Ekaterina Antipushina

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Experience

Applied AI Institute, Spatial Intelligence Lab Jan 2025 – Present

Machine Learning Engineer *Moscow, Russia | Hangzhou, China*

- Developed a 3D spatial grounding pipeline using large vision-language models (Qwen, GPT) for object localisation in ScanNet scene graphs, combining Chain-of-Thought reasoning with pre-computed spatial distances to resolve complex relational queries (above, below, farthest, closest, between)
- Designed a few-shot CoT prompting strategy with automatic distance injection between candidate objects, improving spatial reasoning accuracy across 11 relation types in the SR3D+ benchmark
- Implemented dual-pass evaluation framework comparing ground-truth vs. predicted scene labels, with scene graph prompt generation, adaptive query-aware filtering, and structured output parsing for large-scale annotation-free grounding assessment ($+15$ IoU and $+20\%$ accuracy improvement over the no-GT baseline on SR3D+)

University of Sharjah Jun 2024 -Dec 2024

ML Research Engineer *Sharjah, United Arab Emirates | Moscow, Russia*

- Designed the architecture of a foundation model for multi-channel time-series data, tailored for physiological signals.
- Led a team of statisticians in a project identifying pharmacological biomarkers; developed ML solutions for analyzing neuron-glia interactions in brain pathologies.
- Conducted full-cycle data analysis: hypothesis formulation, EDA, feature selection, model building, and validation.

Center for Bio- and Medical Technologies Jun 2024 – Dec 2024

Researcher *Moscow, Russia*

- Developed pyOpenNFT, an open-source Python framework for real-time fMRI neurofeedback, replacing MATLAB dependencies and improving performance via parallel architecture.
- Created a FastAPI prediction server with RESTful interface and LSL integration for real-time EEG-fMRI predictions.
- Implemented cross-platform solutions (Windows/Linux) optimized with NumPy+MKL.
- Built data processing pipelines for physiological signal analysis in emotional regulation studies.

Applied AI Center, Skoltech Sep 2023 – Dec 2023

ML Research Engineer *Moscow, Russia*

- Developed Rest2Task generative framework for synthesizing task-based fMRI from resting-state scans using VAEs and GANs.
- Created an end-to-end schizophrenia prediction tool based on multimodal neuroimaging with early/late fusion.
- Applied Topological Data Analysis (TDA) and Manifold Learning to extract geometric features from fMRI data.
- Configured Docker environments and integrated Wandb for experiment tracking.

AIRI 2023

Intern Data Engineer *Moscow, Russia*

- Conducted EDA on neuroimaging data to identify significant patterns and correlations.
- Developed and fine-tuned machine learning models for fMRI data analysis.
- Implemented data fusion methods to combine different types of neuroimaging data.

Projects

Speech Enhancement via Knowledge Distillation | *PyTorch, WavLM* 2025

- Developed a speech denoising system using knowledge distillation techniques between models.
- Utilized VoiceBank+DEMAND dataset with 10 noise types and combined loss functions.

Multimodal Models for Niche Domains | *Stable Diffusion, GILL, TinyLLaVA* 2024

- Fine-tuned multimodal models for specialized applications in narrow domains.

Selected Publications

Antipushina E., et al. pyOpenNFT: an open-source Python framework for ML-based real-time fMRI and EEG-fMRI neurofeedback 2025

- A* conference MICCAI 2025, Lecture Notes in Computer Science, Springer

Antipushina E., et al. CSTNet: A Generative Framework for EEG-to-ECoG Mapping via Optimal Transport 2025

- A* conference MICCAI 2025, Lecture Notes in Computer Science, Springer

Skills

Languages: Russian (Native), English (Fluent), Korean (Intermediate)
Programming: Python, Bash
Technologies: PyTorch, TensorFlow, Scikit-learn, Pandas, NumPy, Docker, GitLab, Wandb, FastAPI
Concepts: Deep Learning, Generative AI, Neuroimaging (EEG/fMRI), Foundation Models, Multimodal Learning
Soft Skills: Mentoring, Cross-cultural Communication, Adaptability, Team Leadership