

DENIS UZHVA

Saint Petersburg, Russia
+7(965)088-16-56 ◇ denis.uzhva@yahoo.com
GitHub: <https://github.com/denisuzhva>

PROFILE

Highly motivated mathematical programming graduate student at Saint Petersburg State University. I have over three years of experience in machine learning, including ML and DL applied to data analysis in the NA61/SHINE CERN experiment. During that period, I not only developed programming skills, but also gained experience in working with various software frameworks and APIs such as PyTorch, TensorFlow, or OpenCV, as well as strong background in applied mathematics: statistics, dynamics and theory of computation. Now my interests also encompass multiagent technology (swarm robotics, IoT), stochastic programming (compressed sensing), and music production, aside from maths and programming.

CORE SKILLS

- Programming languages: Python, MATLAB, R, C++, Java
- Frameworks and APIs: PyTorch, TensorFlow, NVIDIA CUDA, Keras, Scikit-learn, JADE, OpenCV
- Data visualization: Matplotlib, NetworkX
- Mathematics: Dynamics, Discrete Mathematics, Optimization, Geometry, Statistics
- Other: Git, LaTeX, Vim, Bash, Docker
- Music: Ableton Live, Bitwig Studio, VCV Rack, analog and acoustic instruments

EDUCATION

St. Petersburg State University, Saint Petersburg Ph.D. in Mathematics Department of Mathematics & Mechanics	<i>September 2021 - Present</i>
St. Petersburg State University, Saint Petersburg M.Sc. in Software Engineering Department of Mathematics & Mechanics	<i>September 2019 - June 2021</i>
St. Petersburg State University, Saint Petersburg B.Sc. in High energy and elementary particles physics Department of Physics	<i>September 2015 - June 2019</i>

EXPERIENCE

Junior Researcher Saint Petersburg State University <ul style="list-style-type: none">• Investigation and development of deep learning approaches for fracture mechanics• Responsible for the machine learning model development, data synthesis and validation.• Key achievement: the developed reinforcement learning model can adequately predict solid body topology for an optimal desired fracture pattern.	<i>April 2023 - Present</i>
Junior Researcher Institute for Problems in Mechanical Engineering of the RAS	<i>October 2020 - Present</i>

- Investigation of new methods to control swarm robotic systems.
- Responsible for development of mathematical theory, which is able to describe multiagent networks. Also responsible for the development of the software environment for network simulations.
- **Key achievement:** the developed theory successfully describes cluster synchronization phenomenon in networks of intelligent agents.

Software Engineer
Saint Petersburg State University

July 2021 - September 2021

- Investigation of algorithms for geophysical data compression.
- Responsible for development of a compression and reconstruction algorithms.
- **Key achievement:** the developed algorithm allows to compress geophysical data without much losses after reconstruction.

Research Engineer
Saint Petersburg State University

January 2021 - January 2023

- Investigation of algorithms for low luminosity photography quality improvement.
- Responsible for the de-noising deep learning model development and modeling of noise for simulated data. Also responsible for algorithm implementation and deployment on GPUs.
- **Key achievement:** the developed deep learning compressed sensing approach performs superior image enhancement in comparison to the SOTA approaches.

Research Assistant
Saint Petersburg State University

September 2019 - December 2020

- Investigation of the applicability of modern machine learning methods (convolutional neural networks) to data analysis in the NA61/SHINE CERN physical experiment.
- Responsible for design of architecture and software implementation of the model, as well as data preparation, augmentation and visualization.
- **Key achievement:** the developed model demonstrate superior accuracy in comparison with classical approaches such as decision trees and “cut-based analysis”.

LANGUAGE SKILLS

- Russian: native
- English: proficient
- Japanese: beginner

CONFERENCES AND SUMMER SCHOOLS

The 22nd IFAC World Congress 2023 (Yokohama, Japan)

“Adaptive Distributed Cluster Flow Control for a Group of Autonomous Robots”

61st IEEE Conference on Decision and Control 2022 (Cancún, Mexico)

“Compressed Cluster Sensing in Multiagent IoT Control”

XIV Multiconference on Control Problems 2021 (Divnomorsk, Russia)

“Cluster Flow Control in Distributed Network Systems”

Eighteenth Russian Conference on Artificial Intelligence 2020 (Moscow, Russia)

“Invariance preserving control of clusters recognized in networks of Kuramoto oscillators”

XIV Workshop on Particle Correlations and Femtoscopy 2019 (Dubna, Russia)

“Convolutional neural network for centrality in fixed target experiments”

NA61/SHINE CERN Analysis/Software/Calibration Meeting 2019 (Katowice, Poland)

“Convolutions neural nets for centrality in Be+Be”

Science And Progress 2018 (Saint Petersburg, Russia)

“Investigation of Deep Learning methods for the classification of events in the NOvA experiment”

JINR Summer Student Program 2018 (Dubna, Russia)

“Investigation of Deep Learning methods for the classification of events in the NOvA experiment”

MAIN PUBLICATIONS

- “Adaptive Distributed Cluster Flow Control for a Group of Autonomous Robots”, The 22nd IFAC World Congress, 2023
- “Compressed Cluster Sensing in Multiagent IoT Control”, 61st IEEE Conference on Decision and Control, 2022
- “Cluster Control of Complex Cyber-physical Systems”, Cybernetics and Physics, 2021
- “Cluster Flows and Multiagent Technology”, Mathematics, 2021
- “Invariance preserving control of clusters recognized in networks of Kuramoto oscillators”, Artificial Intelligence, 2020
- “Convolutional neural network for centrality determination in fixed target experiments”, Physics of Particles and Nuclei, 2020