ANTON MITROKHIN

anton.mitrokhin@phystech.edu / amitrokh@umd.edu (website)

Education

Moscow Institute of Physics and Technology 09/2012 – 07/2018
B.E., Electrical and Computer Engineering
Institute of Microelectronics and Advanced Control Systems
Internship (co-op) at Intel, Advisor: Dmitry Babokin

University of Maryland, College Park 09/2016 – present
Ph.D, Computer Science
Perception and Robotics Group, Advisor: Prof. Yiannis Aloimonos
Degree in progress, expected graduation 05/2020

Research Interests

autonomous robotics, embedded systems, ASICs for vision, Internet of Things, AI

Relevant skills

Programming languages: C/C++ (STL, Boost, C++11, 14), Assembly, Python, Bash, Verilog
Tools: Git, SVN, OpenCL, OpenCV, PCL, ROS, TensorFlow, Theano
IDEs: Vim, Eclipse, Xilinx ISE, Vivado
my Github page is available here

Employment

University of Maryland, College Park 09/2016 – present
Research Assistant: Perception and Robotics Group (website) 01/2017 – present
Teaching Assistant: CMSC 132:
Advanced object oriented programming 09/2016 – 01/2017
Teaching Assistant: CMSC 498F (website):
An introduction to the design and programming of robotics systems 01/2017 – 05/2017
Teaching Assistant: ENPM 673:
Perception for autonomous robots 01/2018 – 05/2018, 01/2019 – 05/2019

NVIDIA 06/2018 – 08/2018
Research Intern: Autonomous Driving / Lidar Perception Team (Sangmin Oh, Tilman Wekel)

Intel Corporation 07/2014 – 07/2016
Research Intern (co-op): Technology Pathfinding and Innovation (Dmitry Babokin)

Moscow Institute of Physics and Technology 09/2013 – 07/2016
Teaching Assistant: MIPT Program for High School Students (Anna Tykova)

Intel Corporation 09/2014 – 07/2016
Teaching Assistant: Intel iLab Computer Science (Ilya Dedinsky)

MIPT Robotics Laboratory 11/2014 – 07/2016
Teaching Assistant: ROS Framework (Alexey Tsyganov, Taras Pustovoy)

Parallels, Inc 08/2013 – 06/2014
Research Intern (co-op): Device Virtualization Division (Anna Melekhova)

Projects

DVS Flow [*Anton Mitrokhin, Cornelia Fermuller, Yiannis Aloimonos*]
DVS, or Dynamic Vision Sensor is a neuromorphic asynchronous sensor which allows to capture ultra high speed motion at rates of more than 10000 frames per second. The goal of my PhD at the University of Maryland is to develop techniques and algorithms capable of processing DVS data and allow for robust navigation, motion segmentation, tracking and collision avoidance for future autonomous robots.

ISPC [*Anton Mitrokhin, Vsevolod Livinsky, Dmitry Babokin*] (website)
ISPC stands for Intel SPMD (Single Program, Multiple Data) Program Compiler – an open source compiler for a variant of C programming language with extensions for SPMD model. ISPC utilizes SIMD units of CPUs to run several instances of a regular serial code with different data inputs, thus delivering up to 4x performance gain on 4-wide SSE units, 8x on AVX units and 16x on AVX-512 units. ISPCs primary purpose is to facilitate the process of creating parallel code for CPU. ISPCs programming model is especially effective with image processing algorithms and renderers. I was one of the major contributors to the project, implementing support for AVX-512, KNC and KNL.

YARP [*Anton Mitrokhin, Vsevolod Livinsky, Dmitry Babokin*] (website)
YARP is an open source random C/C++ program generator, which produces correct runnable C/C++ programs. This project was a part of my Bachelor's thesis at MIPT. The generator is designed to trigger compiler optimization bugs and is intended for compiler testing. YARP utilizes a sophisticated grammar for program generation and is able to outperform modern state of the art test generators such as CSmith and Orange in terms of number of errors found. I am currently preparing a paper on YARP generator for publishing in IEEE.

Publications

A. Mitrokhin, C. Ye, C. Fermüller, Y. Aloimonos, T. Delbruck, and B. Cash. ***"Learning Motion Segmentation and Estimation With Event Cameras"*** - preprint: pdf

A. Mitrokhin, C. Ye, C. Parameshwara, C. Fermüller, J. A. Yorke, and Y. Aloimonos. ***"Unsupervised Learning of Dense Optical Flow and Depth from Sparse Event Data"*** - arXiv preprint: https://arxiv.org/abs/1809.08625. *Project page, video*

A. Mitrokhin, C. Fermuller, C. Parameshwara, and Y. Aloimonos. ***"Event-based Moving Object Detection and Tracking"*** - accepted to iROS 2018 (arXiv preprint: https://arxiv.org/abs/1803.04523). *Project page, video*

Preparing for publication: Mitrokhin, Anton, et al. **"*Yet Another Random Program Generator: Compiler verification using random test generation*"** (https://github.com/01org/yarpgen)

Invited Talks

Data processing and Motion analysis with Dynamic Vision Sensors
2018 Northrop Grumman Mission Systems University Research Symposium — Apr 17, 2018

BetterFlow: High speed Optical Flow estimation with Neuromorphic Sensors — Jul 25, 2017
2017 Telluride Neuromorphic Cognition Engineering Workshop

YARP-gen: Random test generator for optimization verification in C/C++ compilers
59th Moscow Institute of Physics and Technology Scientific Conference (honors section) — Nov 24, 2016

LLVM: Advanced Vectorization Support and Drawbacks in Presence of Explicitly Parallel Code
58th Moscow Institute of Physics and Technology Scientific Conference — Nov 28, 2015

A Survey of Random Program Generation Methods for C/C++ Compiler Testing
58th Moscow Institute of Physics and Technology Scientific Conference — Nov 28, 2015

Relevant Coursework

University of Maryland, College Park (*GPA: 3.95*)
Image Processing (*CMSC 828G, CMSC 733*), Natural Language Processing (*CMSC 723*), Computer Graphics (*CMSC 740*), Network Security (*CMSC 818O, ENEE 759F*).

Moscow Institute of Physics and Technology
Distributed Systems, Operating Systems, Computer Security, Parallel Computing, Computer Networks (Cisco Network Course at MIPT), Object Oriented Programming.

Intel
VLSI design, FPGA development, Graph Theory, Compiler Theory, Computer Architecture, Programming Languages.

Teaching

University of Maryland, College Park Teaching Assistant

- CMSC 132: Advanced object oriented programming 09/2016 – 01/2017
- CMSC 498F: An introduction to the design and programming of robotics systems 01/2017 – 05/2017
- ENPM 673: Perception for autonomous robots 01/2018 – 05/2018

Intel iLab: Introduction to Programming Languages Fall 2014, Fall 2015
Teaching Assistant for Ilya Dedinsky, Intel

Intel iLab: C/C++ and Object Oriented Programming Spring 2015, Spring 2016
Teaching Assistant for Ilya Dedinsky, Intel

MIPT Program for High School Students Fall 2013 – Summer 2016
Teaching Assistant for Anna Tykova, MIPT

MIPT Robotics Laboratory Fall 2014 – Summer 2016
Teaching Assistant: ROS Framework for Alexey Tsyganov

MIPT Robotics Laboratory Fall 2014 – Summer 2016
Student Volunteer: Fast Prototyping and Robotics master classes

Awards

Generously awarded the Brin Family Prize for Autonomous Drone Research	2018
Northrop Grumman Symposium - Student Poster Award	2018
University of Maryland Flagship Fellowship	2016 – 2020
59th MIPT Scientific Conference Best Poster Award	2016
Intel Recognition Award	2014, 2015
Abramov-Frolov merit-based Scholarship	2012 – 2015