+7 (930) 987-89-34, +374 (99) 011-971
akob.petrosyan@phystech.edu
jacpetrosyan@gmail.com

Hakob Petrosyan

ML/DL Engineer

Portfolio: https://drive.google.com
github.com/hakob-petro
linkedin.com/in/jacpetro

Researcher with a demonstrated history of working in the computer software industry. Strong research professional with a Bachelor's degree focused on Radio Engineering and Cybernetics from the Moscow Institute of Physics and Technology. The winner of the final part of the Republican Olympiad of Armenia in the disciplines of Mathematics, Physics, and Astronomy.

Skills

Languages/Framewroks	Python, C++, PyTorch, XGBoost, Scikit-Learn, Numpy, Pandas, Matplotlib, OpenCV, OpenGL, OpenMP, MPI, asyncio, Backtrader
Tools	Git, LaTeX, Docker, Linux, TensorFlow-serving
Fundamental	Calculus, Linear Algebra, Math Optimization, Probability Theory, Theory Of Information, Network Technologies [1-4 lvl. OSI], Distributed Training/Inference of LLMs, Finances/Economics
Communication	English (upper-intermediate), Russian (fluent speaker), Armenian (native language)

Technical Experience

PyTorch Developer **Aug 2023 — Till Now**
Scaletorch.ai *Palo Alto, CA, USA*

- Training parallelization of LLMs using Tensor, Pipeline, Data parallelism techniques. In particular, used PyTorch Pippy, Megatron-LM, DeepSpeed frameworks in combination with their specific opt. methods such as gradient checkpoint, mixed precision, gardient/weight sharding and others.
- Benchmarking speed of preprocessing for the ASR task for my custom Conformer implementation in combination with ready-made implementations from Nvidia Nemo (Conformer-CTC, Fast-Conformer). Testing/analyzing the improvement of training time using Scaletorch DAPP (DLOP) technology.
- Testing HF PEFT (using autotrain-advanced) functionalities (LoRA/qLoRA, Flash Attention 2, BFP4 quantization) for finetunning of LLMs with size >= 7B (Falcon-7B, OPT-13B, Zephyur-13B, Vicuna-7B(Llama 2))

Data Scientist **Feb 2022 — May 2023**
Intelligent Solutions *Moscow, Skolkovo*

- Color autocorrection of images using the X-Rite color palettes with OpenCV and Python colour module.
- Image white balance correction with U-Net.
- Writing an HTTP server, which was a linked server between the backend server and the TensorFlow-serving service.
- Conversion of images of dry surfaces to wet using generative models, as well as using 3D modeling methods.
- Classification of lithotypes using XGBoost and label propagation with self-learning. Comparison of supervised and semi-supervised approaches.

ML Researcher (intern) **Oct 2020 — Jul 2022**
Acronis *Moscow*

- Determination of the causes of the most common hardware breakdowns of systems with Windows-based operating systems. Modeling the future behavior of selected characteristics of the system.

Education

Master, *Moscow Institute of Physics and Technology* **Aug 2022 — Present**

- Faculty of Innovation and High Technology.
- Department of Digital Transformation Technologies.

Bachelor, *Moscow Institute of Physics and Technology* **Aug 2018 — July 2022**

- Faculty of Radio Engineering and Cybernetics.
- Department of Theoretical and Applied Informatics (Acronis).

Projects

Several pet-projects that were carried out independently for interest or at the institute:

> *An implementation of the CNN SincNet architecture using PyTorch.*
> *A simple flappy bird game with NeuroEvolution of Augmenting Topologies.*
> *Prediction of missing DNA nucleotides using PyTorch bidirectional LSTM.*
> *NBA players tracking using YOLOv8.*
> *Writing custom PyTorch optimizer for projected gradient descent algorithm.*
> *Realization of new NN training algorithm forward-forward using PyTorch.*
> *A cache-friendly block matrix multiplication.*
> *The numerical solution of the transport equation using MPI.*
> *The numerical integration using pthreads on shared memory.*
> *Pairs Trading with Actor-Critic Reinforcement Learning algorithm [not finished yet].*
> *Forecasting the price of stock trades with a horizon of 1 second using XGBoost based on high-frequency data from Reuters.*

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Certifications and Courses

- Neural networks and computer vision (Samsung Research, Russia)
- C++ Development Basics: White Belt (MIPT & Yandex)
- C++ Development Basics: Yellow Belt (MIPT & Yandex)
- C++ Development Basics: Red Belt (MIPT & Yandex)
- Free immersion in the DBMS (Computer Science center)
- CCNAv7: Introduction to Networks (Cisco) :
- CCNAv7: Switching, Routing, and Wireless Essentials (Cisco)