Vince Németh

Applied Data Science & AI Student | Full-Stack ML Engineering | Real-World Industry Projects

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Professional Summary

AI Engineer and Applied Data Science student with hands-on industry experience delivering production-grade AI systems. My expertise lies in full-stack AI development: from training custom Transformer models and deploying computer vision pipelines, to orchestrating self-hosted infrastructure. Specialised in deep learning, NLP, robotics integration, and end-to-end ML deployment; building RAG systems for engineering documentation, autonomous phenotyping pipelines, and interpretable ML solutions for industry partners.

Core Competencies

Core & Backend: Python, SQL, FastAPI, PostgreSQL, PySide6 (Qt)

AI & Deep Learning: PyTorch, TensorFlow, Transformers (RoBERTa), CNNs, ResUNet, ResNet50, LSTM, RAG Systems, ChromaDB, MediaPipe, Time Series Analysis

NLP & Language Models: LLMs, Custom Embeddings, Sentiment/Emotion Classification, Speech-to-Text, Machine Translation

Robotics & Control: PID Control Systems, Reinforcement Learning, Opentrons OT-2, Hardware Integration

DevOps & Infrastructure: Docker, Linux/Bash, Git, CI/CD, Traefik, Self-Hosting

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Professional Experience

Freelance Software Engineer

2023 – Present

CineSlice — Desktop video frame extractor with multi-threaded FFmpeg pipeline (Python, PySide6)

Infrastructure Monitor — Self-hosted alerting and monitoring system with Docker, Traefik, and SEO validation

Junior Software Developer

Valeo | Jul 2025 – Aug 2025

Developed custom applications for engineering teams to improve testing and data analysis workflows.

- Built tools to analyse large volumes of test data (1M+ records across 100+ product SKUs) with automated anomaly detection, trend analysis, visualisation, and reporting
- Developed Cpk process capability analysis application used by 2 engineering teams, replacing manual spreadsheet workflows for production-line evaluation
- Contributed to project feasibility assessment and digitisation strategy

Supplier Quality Assurance Assistant

Valeo | Jun 2024 – Jul 2024

- Supported 3 supplier audits, identifying quality deviations across production batches
- Worked with quality control analytics and production data workflows
- Gained insight into quality control logic used in industrial automation

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Featured Projects

Tobroco-Giant — AI Documentation Assistant

Academic Industry Project | Breda University of Applied Sciences

- Designed and deployed a semantic search and Retrieval-Augmented Generation (RAG) system for engineering manuals, enabling intelligent document querying and AI-assisted authoring.
- Built FastAPI backend with ChromaDB vector database for semantic retrieval
- Implemented AI-assisted authoring and intelligent document querying workflows
- Delivered working prototype to stakeholders; project advancing to professional deployment phase

- Tech: Python, FastAPI, ChromaDB, RAG, LLM, Custom Embeddings

NPEC — Autonomous Plant Phenotyping Pipeline

Academic Industry Project | Breda University of Applied Sciences

Developed an autonomous pipeline for the Hades robotic system, combining deep learning with robotic control for high-throughput plant phenotyping at the Netherlands Plant Eco-phenotyping Centre.

- Built Deep ResUNet model for Arabidopsis root segmentation
- Implemented PID and Reinforcement Learning-based control systems for the Opentrons OT-2
- Integrated computer vision pipeline into a complete system that detects root tips and performs precise inoculation

- Tech: Python, PyTorch, Deep ResUNet, PID Control, Reinforcement Learning, Opentrons OT-2

Latent Space: Through the Eyes of the Algorithm

Academic Industry Project | Breda University of Applied Sciences

Interactive art installation that transforms human gaze into AI-interpreted artwork. Eye movements are tracked via MediaPipe and rendered as abstract strokes, classified with ResNet50, and interpreted through custom LLM prompts generating psychoanalytical readings, culminating in a thermal print keepsake.

- Tech: Python, MediaPipe, ResNet50, LLM, Computer Vision

Hungarian Video Emotion Classification Pipeline

End-to-end NLP pipeline processing Hungarian YouTube videos through audio extraction, speech-to-text (AssemblyAI), translation (Helsinki-NLP OPUS-MT), and 7-class emotion classification using RoBERTa-generated embeddings fed into a trained LSTM classifier.

- Tech: Python, Transformers, RoBERTa Embeddings, LSTM, AssemblyAI, Helsinki-NLP OPUS-MT

AI Stock Forecasting Dashboard (Digital Advisor)

AI-powered predictive system for real-time stock movement forecasts using LSTM models, backed by PostgreSQL and served through a FastAPI dashboard interface.

- Tech: Python, PyTorch, LSTM, PostgreSQL, FastAPI

Automated Vehicle Damage Classifier

Deep learning image classifier for automated car damage assessment, detecting cracks and dents with potential to expand to scratches, broken glass, flat tyres, and lamp damage.

- Tech: Python, PyTorch, CNNs, Image Classification

Education

BSc Applied Data Science & Artificial Intelligence

Breda University of Applied Sciences | 2024 – Expected 2027–2028

Focus: Deep Learning, NLP, Computer Vision, Robotics, MLOps, Research Methodology

Key coursework: Introduction to AI & Data Science, Machine Learning Fundamentals, Deep Learning & Image Classification, Data Science Lifecycle, Natural Language Processing, Computer Vision & Robotics, Research Methodology, MLOps & Cloud Computing

French Bilingual Faculty

Vetési Albert Gimnázium | 2019 – 2024

Advanced Mathematics and Computer Science

Certifications & Languages

- Cambridge CAE – C2 (Score: 190)
- English (C2) | Hungarian (Native) | French (Intermediate)

Personal Projects

- **TrueNAS Server** — ZFS-backed NAS with Docker services and automated backups
- **2D Strategy Game** — Turn-based strategy with procedural map generation and AI opponents in Godot Engine (GDScript)
- **Data Science Library** — From-scratch DataFrame implementation in pure Python for understanding internals