Daniil Medyakov

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Education

- **Moscow Institute of Physics and Technology** Moscow, Russia
  Bachelor of Applied Physics and Mathematics *Sep 2020 - June 2024*
  - **GPA**: 4.65/5.00

Work Experience

- **Internship in Machine Learning Department, MBZUAI** Mar 2024 - Apr 2024
  Researcher
  Scientific research in the field of machine learning and optimization.
- **Laboratory of Mathematical Methods of Optimization MIPT, MIPT-Yandex Laboratory** Aug 2023 - Present
  Researcher
  Scientific research in the field of optimization.
- **Lyceum, St. Petersburg** Sep 2020 - Sep 2022
  Tutor
  Additional lessons in Olympiad mathematics, physics and programming.

Projects

- **Robust learning with byzantine workers** Mar 2024 - Present
  Optimization Python
  Development of a robust algorithm for federated learning under conditions, when there are Byzantines in the network.
- **Optimal data splitting** Feb 2023 - Sep 2023
  Optimization Python
  Recently, a lot of work on distributed optimization has focused on reducing the large cost of communication. But all results solve the communication bottleneck by focusing only on the fact that communication is significantly more expensive than local computing and does not take into account the various capacities of network devices and the different relationship between communication time and server capacity. We consider this problem an the objective of this study is to achieve an optimal ratio of distributed data between the server and local machines for any communication costs and local computations. The running times of the network are compared between uniform and optimal distributions. The superior theoretical performance of our solutions is experimentally validated.
- **Summer school "Management, Information and optimization" named after B. T. Polyak** Jul 2023 - Jul 2023
  Optimization Python
  Participated in the B. T. Polyak Summer School and presented a poster session with a paper on optimal data splitting.
- **Shuffling methods** Aug 2023 - Present
  Optimization Python
  Work is in progress to apply the shuffling method to variance reduction and coordinate methods. Nowadays, it is practically obtained that many stochastic methods converge fast if we apply the shuffling technique to them. The aim of the paper is to prove better theoretical estimates of the convergence of these methods, thereby showing that methods with shuffling perform better than without it.
- **Database** Sep 2020 - Dec 2020
  Microsoft SQL Server Metadata Transactions Triggers Optimization
  Created a database in SQL for a conditional poster of performances in famous theaters as a **graduation project** for a course at the MIPT. In addition to creating a DBMS, the following topics were worked out: Manipulating data, Creating and using views, Managing transactions, Managing access, Fetching metadata, Creating and using triggers, Using indexes and query optimizers.
- **School projects** Sep 2019 - May 2020
  Engineering C AutoCAD
  Mini-rocket
  Designed a model of a mini-rocket in AutoCAD. Inside the rocket there were sensors for measuring temperature, humidity, an axylometer, etc. The sensors transmitted data to a computer using a controller. The controller was programmed in C. The rocket was launched to a height of 150 meters and successfully parachuted to the ground.

Achievements

- **Mathematics Olympiads:**
  Various Olympiads of levels 1, 2, and 3 from the list of the Russian Council of Education of Schoolchildren, including the MIPT Olympiad

Extracurricular activities

- **McKinsey case championship**
  Case Format: **Letter of Proposal** of a Zinc mining company. The following stages were completed during the project:
  Directions for medium-term **revenue increase** are proposed and **in-depth analysis on Python** was carried out
  Suggested directions for **long-term revenue growth** and approach to solving the problem of **entering new markets**
- **Changellenge It cup 2021 case championship**
  The task of linguistic learning was accomplished. It was required to understand which type of connection belongs to the sentence: consequence, contradiction, independence of statements.
- **Nuclear power plant**:
  As part of a three-day case championship, as part of a team of 10 people designed a model of a nuclear power plant in the conditions of the far north of Russia. In the course of the work, the most advantageous location of the power plant was calculated, an economic assessment of the benefits of its operation was carried out, and its model was created in VR.
- **Hobbies**
  Music (6 years in Music School), Chess(1st category), Figure Skating(vice master), Football, History, Automobiles, Architecture

Courses

- **Modern numerical optimization methods**: from **MIPT**
- **C++ Engineering**: from **MIPT**

Technical Skills

- **Programming**: Python, C++, C, SQL
- **Libraries**: Numpy, Pandas, MatPlotLib, SciPy, Scikit-learn
- **Knowledge**: Calculus, Linear and Higher Algebra, Differential equations, Numerical Optimization, Algorithms and Calculation models, Probability Theory, Complex Analysis, Functional Analysis, Parallel Computing
- **Languages**: Russian(native), English(B2)