Artem Molchanov

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Research Interests

Robotics, Artificial General Intelligence, Reinforcement Learning, Deep Learning.

Education

Aug 2013 - May 2020 — **PhD in Computer Science / Robotics**,
University of Southern California, Los Angeles, US
Thesis: Data Scarcity in Robotics: Leveraging Structural Priors and Representation Learning
Advisor: Gaurav S. Sukhatme
GPA: 3.88/4.0

Sep 2004 - May 2010 — **Engineering Degree in Robotics**,
Bauman Moscow State Technical University (BMSTU), Moscow, Russia
Thesis: Attitude and Heading Reference System for a Remotely Operated Underwater Vehicle
Advisor: Sergey A. Egorov
GPA: 4.94/5.0. **Diploma with Honours**

Professional Experience

Jun-Sept 2019 — **Research Intern** at **Facebook AI Research**, Menlo Park, CA, US
Project on Meta Learning via Learned Loss.

Jun-Aug 2017 — **Research Intern** at **Nvidia**, Seattle area, WA, US
Contributed to 2 research projects:
- Project on Automatic Curriculum Generation for Deep Reinforcement Learning with Sparse rewards.
- Project on Image-Centric Domain Randomization for Learning Human-Readable Plans from Real-World demonstrations.

Jun-Aug 2016 — **Deep Learning Intern** at **Volkswagen group of America**, Belmont, US
Research and bench-marking of deep compression algorithms using TensorFlow in application to autonomous driving.

Jun-Aug 2015 — **Software Intern** at **Blue River Technology**, Sunnyvale, US
Development of a plant classifier/detector for the vision system of the Lettuce Thinning Bot using convolutional neural networks.

Mar 2009 Jul 2013 — **Control Systems Engineer** at
Research Institute of Special Mechanical Engineering of BMSTU, Moscow, Russia
Development of Underwater Robotic Systems:
- Software and hardware control systems architecture design.
- Development (C++, Matlab) of motion control and signal processing algorithms.
- Design, development (C++,Qt) and deployment of user interfaces for pilot control units.
- Deployment and field tests (ocean trials) of the entire ROV system.

Entrepreneurship

Swerve.ai (Feb – Aug 2018): **Co-founder and Chief Data Officer (CDO)**. The startup targeted autonomous driving safety improvement by developing technologies for car planning and control at the limits of handling. As a CDO I was working on the perceptual system of the autonomous car. Particularly, I was developing wet surface detectors from cameras and microphones for the purpose of friction estimation.

Leadership

Student advisor:
Tao Chen - Sim-to-Real for Quadrotor Control. Earned 2019 Viterbi Master's Award.
Jialou Wang - Sim-to-Real for Quadrotor Control.
Pushpreet Singh - Sim-to-Real for Quadrotor Control.
Joe Mathai - RL for Active Perception

Teaching

Summer 2020	Machine Learning (CS-567). Teaching Assistant.
Fall 2017	Deep Learning (CS-599). Teaching Assistant.
Summer 2018	Introduction to Programming (CS-103). Teaching Assistant.
2017 – 2019	Introduction to Computer Science (CS-109). Teaching Assistant.

Software Development Skills

Programming Languages:	Python, C/C++, Matlab, LaTeX
Libraries and Frameworks:	PyTorch, TensorFlow, Keras, ROS, OpenCV, Qt
SW Development Tools:	Git, PyCharm, CMake, QtCreator, KDevelop
Operating Systems:	Linux

Grants, Scholarships, Awards

May 2019, May 2017	USC Robotics Bekey Award for RESL compute infrastructure development
Nov 2016, May 2017	NVIDIA GPU grant
2005-2010	Recipient of stipend for outstanding students at BMSTU

Volunteering

ICRA 2014-1019, IROS 2014-2020, CoRL 2018, Journal of Ocean Engineering and Science (JOES) 2016, Autonomous Robots (AURO) 2019, IEEE Transactions on Robotics (T-RO) 2019

Press

Our work on RL for quadrotors was featured in USC Viterbi news article.

Interests and Hobbies

Astrophysics, Sports (Rock Climbing, Running, BJJ), Guitar, Motorcycles

Selected Publications

S. Bechtle*, **A. Molchanov***, Y. Chebotar*, E. Grefenstette, L. Righetti, G.S. Sukhatme, F. Meier. Meta-Learning via Learned Loss. International Conference on Pattern Recognition (ICPR), Jan 2021

A. Molchanov, T. Chen, W. Hönig, J. A. Preiss, N. Ayanian, G. S. Sukhatme. Sim-to-(Multi)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors. IEEE/RSJ International Conference on Intelligent Robots and Systems, Nov 2019

J. Tremblay, T. To, **A. Molchanov**, S. Tyree, J. Kautz, S. Birchfield. Synthetically Trained Neural Networks for Learning Human-Readable Plans from Real-World Demonstrations. IEEE International Conference on Robotics and Automation (ICRA), May 2018

A. Molchanov, O. Kroemer, Z. Su, G. Sukhatme. Contact Localization on Grasped Objects using Tactile Sensing. IEEE International Conference on Intelligent Robots and Systems (IROS), 2016.

Y. Chebotar, K. Hausman, Z. Su, **A. Molchanov**, O. Kroemer, G. Sukhatme, S. Schaal. BiGS: BioTac Grasp Stability Dataset. ICRA Workshop on Grasping and Manipulation Datasets , 2016

Z. Su, K. Hausman, Y. Chebotar, **A. Molchanov**, G. Loeb, G. Sukhatme, S. Schaal. Force Estimation and Slip Detection for Grip Control using a Biomimetic Tactile Sensor. IEEE-RAS International Conference on Humanoid Robotics (Humanoids), Jul 2015.

A. Molchanov, A. Breitenmoser, G. Sukhatme. Active Drifters: Towards a Practical Multi-Robot System for Ocean Monitoring. IEEE International Conference on Robotics and Automation (ICRA), May 2015.

A. Molchanov, A. Breitenmoser, G. Sukhatme. Active Drifters: Sailing with the Ocean Currents. RSS Workshop on Autonomous Control, Adaptation, and Learning for Underwater Vehicles, 2014.

A. Molchanov, K. Chernenko, S. Egorov, A. Kutsenko. Data processing and Control System of a Small Survey Class Remotely Operated Underwater Vehicle. IV All-Russian Tech Conference «Technical problems of exploitation of the World Ocean», pages 66-70, Vladivostok, Russian Federation, 2011.