Roman Vlasov

ML Research engineer

22.09.1991, Saint-Petersburg → Moscow

Microelectronics and sensorics → Software, FPGA → ML, optimization

☎ Contact information

`phone` +7 906 268 00 79

`e-mail` spbroma@gmail.com

`telegram` @spbroma

`linkedin` http://linkedin.com/in/roman-vlasov-69b32b69

`github` https://github.com/spbroma

`gitlab` https://gitlab.com/spbroma

💡 Interests

Research of machine learning algorithms and optimization methods, solving applied problems with them.

Directions, which I'm interested in for the future: image and video processing and generation, AR/VR/XR, ML for 3D, application of geometrical methods and topology

👨‍💻 Speeches and Publications

Presentation: ODS.AI DataFest: ML Perf, Machine Learning Hardware Benchmark (2020)

Workshop: "Application of global and gradient-based neural architecture search approaches for nonlinear digital signal processing" at summer school "Modern methods of information theory, optimization and control" (2020, 2021)

Paper: Non-convex optimization in digital pre-distortion of the signal (arXiv)

💻 Working experience

Huawei Russian Research Institute, Moscow

Senior Research Engineer
Apr 2017 — ongoing

✨ General task

Adaptive models in digital signal processing (**DSP**) domain for **system recognition** task of radio-frequency signal.

🔬 Research

- Optimization algorithms for complex-valued adaptive nonlinear dynamic system: gradient, second-order, non-gradient methods
- Online structure optimization
- Evolutionary model architecture search, DARTS and other approaches

🛠️ Development

- Custom framework for automatic differentiation with complex-valued signal and parameters (support and improvement, implementation of new adaptation methods)
- Flexible framework for multiple simulation launching with automatic report generation, comparing and analyzing results
- Complex-valued models for TensorFlow and PyTorch, custom C++ TF-blocks
- Flexible bitwise fixpoint C++ testbench for FPGA implementation of adaptive models

🧰 Languages and tools

- Python, Matlab, PyTorch, TensorFlow, C/C++, Verilog, SystemVerilog
- Git, SVN, Ubuntu, Xilinx Vivado

📄 Keywords

`machine learning`, `non-convex optimization` , `adaptive models`, `GitLab`, `AutoML`, `Neural architecture search`, `NAS`, `DARTS`, `DSP`, `Matlab`

Special Technological Center, Saint-Petersburg

Software Engineer
Jul 2014 — Jan 2017

✨ General task

Development solutions for information security tasks.

🔬 Research

- Distributed high performance computing (FPGA, GPU)
- Cryptography
- Reverse engineering of ASIC

🛠️ Development

- Timing and resource optimization of RTL
- Participation in development of devices for HPC, systems for receiving and processing of RF-signal
- Software development for Windows (Qt, Visual Studio)
- Custom FPGA IP-cores for I2C, SPI, UDP

🚒 Languages and tools

- C/C++, Verilog, Qt
- Xilinx Vivado, MS Visual Studio, Wireshark

📄 Keywords

`DSP`, `FPGA`, `software`, `hardware`, `wireless`, `cryptography`

Center of Microtechnologies and Diagnostics, LETI, SPb

Engineer
Feb 2013 — Jun 2014

✨ General task

Work on master thesis: research in algorithms of signal processing for optical and acoustic sensors, implementation it in hardware and software. Devise and conducting experiments, other support tasks

🔬 Research

- Methods of stress measurement for thin-film membranes for MEMS
- Fiber-optics and acoustic sensors
- MEMS sensors
- Increasing dynamic range of interferometric fiber-optic sensor

🛠️ Development

- Windows software (Qt, matlab, LabVIEW)
- Microcontroller firmware
- RTL design
- Designing of the devices body

🚒 Languages and tools

- C/C++, Verilog, Qt, LabVIEW, Matlab, LaTeX
- Qt Creator, Xilinx ISE, SolidWorks, IAR

📄 Keywords

`sensors`, `signal processing`, `optics`, `hardware`, `software`, `MCU`, `FGPA`, `measurements`, `experiment planning`

📚 Education and courses

👨‍🎓 University

Saint-Petersburg State Electrotechnical University “LETI” (2008-2014)
Nanotechnology and microsystem technics department
Bachelor and Master of Electronics and Nanoelectronics

▼ Achievements

- The second place diploma in the competition of master’s dissertation of SPb ETU students of 2013/2014 with work “Multiwavelength method of processing signal from interferometric fiber optics sensors”
- Report at conference "Applied Optics-2014"
- Report at military-scientific conference in 2014

✍️ Courses

Introduction to Machine learning (Coursera, 2018)

Introduction to Deep Learning (Coursera, 2020)

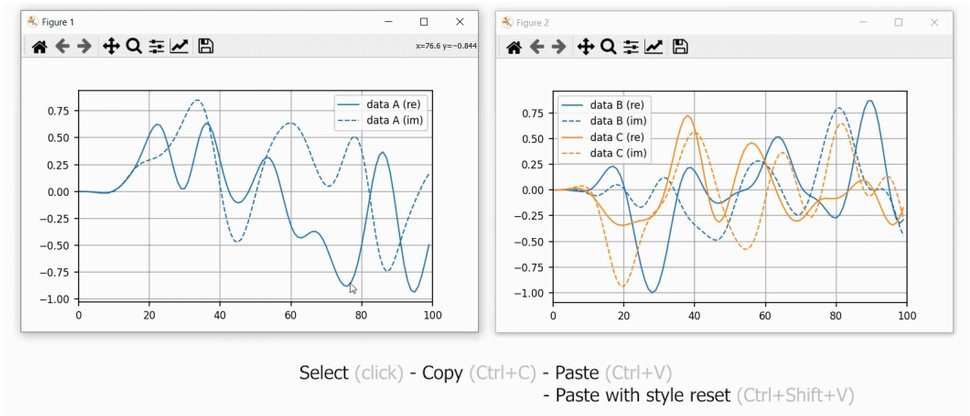
Bayesian Methods for Machine Learning (Coursera, 2021)

🐕 Pet projects

DSPlot (2021)

Python wrapper around Matplotlib and Plotly with unified interface for interactive plotting with rich opportunities. Initially, for complex-valued data with time-series, PSD and other plots.

▼ Preview



Grid map of Russia (2018)

Python interface for creating tile map visualization of Russia
More details about the whole project: https://gizh.ru/all/russian-tilemap/

Demo

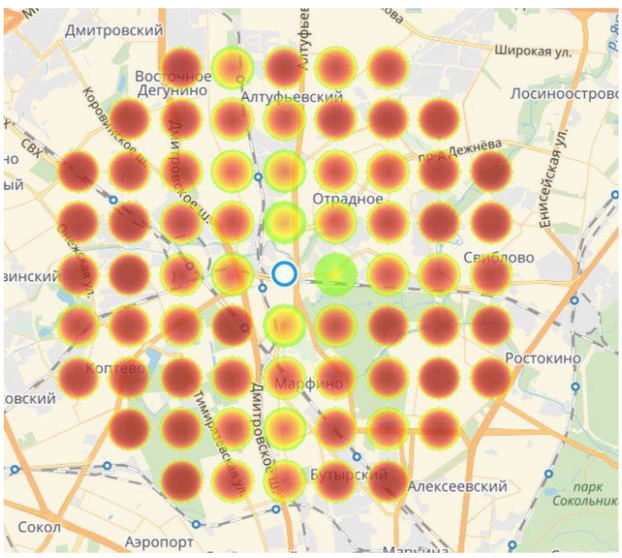
Yandex Router (2017)

After relocating to Moscow, I wanted to automate task of searching optimal area for rental flat in unknown city. First criteria was public transport availability from work. To

estimate it, I wrote a script, which uses API of Yandex.Maps, calculates time to reach points from target and visualize it.

For now page doesn't work, because of limitations and terms of use API of Yandex.Maps.

▼ Screenshot



🌠 Other interests

- 3D graphics
- Photography and graphic design
- Music