ELSUN NABATOV

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RESEARCH INTERESTS

I am interested in neuro-AI, computational neuroscience and uncertainty-aware decision systems, especially how intelligent agents, biological or artificial, form reliable representations from incomplete or noisy sensory data. My work combines generative modeling, optimization, and causal inference to study perception, communication impairments, and robust inference in complex environments. I aim to develop principled models that connect neural information processing with co-designed sensing and decision systems for health, mobility, and intelligent infrastructure

EDUCATION

Newcastle University (United Kingdom) **September 2023 - August 2024**
Master's, Data Science (Specialization in AI) *GPA: 3.9/4.0*

- Built and evaluated end-to-end ML pipelines during advanced coursework in Deep Learning, Cloud ML Engineering and Big Data
- Conducted independent GenAI research projects, including a hybrid GAN-Diffusion model for 3D medical image reconstruction
- Awarded a prestigious government scholarship valued at over $100,000 for academic excellence

Yildiz Technical University **October 2021 - July 2023**
Master's, Quantitative Economics *GPA: 3.6/4.0*

- Courses: Artificial Intelligence in Quantitative Economics, Calculus II

Azerbaijan State Economics University **September 2017 - July 2021**
Bachelor's, Economics *GPA: 95.12/100*

- Courses: Economic Forecasting, Econometrics, Mathematics, Statistics I & II

AWARDS & ACCOMPLISHMENTS

- Selected as one of 100 researchers worldwide for the Mediterranean ML Summer School (**sponsored by Google DeepMind, NeurIPS, Jane Street**), including travel scholarship and poster presentation
- Earned **Distinction in MSc Artificial Intelligence at Newcastle University** (awarded to top-performing graduates)
- **2023 State Program for the Education of Youth at Prestigious Universities of Foreign Countries:** Total costs for a master's degree at Newcastle University, covering visa application fees, tuition, living expenses, and travel allowances
- **Türkiye Government Scholarship (YTB – Graduate Scholarship Program):** Covers full tuition, monthly stipend, health insurance, dormitory, Turkish language training, and round-trip travel. Award Number: 21AZ003711
- **2017 Government scholarship:** Total cost for a bachelor's degree at Azerbaijan Government University, covering four year university tuition, and living expenses.

PUBLICATIONS & POSTER

Physics-guided Hybrid GAN–Diffusion with Vision–Language Assistance for 2D to 3D Brain Reconstruction (Poster) *2025 - Present*
M2L Summer School (Google Deepmind)

- A physics-guided hybrid GAN–Diffusion model reconstructs 3D brain volumes from 2D X-rays, integrating vision–language guidance for interpretability and uncertainty estimation, achieving fast, accurate, and reliable low-dose volumetric imaging.
- *Link to project*

The economic and operational impacts of artificial intelligence on agriculture **United Kingdom**
AI & Society (Q1, Impact factor: 4.9) *2025 - Present*

- This study investigates the transformative role of artificial intelligence (AI) technologies
- *Link to project*

Using Machine Learning to Enhance Productivity in Turkey: Insights on the Importance of Soil Moisture, Temperature and Precipitation Patterns *2024 - Present*
International Journal of Environmental Science and Technology (Q1, Impact factor: 3.4)

- *Link to project*

The Analysis of the Relationship Between Money Supply, Budget Deficit and Inflation Rate in Azerbaijan *2022 - Present*
International Journal Business and Economics Research
- *Link to project*

Institutional Base and Infrastructure Development for Non-Cash Payments in Azerbaijan *2020 - Present*
Academic Journal of Economic Studies
- *Link to project*

WORK EXPERIENCE

Multiverse Computing **San Sebastian, Spain**
Machine Learning Engineer *October 2025 - Present*
- Designed and deployed **quantum-inspired optimization models** and **multi-agent RL systems** that improved policy planning accuracy by **25%** in government-scale simulations, using techniques such as QAOA-style heuristics, actor–critic RL, and distributed agent coordination.
- Built **LLM-driven optimization pipelines** integrating constraint-solving, numerical reasoning, and retrieval-augmented decision modules, reducing scenario-analysis time by **40%** for large-scale operational tasks.
- Implemented **hybrid classical–quantum workflows** for combinatorial optimization and forecasting, improving solution quality by **15–20%** compared to classical baselines on benchmark resource allocation problems.

Yandex **Istanbul, Turkey**
Data Scientist/ML Engineer *November 2024 – October 2025*
- Reduced hallucination rate by 30% in production by designing and deploying Yazeka, a Turkish GenAI assistant built with RAG pipelines, FAISS vector search, and RLHF-tuned LLMs. Fine-tuned multilingual models using LoRA and PEFT methods for efficient memory use and reduced training time.
- Improved retrieval latency by 40% and search coverage by 20% through a hybrid neural + keyword search pipeline built with FastAPI, Docker, and PyTorch, now serving 10M+ users.
- Cut manual review costs by $1M+/year by training and deploying an XGBoost NLP classifier for URL categorization (95% precision), processing millions of URLs per week.
- Boosted CTR by 12% and reduced bounce rate by 15% by leading development of a deep learning–based ranking model and integrating it into the search engine with A/B testing & MLflow monitoring.

PRODATA **Tel Aviv, Israel**
Senior Data Scientist *October 2022 - August 2024*
- Prevented $3M+ in annual churn-related losses by deploying customer retention models using logistic regression, XGBoost, and customer behavioral data in production.
- Accelerated model refresh by 35% via automated ETL and ML pipelines using Databricks, Airflow, and MLflow, reducing latency in reporting and retraining cycles.
- Localized voice AI systems for the Azerbaijani language by fine-tuning OpenAI Whisper for STT and VITS for TTS, achieving over 92% transcription accuracy and high-fidelity speech synthesis for internal conversational AI tools.

Presidency of the Turkey Republic **Ankara, Türkiye**
Quantitative Analyst *June 2022 - October 2022*
- Developed data-driven strategies to optimize government infrastructure, reducing costs by 20%. Delivered financial models for forecasting inflation's impact, improving planning accuracy by 17%
- Collaborated with cross-functional teams to build data-driven strategies, leveraging ML models to optimize government infrastructure, reducing costs by 20% through improved data utilization.

SKILLS

Machine Learning & AI: Supervised and unsupervised learning (Random Forests, Gradient Boosting, Decision Trees, K-Means), Neural Networks (RNN, CNN, LSTM), Generative AI, NLP, Text Mining, GPT, RAG, Computer Vision, Causal inference, LangChain, LangGraph
Data Science Tools: Python (scikit-learn, Pandas, NumPy), Jupyter, Spark/Scala, PostgreSQL, ELK, Matplotlib
Big Data & Cloud Technologies: SQL, PostgreSQL, Airflow, Apache Spark, Hadoop, AWS, Google Cloud Products (GCP), Microservices-oriented architecture, Batch ML pipelines
Data Visualization & Analytics: Tableau, Power BI, Looker, QlikView, Grafana
Soft Skills: Communications, Storyteller, Decision-maker, Leadership, Teamwork, Time Management, Critical Thinking, Creativity, Emotional Intelligence, Adaptability, Problem-Solving
Languages: Russian, Turkish, Azerbaijani, English