D.*, Chowdhary G., Davis A., Multi-Agent Planning for Coordinated Robotic Weed Killing. 2018 IROS conference.</p> <p>Osipychev D., Tran D., Sheng W., Chowdhary G., Human intention-based collision avoidance for autonomous cars. 2017 American Control Conference (ACC).</p> <p>Tran D., Du J., Sheng W., Tadesse E., Osipychev D., Sun Y., Bai H., A Human-Vehicle Collaborative Driving Framework for Driver Assistance. 2018 IEEE Intelligent Transportation Systems Transactions.</p> <p>Tran D., Tadesse E., Osipychev D., et al., A collaborative control framework for driver assistance systems. 2017 ICRA conference.</p> <p>Osipychev D., Tran D., Sheng W., Chowdhary G., Proactive MDP-based Collision Avoidance Algorithm for Autonomous Car. 2015 IEEE CYBER Conference.</p> <p>Osipychev D., Tran D., Sheng W., Chowdhary G., Proactive MDP-based Collision Avoidance Algorithm for Autonomous Car. 2014 NIPS Workshop “From Bad Models to Good Policies”.</p>
Coding Proficiency	<p>Experience in agile software development and integration of the following:</p> <ul style="list-style-type: none"> o Deep RL-agents (incl. DDPG, GA3C, DQN, PG) on Tensorflow/Pytorch libraries o Regression, classification, GAN models on Pytorch libraries o Dynamics simulations and surrogates (multi-agent systems, vehicle dynamics, construction equipment, game-theory, computer games) o Integration to real robotic systems (software/hardware in the loop, ROS, Gazebo) o Task-optimization methods (Q-learning, genetic/evolutionary algorithms, graph search, RRT) o Utility function optimization techniques (SGD, GD, potential fields, elastic bands, particle swarm, leap-frog) <p>Simulation of physical and control processes, visualization, and GUI</p> <p>Languages: Python, C++, JavaScript</p>

