Daniil Emtsev

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Education

ETH Zurich Sep 2019 – present
MS in Computational Science and Engineering D-MATH *Zurich, Switzerland*
Major - **Robotics**, *GPA: 5.50/6.00*
- *Courses*: CS & ML courses, Algorithms and Data Structures, Optimization, Numerical Methods

Moscow Institute of Physics and Technology (MIPT) Aug 2015 – June 2019
BS in Computer Science and Electrical Engineering; *GPA: 9.00/10.00* *Moscow, Russia*
Major - **Data Science**, with Honors and Distinction, rank - **5/200**
- *Courses*: Electrical Engineering, Physics, Machine Learning

Experience

Computer Vision Lab ETH Zurich & Toyota Research – Master Thesis student Apr. 2021 – Dec. 2021
- Master's thesis on 2D image and 3D point cloud matching, 3D geometry, and deep learning *Zurich, Switzerland*
- Implemented algorithms on images and point clouds
- Improved the accuracy of localization by 50%
- Patented the method with Toyota

Computer-Assisted Drug Design, Rethink – R&D Software Engineering Student Feb. 2020 – Nov. 2020
- Implemented Generative network models with self-attention for de novo drug design *Zurich, Switzerland*
- Implemented natural language models and improved the synthesis quality by 30%

Data Analytics in Science and Engineering – R&D Software Engineer June 2019 – Aug. 2019
- Implemented new methods and algorithms in topological data analysis and ML. *Moscow, Russia*
- Implemented a more efficient algorithm that allowed to solve problem instances 100 times bigger comparing to existing libraries.

Institute for Information Transmission Problems – Bachelor thesis student Feb 2019 – Jun. 2019
- Developed a pipeline for FMRI images classification *Moscow, Russia*
- Improved the classification accuracy by 10%

Amgen company – Research Intern, ETH Zurich Medical Imaging Group July 2018 – Aug. 2018
- Implemented neural networks (GAN) for processing MRI images. *Zurich, Switzerland*
- Predicted visual effects of Alzheimer's disease

Publications

1. **Emtsev D.**, Danda Pani Paudel, Vaishakh Patil, Anton Obukhov, Luc Van Gool. A Direct Registration of Images on Point Clouds *submitted to* ***CVPR*** *2022.*

2. Lionar, S., **Emtsev, D.**, Svilarkovic, D., Peng, S. (2020). Dynamic Plane Convolutional Occupancy Networks. *Winter Conference on Applications of Computer Vision* ***WACV*** *2021.* Available: https://arxiv.org/abs/2011.05813

3. Barannikov S., Korotin A., Oganesyan D., **Emtsev D.**, Burnaev E. Barcodes as summary of objective function's topology. Available: https://arxiv.org/abs/2011.05813.

4. **Emtsev D**. Studying Alzheimer's Disease related brain deformations using Generative Adversarial Networks *Poster in* ***Cambridge Amgen Scholars symposium*** (2018). Available: link

Awards and Honours

- Master Scholarship Program ETH Zurich *covers all necessary living and study costs* February 2019
- Singapore International Pre-Graduate Award in Bioinformatics 2019
- Abramov's Scholarship for Academic Achievements at MIPT 2016-2019
- Winner in the All-Russian Olympiad *Absolute Winner in Mathematics & Physics, 1/1000 participants* February-2013
- Winner in the international tournament *International mathematical Olympiad "The Tournament of Towns"* July-2013
- Silver Medal Award, International Olympiad in Mathematics and Physics, Belgrad July-2013

Projects

Augmented Reality | *C#, Unity* | github.com/janwww/motion-instuctor — Sep. 2020 – Dec. 2020, *Zurich, Switzerland*

- Built Hololens2 application for virtual dancing movements (UI, kinematics)
- Implemented and visualised score similarity between body postures

Gesture Recognition | *Python, Tensorflow* | github.com/daniil-777/deep-gesture — May 2020 – Aug. 2020, *Zurich, Switzerland*

- Implemented RNN with self-attention for gesture recognition
- Implemented transformer network for gesture recognition

3d vision | *Python, Pytorch* | github.com/daniil-777/dpco — Feb. 2020 – Sep. 2020, *Zurich, Switzerland*

- Implemented algorithms for 3d point cloud reconstruction
- Wrote a paper and published in the conference

Fluid Simulation | *C++, OpenMP* | github.com/daniil-777/fluidsim — Sep. 2020 – Dec. 2019, *Zurich, Switzerland*

- Implemented liquid simulation for computer graphics application
- Achieved 1.5x speedup by optimizing cash locality

Graph Matching | *Python, Pytorch* | github.com/daniil-777/graph-matching — Sep. 2019 – Jan. 2020, *Zurich, Switzerland*

- Implemented a deep learning framework for Graph Based Semantic Matching

Sales Prediction | *python, R* | github.com/daniil-777/salesprediction — June 2018, *Moscow, Russia*

- Implemented a pipeline for the feature extraction from financial time series
- Top-3 solution among all participants

Time Series Anomaly Detection | *python* | github.com/daniil-777/Siburchallenge — December 2016, *Moscow, Russia*

- Proposed a solution for time series anomaly detection for the company Sibur
- Implemented a pipeline for statistics extraction from time series
- Top-2 solution using xgboost classifier
- Got the offer from the company

Teaching

Teacher & Organiser – MIPT, International Center of education — May 2016 – April 2018, *Moscow, Russia*

- Organized summer international school and led lectures in olympiad physics and mathematics
- Led own courses in electrostatics and olympiad geometry
- Wrote a book "Problems and Solutions of the Olympiads at International Schools"

Technical Skills

Languages: *Advanced:* Python *Intermediate:* C++, C#, C, R, MATLAB *Familiar:* Java
Libraries: Boost, Eigen, Libigl, OpenCV, PyTorch, TensorFlow, Scikit-Learn, Pandas, NumPy, Matplotlib
Software: Git, Unity, Visual Studio Code, Bash, Vim, Docker, Google Cloud
Parallel Programming: CUDA, OpenMP
Engineering: 3D CAD modelling (Solidworks), Electronic Design, Plate Soldering, Programming of Microcontrollers