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

Pyparse, Evotech   *Yekaterinburg (Online), Russia*

BACKEND DEVELOPER   *July 2020 - August 2021*

- A project for auto parts distributors, with the primary goal of creating a service for searching and purchasing auto parts from a list of online store websites, as well as tracking orders.
- My responsibility was to develop a worker and a page parser in Python, which sent requests to websites and extracted the necessary information. The task was complicated by the fact that most of the websites did not have open APIs.
- Initially, the task was implemented by other developers, but the solution lacked full functionality (only supported parts search) and was very slow (taking around 10–15 minutes per request) as it was developed using Selenium.
- Technologies used: FastAPI, asyncio, BeautifulSoup, as well as HTML and JavaScript for parsing.
- My responsibilities included: developing a worker to receive tasks from the main application, developing parsers for websites, and implementing the logic for order processing.
- As a result, we created a scalable project architecture where adding a new order source no longer required considering functionality beyond parsing. We optimized the application, reducing the time per request to about 30 seconds instead of 10–15 minutes.

Software Project, Innopolis University   *Innopolis, Russia*

BACKEND DEVELOPER   *June - July 2022*

- As part of the Software Project course, we developed a project titled "Reusable Learning App."
- The main goal of the project was to provide a template application for educational materials that could be extended further. Examples like Duolingo and Brilliant were taken as references.
- My tasks included developing an API for the mobile app with functionalities for user registration and authorization, adding and modifying educational materials, and implementing a course system and an experience system to track course progress.
- Technologies used: Django, Django REST Framework, PostgreSQL, Docker.

Capstone Project, Innopolis University & Gazpromstroy   *Innopolis, Russia*

BACKEND DEVELOPER & ML ENGINEER   *June - July 2023*

- As part of the Capstone Project course, we developed a service for Gazpromstroy.
- The main goal of the project was to create a system for recognizing markings on pipes.
- The task was challenging due to the markings being manually applied by different people using various tools (markers, stickers, etc.), and the symbols were often worn out due to long exposure to harsh conditions.
- My responsibilities included preparing data for training the recognition model, data annotation, selecting the most suitable model, and developing an API for user authorization functionality.
- Technologies used: OpenCV, CVAT, PyTorch, MMOCR, FastAPI, PostgreSQL, Docker.

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.

TourManager

Innopolis, Russia

BACKEND DEVELOPER

June - September 2024

- An application designed to simplify the internal processes of tour companies. It allows managers to create excursions with all the necessary information, and tour guides can view their excursions and details.
- My responsibilities included developing a new backend, as the old one had limited functionality and a poorly scalable architecture.
- As a result, I developed an architecture adhering to Domain-Driven Design and Robert C. Martin's Clean Architecture principles.
- Technologies used: FastAPI, adaptix, SQLAlchemy, PostgreSQL, pydantic, Redis.

Extracurricular Activity

Game Jam Pyweek 35

Online

GRAPHICS ENGINEER

March 2023

- The task of the game jam was to create a game in Python on the theme "In the shadows."
- My responsibilities included developing a lighting and shadow system, and later I took on the task of implementing the mechanics for enemies chasing the main player.
- Technologies used: OpenGL, Arcade.

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	