

# Andrei Aralov

## Curriculum Vitae

Paris, France

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### Key achievements

- Created a novel algorithm for CT data postprocessing at subvoxel precision. It instantly attracted 2 new customers for the whole product.
- Developed custom 3D FCNN network (a variation of U-Net) for CBCT scans segmentation.
- Used SOTA detection model to improve the accuracy of a mesh segmentation algorithm by about 20%.
- Used style-transfer technique to reduce the influence of fog and haze on the automatic processing of satellite imagery.
- Implemented a universal inference engine backed by TensorRT and OpenVino for the best performance on different types of hardware

### Detailed Experience

#### **C++/ML Engineer**, "Adalisk", Yerevan (remote)

Subject domain: medical data processing and analysis. Algorithms on triangular meshes and voxels.

- Developed an algorithm to reduce bite alignment procedure from the usual 5-10 minutes (operator) to 10 seconds
- Optimized segmentation algorithm, reducing latency by about 50%
- Used SOTA detection model to improve the accuracy of the segmentation algorithm by about 20%
- Developed a Perspective-n-Point problem's solution, which outperforms competing software (including OpenCV)
- Implemented features for CT reconstruction and meshing algorithms, improving quality and supporting new types of objects
- Developed custom 3D FCNN network (a variation of U-Net) for CBCT scans segmentation
- Created a novel algorithm for CT data postprocessing at subvoxel precision.
- Implemented high performance filtering of voxel data using CUDA

#### **Computer Vision engineer**, "Terra Tech" JSC, Moscow

Subject domain: automatic processing and analysis of satellite imagery.

- Conducted research to eliminate haze & translucent clouds in satellite images
- Conducted research on terrain segmentation
- Successfully implemented many algorithms (including the two above) with optimizations using TensorRT and OpenVino for different types of hardware
- Developed extensible end-to-end solution for satellite imagery analysis

### Education

Sorbonne Université, Paris

- MS in Computer Science
- Major in quantum computing

National Research Nuclear University MEPhI, Moscow

- BS in Computer Science
- Bachelor thesis: "Development of a dependent type compiler for algebraic computations"
- Overall GPA 4.3 out of 5.0

## — Publications

- 2021 G. A. Ryabets, A. A. Aralov, D. A. Uskov and D. L. Khabarov, "Research of Neural Networks Efficiency in Video Generation Problem," 2021 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (ElConRus), St. Petersburg, Moscow, Russia, 2021, pp. 627-632, doi: 10.1109/ElConRus51938.2021.9396226

## — Skills

**Languages:** English (fluent), French (learning), Russian (native).

### **Math and related**

- Calculus and linear algebra
- Statistics, probability theory and classical ML
- Algorithms and data structures
- Computer Vision, CNNs
- Generative Models
- Lambda calculus, Haskell, Idris
- Limited knowledge of abstract algebra, topology and category theory
- Limited knowledge of quantum informatics

### **Programming**

- Proficiency in modern C++ and Python 3
- Parallel and asynchronous programming
- GPU programming with CUDA
- Assembly and low-level optimizations
- SQL (with and without ORMs)
- PyTorch, Tensorflow, OpenCV, Numpy, Scipy
- Torch C++, OpenVino, TensorRT
- LLVM and MLIR (compiler infrastructures)
- Modern development tools: Linux, Git, CI/CD, Docker, Prometheus, Grafana, MLFlow, AWS