Alexey Gronskiy

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Summary

Mathematician by training, computer science PhD, with experience in both corporations and startups, I worked in range of roles from software eningeering to data and ML engineering, and in range of fields from computer vision for airborne collision avoidance to financial data analysis. I am a private pilot and paramedic assistant in my free time. In software development, my priorities are systematism and clear communication.

- 5 years industry (Software Engineering)
- Permanent Swiss residence permit ("C")
- 6 years academia (PhD, Computer Science)
- Married, two children

Listed below are the skills split into "fresh" and "past" ("secondary") ones. The latter can be brushed up quickly.

"Fresh" **Areas of activity**

- o Machine learning, deep learning
- Computer vision for autonomous flying
- Object detection, collision avoidance
- Large scale data analysis, ETL pipelines
- Neural networks verification and certification
- o Process development and documentation
- Navigating regulatory standards
- MSc/BSc theses advisory

Operating programming languages

∘ C++ Python o SQL

Software frameworks

- Tensorflow, Keras o gRPC/REST
- Scikit-learn, PyMC3

Networkx, OSMnx

o Plotly, Dash, Folium

- OpenCV
 - Pandas, Geopandas

Stacks & Tools

- o CI/CD: Bazel, Jenkins, Docker, Git
- o Packages: Nix, JFrog Artifactory, Anaconda
- Data: Hadoop MapReduce, Spark, Parquet
- [No]SQL: Redis, MongoDB, MariaDB
- o GCP: Storage, Computing, KubeFlow
- Azure: Databricks & DataLake, DevOps
- Training: Determined AI, CUDA
- o Organizational: Phabricator, JIRA, Confluence

"Past" and Areas of activity

"Secondary"

- Natural Language Processing
- o Question reformulation, morphological analysis
- Statistical Learning Theory
- Algorithmic robustness under uncertainty
- $\circ \ \, \text{Teaching assistance}$
- o External API design for SDK products
- o Cross-platform UI development
- o Database normalization analysis

Programming languages & Software frameworks

∘ C# ∘ COM/COM+ o MATLAB o HTML/JS/CSS o WinAPI/MFC o Qt4 OpenMP Hugo/Jekyll

Stacks & Tools

- o CI/CD: Google's Blaze, Mercurial, Bazaar, SVN o Cloud: Google's Borg o Data: Google's Flume (Apache Beam), Rab- o Organizational: UML bitMQ
- $\circ \ \, \mathsf{Databases:} \ \, \mathsf{MySQL}, \, \mathsf{PostgreSQL}$

- Typesetting: LATEX

Working Experience

2020–2021 Senior data engineer, SIX Banking Services, Zurich, Switzerland



- Organized technical stack, code review and other processes in a newly established data science unit.
 - Performed analytical support of stakeholder business units, provided analysis and computed KPIs for ongoing projects in payment ecosystems.
- $\circ\;$ Participated in preparatory work for transition to cloud pipelines
- o Skills: Python, Geospatial analysis, Mircosoft Azure (Data Factory, DataLake, Databricks), JFrog Artifactory, data security and compliance.

2018-2020

Machine learning & computer vision engineer, Daedalean Al (ddln.ai &), Zurich, Switzerland



- Conceived and developed a prototype of a visual air-to-air object detection and tracking system (as part of autopilot collision avoidance).
- Researched, evaluated and made early technical decisions, shaped out data acquisition and annotation strategies. Developed evaluation metrics, navigated aviation industry standards on operational performance.
- As part of a 4-member team, worked with European Aviation Safety Agency on defining the concepts of safety assurance for neural networks (coauthored gron.sk/codann c, see "Publications").

- Conceived, developed an extendable and modularized machine learning evaluation and reporting framework used across several projects.
- Co-supervised interns and joint MSc/semester
- Carried out flight tests as a fixed-wing aircraft
- o Skills: C++14, Python, Tensorflow, Git, object detection and tracking, cloud computing and automation (GCP/GKE/KubeFlow/Jenkins), operational performance metrics, technical ownership, requirements design, product development cycle.

summer 2017 Research intern, Research and Machine Intelligence, Google Zurich, Switzerland



- Worked on answer ranking module for active question reformulation (see Google AI blog post 12).
- Developed several deep learning models for answer ranking.
- Presented at monthly meeting of Google Research.
- Approved for full-time conversion by the hiring committee.
- Skills: Python, C++11, Tensorflow, NLP, experimental design, MapReduce, communication.

ETH zürich

2012–2018 **Doctoral research assistant, head teaching assistant**, Machine Learning Group, Department of Computer Science, ETH Zurich, Switzerland

- o Conducted research in both theoretical and practical fields (see "Projects" below).
- o Launched medical collaborations with University Hospital Zurich (see www.cardioml.ch ぱ).
- Supervised several MSc theses.
- o Taught "Introduction to Machine Learning" and "Statistical Learning Theory" courses, created a script for the latter.

2010–2012 C++ software engineer, ABBYY Software, Moscow, Russia

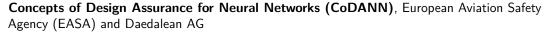
- Worked on a framework for automated native language understanding and translation.
- Designed, developed SDK wrappers for language
- morphology analysis and text classification.
- Skills: C++03, C#, COM/COM+/WinAPI, SVN, interface design, internal libraries, UML.

2008–2011 Independent (freelance) C++ developer

- Conceived and developed a cross-platform (Mac/Linux/Windows) tool for photo management, sold and maintained it.
- Skills: C++03, Qt 4, MercurialHg, PostgreSQL, selling and presentation.

Research Projects, Working Groups, Publications and Talks

Working Group





- which aimed at establishing methods and concepts for ensuring operational safety of machine learning models in aviation.
- Participated in a working group (gron.sk/easa ♂) Co-authored a report "Concepts of Design Assurance for Neural Networks", whose official summary (gron.sk/codann ♂) was published by EASA.

Research Projects Statistical Mechanical Analysis of Combinatorial Free Energy, ETH Zurich with Center of & Publications Science of Information, Purdue University



- PURDUE
- o "On Phase Transitions of Free Energy in Combi- o "Free Energy Rates for a Class of Optimization
 - International Conference on Analysis of Algorithms (AofA) 2017, Princeton
- "Phase Transitions in Parameter Rich Optimiza- o "Asymptotic Evaluation of Posterior Agreement tion Problems"
 - Analytic Combinatorics (SODA-ANALCO) 2017, Barcelona
- Problems"
 - International Conference on Analysis of Algorithms (AofA) 2014, Paris
- for some Optimization Problems"

J. of Theor. Comp. Sci. (TCS) 2018

Robustness and Informativeness of Minimum Spanning Tree Algorithm, ETH Zurich

- rithms"
 - Joint ETH & Google Workshop, Google, Zurich, 2016
- o "On Informativeness and Robustness of Algo- o "How Informative are Minimum Spanning Tree Algorithms"
 - International Symposium on Information Theory (ISIT) 2014, Hawaii



Machine Learning for Cardiological Diseases (www.cardioml.ch ☑), ETH Zurich with University Hospital Zurich and MPI Tübingen, Germany



- Detecting causal and statistical dependencies be Launched and co-led the project initially, supertween key factors of Acute Coronary and Takotsubo syndromes.
 - vised BSc and MSc theses.

Robust Solving of Algorithmic Problems, ETH Zurich with Institute of Theoretical Informatics, 7urich

o "Robust Optimization in the Presence of Uncertainty: a Generic Approach" J. of Computer and System Sciences (JCSS) 2018

Education

ETH zürich

2012–2018 Doctoral degree (Dr. Sci. ETH), Machine Learning Group, Department of Computer Science, ETH Zurich, Switzerland

> o Ph.D. Thesis "Statistical Mechanics and Information Theory for Approximate Robust Inference" (gron.sk/thesis ♂).



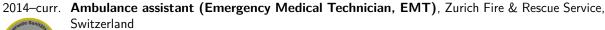
2006–2011 BSc + MSc, Department of Mathematics and Mechanics, Chair of Discrete Mathematics, Moscow State University of M.V. Lomonosov (MSU), Russia

- Specialist (equiv. BSc + MSc) degree in Pure and Applied Mathematics, with Honors.
- Thesis "On some metrical properties of Boolean functions" (gron.sk/msc-thesis \(\mathcal{C}\)).

Languages

 Russian native o German fluent (C2 Goethe, 2016) o English..... fluent French fluent (C1 DALF, 2011)

Volunteer Work





- Regularly training as an ambulance assistant.
- Participating in ambulance shifts during public events in the city of Zurich.
- o First responder to alarms from large-scale emergencies.

2007–2012 Lecturer/Teacher, MSU-/MIPT-based summer and winter schools ♂ for mathematics and programming, Russia



- Created original lecture/seminar materials.
- o Conducted lectures and seminars for high school students.
- o Topics: mathematical analysis, discrete mathematics, programming.

Hobbies and Other Activities

Aviation Pilot, SWISS Flying Club (www.swissflyingclub.ch 2), Hausen am Albis, Switzerland

• Private Pilot License (PPL(A)), single engine piston (SEP) class rating.



- SWISS Flying Club 120+ hours flight time.
- contests
- Programming o II prize team, All-Russia Programming Contest II prize team, Moscow Programming Contest (2005).
 - (2005).

- Sports & Music O Karate (gold medal in Swiss Spring Kyu- O Alpine skiing and snowboarding. tournament, 2014).

 - o Playing flute, guitar.

Pilot blog Author, Telegram channel "CrossWind Landing" (in Russian) (gron.sk/x-wind 다)



- o Telling the story of learning for private pilot license in Switzerland.
- o Topics about aerodynamics, meteorology, and the fun of flying.