Roman Knyazhitskiy

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Summary

Master's student with a passion for Machine Learning and Robotics. Experienced in prototyping applications using LLMs, computer vision, and implicit neural representations. Skilled in translating research concepts into tangible, user-facing prototypes, demonstrated through projects like a real-time sign language interpreter and an LLM-powered literature search engine.

Education

MPhil in MLMI (Machine Learning), University of Cambridge 10/2025 - 09/2026

BSc Computer Science and Engineering, TU Delft 09/2022 - 07/2025

- GPA: 8.7/10. Distinction (cum laude, top 5%) + Honours.

Work Experience

Machine Learning Engineer, Delft Mercurians 05/2023 - 09/2025

- Started as an individual contributor, then grew a team of ML control up to 5 people.
- Developed a PyQt interface for Kalman filter calibration, enabling interactive data visualization.
- Integrated Python-based ML models into a performance-critical Rust codebase.
- Built and maintained a JAX-based differentiable physics simulator for training control models.

Research Associate, TU Delft 03/2023 - 08/2025

- Researched applications of Large Language Models in software engineering, focusing on code generation.
- Investigated transformer-based Prior-Data Fitted Networks (PFNs) and participated in research discussions on diffusion models for generative tasks.

Applied Machine Learning Intern, Central Robotics Institute 06/2021 - 07/2021

- Developed a computer vision tool to convert images into line art for a robotic drawing application.

Selected Projects

Silver-qt: Sign Language Recognition System, Python, PyQt, Computer Vision, ONNX 2019

- Developed a consumer-facing application for real-time sign language recognition from video streams.
- Built a cross-platform GUI with PyQt5/QML and used ONNX Runtime for optimized ML model inference.
- Implemented a multi-stage vision pipeline: YOLOv5 for hand detection, Autoencoder for feature extraction, and an LSTM for sequence classification.

Spectral: Speech Analysis Web Platform, Python, FastAPI, SvelteKit, Docker 2024

- Built and deployed a full-stack, containerized web platform for atypical speech analysis.
- Designed a microservices architecture with a Python/FastAPI backend and a SvelteKit frontend, enabling researchers to upload and analyze audio data through a user-friendly interface.

Better Literature Search Project, LLMs, Embedding Models, Python 2024

- Co-founded a startup building a user-facing literature search engine similar to Elicit.
- Designed and prototyped a system using embedding models for semantic filtering and an LLM for final paper scoring and ranking, demonstrating a passion for building intelligent products.

Publications

[1] J. Luijmes, A. Gielisse, R. Knyazhitskiy, and J. van Gemert. ARC: Anchored representation clouds for high-resolution INR classification. In *ICLR 2025 Workshop on Weight Space Learning*, 2025. Accepted.

[2] R. Knyazhitskiy and P. R. Van der Vaart. A simple scaling model for bootstrapped DQN. 2025. Under review.

Honours and Awards

- **1st Place**, Bunq Hackathon 6 (2025).
- **2nd Place & Special Prize**, Epoch AI Hackathon (2024).
- **Silver Medal**, AIIJC International AI Competition for Juniors for Sign language recognition app.
- **Best Software Solution**, RoboCup World Championships, Sydney (2019).

Open Source Contributions

- Enhanced functionalities in Google's jaxtyping and Equinox, resolving multiple issues.
- Contributed to Gymnax, a widely used JAX RL environments collection.
- Improved libccd (C++ collision detection library) by fixing a critical infinite loop bug.