Yakov **Dementyev**

Robotics Engineer · Backend Engineer · Data Scientist

Innopolis, Republic of Tatarstan, Russia

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Education

Innopolis University — *Innopolis, Russia*

B.S. in Computer Science and Engineering — *August 2021 - May 2025*

- During studies I studied comupter architecture, operating systems, machine learning
- In the middle of studies I went to the robotics track.
- During robotics studies I studied control theory, modeling of systems, digital signal processing, CAD-modeling, microcontroller programming, computer vision
- Currently writing thesis on topic ”Visual stimuli reconstruction from human brain EEG data via Spiking Neural Networks”

Skills

Back-end	FastAPI, Django, REST API, PostgreSQL, TCP/IP, RabbitMQ, Redis, Clickhouse, Docker
Programming	Python, C/C++, LaTeX, Julia
Robotics	Control Theory, Microcontrollers, CAD (SiemensNX), Autonomous mobile robots, Computer vision, ROS1/ROS2
Machine Learning	Pytorch, Tensorflow, Computer vision, NLP, LLM, Classical algorithms, Deep learning
Languages	Russian, English, Swedish
Soft skills	Literature analysis, Critical thinking, Self-reflection
Hard skills	Clean code, Clean architecture, TDD

Experience

Invian — *Innopolis, Russia*

Junior Backend Developer — *April 2024 - June 2024*

- The company is engaged in analyzing traffic on the roads and controlling traffic signals.
- Architecture of the projects was following TDD.
- Stack of technologies used: FastAPI, InfluxDB, telegraf, Redis, pytest, pydantic.
- I have been working on adding recurring tasks to an existing service using telegraf and Dramatiq.
- I developed a service to create a matrix of correspondences for intersections in the form of an Excel spreadsheet, after which it was wrapped in an API for frontend use. Also added authorization requests to the API.
- I was writing unit tests for a service that interacts with InfluxDB.

Extracurricular Activity

Hackathon ”Цифровой прорыв. Сезон: Искусственный интеллект (ПФО)” — *Perm, Russia*

Machine Learning Engineer — *October 2023*

- The main objective was to find a solution to the problems of detecting and tracking solid waste items in the multispectral images.
- The YOLOv8 model was used to solve the detection problem.
- My task was to manage the team within the machine learning and data preprocessing tasks.
- I researched current models and methods for solving detection and tracking problems.
- I analyzed the data as it was fed in a non-standard format due to channels other than RGB.
- I dealt with augmentations of the input data.
- I modified the YOLOv8 model from the Ultralitycs library to allow it to accept eleven-channeled images.
- After expert evaluation our solution was ranked second.

Hackathon VTB MoreTECH 5.0 *Online*

Backend Engineer *October 2023*

- The task was to display VTB Bank branches in a user-friendly interface to make it easier to find the most suitable branch.
- Our team used Flutter to write the mobile app and FastAPI to write the backend part.
- To find the best branch, our team decided to use two metrics: branch occupancy and the time it takes for a customer to get to the branch by the chosen mode of transportation.
- To measure branch occupancy, we suggested using surveillance camera images every twenty minutes, to count the number of people and keep statistics in case of system failure.
- In the course of my work, I integrated a microservice that tracks the occupancy of bank branches. For integration I used RabbitMQ.
- Our team made it to the finals (top 10), but did not win any places.

Hackathon "Цифровой прорыв. Сезон: Искусственный интеллект (Международный)" *Online*

Machine Learning Engineer *November 2023*

- The task of the hackathon was to identify infrastructure objects in satellite images.
- I managed a team within the machine learning and data preprocessing tasks.
- During the hackathon, I studied the literature to test out-of-the-box models for our task, unfortunately for the methods proposed in the research, we lacked time and computational resources, so it was decided to fine-tune a pre-trained model.
- Our solution was a trained Unet model.

Hackathon IT Inno Hack *Online*

Machine Learning Engineer *September 2024*

- We were given the task of merging records.
- The data were three databases with information about people, it was necessary to merge the records related to the same person.
- The data were corrupted: some records had missing fields, others had typos, and sometimes words could be duplicated.
- An important problem was that 11 million records had to be analyzed in 20 minutes.
- I researched the literature related to our topic and the methods used to solve the Record Linkage problem.
- The solution to the problem was to use the Expectation-Maximization algorithm with Levenshtein distance.
- After evaluating the solutions, our team came in fourth place with a minimal gap from the winners.

Hackathon "Цифровой прорыв. Сезон: Искусственный интеллект (ПФО)" *Nizhniy Novgorod, Russia*

Machine Learning Engineer *October 2024*

- The task was to detect flooded regions and infrastructure on multispectral satellite images. from satellites.
- In addition, one of the metrics was to count the number of houses that were flooded.
- I was engaged in reviewing research relevant to our task.
- During the solution, I implemented an algorithm that utilizes the surface reflectance features through a modified co-occurrence matrix for color images, as well as an algorithm to train a generative-adversarial network.
- As a solution, we provided a generative-adversarial network with the Unet model as the generator.
- As a result, our team took the seventh place.

Honors & Awards

2023 **2nd Place**, Hackathon "Цифровой прорыв. Сезон: Искусственный интеллект (ПФО)" *Perm, Russia*

2023 **Finalists**, Hackathon VTB MoreTECH 5.0 *Online*

2024 **Finalists**, Hackathon IT Inno Hack *Online*

Certificates

2020 **Honors student**, Yandex Lyceum