

# Patrik Valach



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[linkedin.com/in/patrik-valach/](https://linkedin.com/in/patrik-valach/) | Slovak (EU) National

**MSc Information Systems @ UZH** | Agentic AI | Data Science & ML |  
Software Engineering | Knowledge Graphs

Expertise in data science & software engineering with hands on business understanding. Driven by a sense of innovation and responsibility about projects and value delivery. With a track record of adaptability and embracing challenges in diverse environments and fields. From enterprise data teams and medical AI research to co-founding an investor-backed fintech startup.

## Professional Experience

### Software Engineer

07/2024 - 05/2026

[Bora IT Solutions, Frankfurt am Main, Germany](#)

- Co-founder of a B2B fintech startup venture
- Leader of software development
- Secured pre-seed investment for development of infrastructure
- Development of custom fintech systems, vision was to use our investor-entrusted projects as base running revenue and demonstration track record to then attract new customers from the Frankfurt financial hub, focusing on certifications, reliability and long life-cycle that would foster client retention and satisfaction
- Investor supported project included architecting and development of a digital wallet and prepaid card payment system with physical POS vendor support and cryptocurrency integration
- Wound down following co-founder's pivot

### Werkstudent: Data Scientist

07/2023 - 07/2024

[Lidl Digital International GmbH & Co. KG, Data Enablement Department, Neckarsulm, Germany](#)

- Team-designed and ran an internal AI hackathon centred on knowledge graph exploration, generating 9 project proposals across 3 participating departments with 40 participants
- Engineered end-to-end AI prompt pipelines and complex regex transformations for a media data architecture processing 50k+ product records, reducing manual transformation effort by ~97%
- Benchmarked 21 transformer-based text and image embedding models (Sentence-BERT, CLIP variants,...) for cross-article mapping, improving match accuracy by ~56% vs. rule-based system
- Partnered with 2 business departments to define data KPIs and produce technical documentation, enabling self-serve analytics for non-technical stakeholders

## Education

### Master of Science in Informatics (Current Grade: 5.3<sup>\*1</sup>)

08/2025 - Present

[University of Zurich \(UZH\), Zurich, Switzerland](#)

Expected: 08/2027

- Major: Information Systems | Minor: Informatics

### Bachelor of Science in Information Engineering (Grade: 2.2<sup>\*2</sup>)

10/2022 - 09/2025

[Technical University of Munich \(TUM\), Heilbronn, Germany](#)

- Computer Science & Management | Focus: Data Engineering, LLMs, Machine Learning
- Erasmus+ Exchange (1 Semester): Arctic University of Tromsø (UiT), Tromsø, Norway
- Thesis: *Learned Verification of SPARQL Translations (URL)*, Professorship of Data Engineering

### English Bilingual Gymnasium

2017 - 2022

[High School Evangelical Lyceum, Bratislava, Slovakia](#)

- Exchange year: Bundesrealgymnasium Neusiedl am See, Neusiedl am See, Austria

<sup>\*1</sup> Swiss grading system - 6.0 Best, 4.0 Minimum passing | <sup>\*2</sup> German grading system - 1.0 Best, 4.0 Minimum passing

## Publications

**Q-NL Verifier: Leveraging Synthetic Data for Robust Knowledge Graph Question Answering** (paper URL) (GitHub URL) - TUM Professorship of Data Engineering  
Co-authored | Volunteer Research

- Developed a verifier for natural-language-to-SPARQL translations using synthetically LLM-generated training data; demonstrated robust question answering over knowledge graphs
- Designed a reverse-translation LLM pipeline to generate NL↔SQL training pairs from human examples

## Projects

**Full-Stack AI Health tool** - PRECIOUS Platform extension - MSc Project (URL) **Present**  
Python | FastAPI | React | TypeScript | MCP | Wearable APIs | Local AI

- Designing and building a full-stack AI health tool for the PRECIOUS digital therapeutics platform, integrating wearable sensor data with phase-aligned interactive dashboards
- Architecting a personalised MCP-based AI health assistant enabling patients to query their own health data through agentic interface
- Conducting end-to-end user studies validating usability and clinical utility of the AI tool

**Decentralised Event Crowdfunding DApp** - UZH Blockchains & Overlay Networks **2026**  
Solidity | React | TypeScript | ethers.js | MetaMask | IPFS | Web3 | Ethereum | CI/CD

- Co-built decentralised crowdfunding platform on Ethereum Sepolia testnet with ERC20 token mechanics and multi-contract architecture; Solidity smart contracts + off-chain oracle for deadline enforcement
- Deployed live with 35+ CI/CD releases via Vercel; integrated IPFS for decentralised storage

**Multi-Layer News Network Analysis** — UZH Network Science (URL) **2026**  
Python | Selenium | NetworkX | Supabase | Pandas | Plotly | Louvain | Graph Analytics

- Scraped 16,400+ articles from NZZ.ch and ZEIT.de with full author and relational metadata into Supabase; constructed multi-layer co-authorship and citation graphs
- Applied Louvain clustering, centrality, assortativity analysis to reveal community structure, small-world properties and editorial organisation and delivered as visualisations

**SEET Match — Intelligent Mentor-Mentee Matching Platform** - Crisis Apps Hackathon **2025**  
TypeScript | Python | React | REST API | Multi-criteria Optimisation

- Designed system architecture of full-stack platform and 5-dimension scoring pipeline (academic, language, geography, age, gender) for SEET — an NGO matching refugee students with Swiss mentors

**Legal Vantage — Graph-RAG Legal Q&A System** (URL) **2024**  
LightRAG | Neo4j | Python | FastAPI | React | Docker | Graph-RAG | Vector Search

- Built a graph-based RAG system for legal document, combining Neo4j graph with a Nano vector store
- Designed Python API backend with agentic AI for generation and semantic indexing

## Technical Skills & Tools

|                  |                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------|
| Programming      | Python, Typescript/Javascript, SQL, SPARQL, Solidity                                                       |
| Web              | React, Next.js, Deno, Node.js                                                                              |
| Databases        | Neo4j, PostgreSQL, MongoDB, Snowflake, Supabase                                                            |
| AI / Agent Stack | LLMs, MCP, RAG, LangChain, Ollama, Cursor, Claude Code                                                     |
| ML & Data        | TensorFlow, PyTorch, PySpark, Scikit-learn, Pandas, NumPy, Hugging Face Transformers, SentenceTransformers |
| Infrastructure   | Git, Docker, Databricks, Apache Kafka, Jira                                                                |
| Management       | Scrum, Project Management and Documentation                                                                |

## Language Skills

|                     |                    |               |                   |
|---------------------|--------------------|---------------|-------------------|
| English Fluent (C1) | German Fluent (C1) | Slovak Native | Czech Fluent (C1) |
|---------------------|--------------------|---------------|-------------------|