

Roman Knyazhitskiy

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Summary

Machine Learning Engineer with experience in PyTorch/JAX and deep learning. Developed ML systems for robotics and reinforcement learning, focusing on model optimization and scaling. Proficient in Rust/C++ for systems programming and contributed to open-source ML libraries. Research background in AutoML, Meta Learning, and LLM applications.

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. Cum Laude + Honours.

Work Experience

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

- Researched LLM applications for code analysis and vulnerability detection
- Investigated Prior-Data Fitted Networks and MCMC/VI hybrid methods
- Delivered talks on optimization methods, induced norms and higher-order optimizers

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

- Implemented Model Predictive Control system for real-time trajectory optimization
- Built JAX+Equinox differentiable simulator for robot dynamics
- Integrated JAX ML models into Rust codebase with tokio threading

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.

Selected Projects

Bootstrapped DQN Scaling Laws, 2025

- Ran empirical study of bootstrap-based exploration across 40,000 configurations
- Identified scaling law explaining 80% of time-to-convergence variance
- Implemented mixed precision training and automatic multi-GPU sharding

Nano JAX GPT, 2023

- Implemented GPT with custom Flash Attention in JAX and multi-device sharding
- Used optimization techniques including early-exit decoding and multi-token prediction

IEFT-PFN: Inference Efficient Freeze-Thaw Prior Fitted Networks, 2025

- Built transformer system for hyperparameter optimization using in-context learning

- Implemented three spatial weighting schemes for multi-curve aggregation
- Obtained 15-20% improvement over baseline with learned attention weighting
- Used gradient accumulation and automatic mixed precision for training

Weather forecasting and option trading system,

2025

- Built algorithmic trading system integrating probabilistic ML models
- Implemented Continuous Normalizing Flow with neural ODEs for uncertainty-calibrated predictions
- Used imprecise probability bounds under Dempster-Shafer theory for decision-making

Open Source Contributions

- Contributed features to [jaxtyping](#) and [Equinox](#)
- Contributed to [Gymnax](#), a JAX RL environments collection
- Fixed infinite loop bug in libccd collision detection library (C++)

Honours and Awards

- **1st Place**, Bunq Hackathon 6 (2025) – Team of 4 against 50+ teams, €30,000 prize
- **2nd Place & Special Prize**, Epoch AI Hackathon (2024)
- **Silver Medal**, AIJJC International AI Competition for Juniors