Artem Pulkin

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Amsterdam NL

Expertise

Software development, machine learning, data, scientific research

Education

Docteur ès Sciences EPFL in physics Lausanne CH Specialized on: numerical electronic structure, quantum simulations. Thesis: Electronic Transport in 2D Materials with Strong Spin-orbit Coupling (03/2017); supervisor: Oleg Yazyev — 2012-2017

Master of Science Chalmers in applied physics Göteborg SE Thesis: Spintromechanical Aspects of Charge Transport in Nanostructures (06/2012); supervisor: Robert Shekhter — 2010-2012

B.Sc. in Physics cum laude V.N. Karazin's State University Kharkiv UA — 2006-2010

Training

Coursera: Machine Learning from Stanford University

Experience

Quantitative developer @ Quantile — Apr'23-

As a part of a global team, building, implementing, and supporting financial risk models.

Researcher @ QuTech TU Delft — Apr'19-Apr'22

Designed and implemented machine learning for quantum research.

Postdoctoral researcher @ Caltech US — Jul'17-Mar'19

Performed research and development in numerical computer simulations of properties of novel materials.

PhD @ EPFL CH — Oct'12-Apr'17

Visiting esearcher @ Seoul National University, KR — Jun'12-Aug'12

Researcher @ Chalmers, SE — Aug'10-Jun'12

Example work

An in-house financial **python/pandas** tool contains two overlapping implementations of similar logic across multiple files. I refactored the code towards a single implementation that covers features of both.

Automated testing of an application lacks integration tests that are fast enough to run off-schedule in **pytest**. I implemented a **python** script that generates minimal datasets for quick integration testing.

A **parallel application** occasionally freezes and fails outside python stack. Failures cannot be reliably reproduced. I investigated and localized the cause of the failure down to the supply chain that needs to be updated.

Featured OSS

More on github/pulkin

pyteleport https://github.com/pulkin/pyteleport

My experiment in serializing **cPython runtime** through bytecode introspection.

rdiff https://github.com/pulkin/rdiff

A WIP to provide a meaningful and performant (**Cython**) diff tool for tabular data. Inspired by my past contribution to core **python**.

miniff https://gitlab.kwant-project.org/qt/miniff

A **machine learning** project for natural sciences.

Awards

Personal **Swiss NSF grant** to study abroad 80k CHF, 18 months, postdoctoral level (Early Postdoc.Mobility) grant P2ELP2_175281 — postgraduate

💰 Personal computing time at **national supercomputing facilities (SURF NL)** Approximate equivalent of 26k EUR, 24 months project 45873

🥇 Olympiad in Physics for University Students (national in Ukraine) – **first prize** `graduate`

🥇 **Youth Physicists Tournament** (national in Ukraine, team) – multiple prizes

🥇 Open Olympiad in Applied Physics (MIPT Moscow) – **first prize**

💰 Kharkiv City Mayor and Kharkiv State Governor scholarships for gifted youth

🥇 Dozens of prizes in physics and informatics (olympiads, student projects; **top-10 and top-1 in national competitions**) `high school`

💰 Multiple scholarships

Skills 🔨

Software development in 🐍 Python (8 years): scientific stack: numpy, torch, scipy, pandas; HPC and parallel/distributed/concurrent computing (MPI, OpenMP, multiprocessing, async); performance-driven development with C and cython; styling, testing, documenting, packaging; other: FastAPI, django, OpenCV, OpenCL, cPython bytecode.

C/C++: HPC and parallel environments (MPI, OpenMP); Lapack; embedded platforms; interfacing other languages; decompiling and reverse-engineering.

Other: ☕ Java, Fortran, Julia, Javascript, Matlab.

Infrastructure: git, CI/CD (Travis, Gitlab-CI, Azure pipelines), docker, HPC, AWS (EC2, S3).

IDEs: Pycharm, vim, VSCode.

Machine learning: supervised learning (DNN, linear fits, logistic fits, SVM); unsupervised learning (PCA/SVD, K-means, anomaly detection); dataset generation, feature extraction, adversarial models.

Soft: critical analysis, problem solving, communicating (organizing discussions, presenting, paper/grant/documentation writing), full-cycle project management (idea - funding - implementation - reporting), supervision.

Languages

English (prof), Ukrainian (mother), Russian, French (basic), Dutch (basic).

Hobbies

Sports, ✈ travels, cross-stitching, soldering, 🔒 lock picking, 🕹 board and video games, open-source projects.