



NARGES VAHDANI

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PROFESSIONAL SUMMARY

AI Engineer & Data Scientist with 5+ years of experience designing intelligent systems across geospatial platforms, agentic AI workflows, and predictive automation. Adept at combining LLMs, RAG, and real-time data pipelines to build solutions for climate science, urban planning, and intelligent architecture. Known for collaborative leadership, technical versatility, and a strong bias toward impact.

PROFESSIONAL EXPERIENCE

Master's Student & Data Engineer Intern | Zurich (2024–2025) | IBM Research

- Text-to-Geospatial SQL Pipeline: Designed an instruction-following system leveraging prompt engineering, chain-of-thought reasoning, and metadata enrichment to enhance the accuracy of geospatial SQL generation. Created a custom synthetic dataset (NL-to-SQL pairs) using IBM Granite, LLaMA, OpenAPI, and advanced prompting strategies. Fine-tuned IBM Granite 8B with QLoRA, then converted the model to GGUF and Ollama formats for efficient local deployment and inference.
- Agent-Bee (Agentic AI for Geospatial): Developed three modular tools for IBM's Agent-Bee framework—dynamic prompt generation, semantic dataset retrieval, and auto-parameter tuning—to empower agentic reasoning in IBM's Geospatial Studio. This work was done in collaboration with NASA, enhancing multi-agent orchestration and adaptive model usage for geospatial analysis.

Data Engineer Intern | Zurich (2023–2024) | Basler & Hofmann

- B&H Digital Twin (Bbtwin) Enhancement: Engineered a voxel-based CNN pipeline for point cloud segmentation, boosting object classification accuracy in 3D environments. Leveraged deep learning, Java, and labeled data fine-tuning, and streamlined the deployment with Docker and API integration for scalable workflows.
- Revit Automation with Agentic AI: Integrated PyRevit with an Agentic AI system, enabling chat-based task automation within Revit. This solution accelerated design workflows and automated data extraction, significantly improving operational efficiency in BIM-driven environments.

Research Assistant | Luzern (2023–2025) | iHomeLab

- Real-Time IoT Analytics for Smart Environments: Developed a deep learning-based system to analyze real-time sensor signals and predict the likelihood of an elderly person being present in a room, based on temporal and environmental patterns. Collected and trained models on household-specific datasets, using signal optimization, cleaning, and repair techniques. Enhanced performance using RAG-based similarity search, anomaly detection, and real-time inference to extract insights from noisy, heterogeneous data streams.

Technologies: Python, NumPy, SciPy, Deep Learning (custom CNN/RNN), Signal Processing, LLMs, and Fine-Tuned RAG

Market Analyst (Power BI & SAP) | Hamilton, Canada (2018–2021) | PMO Group

- Cross-Functional Leadership & Real Estate AI Analytics: Directed a sales and construction team, optimizing operations and strategic planning through data-driven leadership. Designed advanced analytics solutions using SAP, Power BI, and machine learning to model Toronto's real estate market trends. Integrated AI-driven risk assessment tools to guide client investment strategies during COVID-19, reducing uncertainty and maximizing ROI under volatile conditions.

Assistance-Database Operator | Toronto, Canada (2016–2018) | LifeWorks

- Implemented real-time performance monitoring and designing highly optimized SQL queries and ETL pipelines for the database

TECHNICAL PROJECTS

AI-Powered Financial Management Assistant | Madani Consulting | Zurich (July–Sept 2024)

- As the AI Architect and Lead Developer, I designed and presented a cutting-edge agentic AI framework tailored for automating high-priority enterprise financial operations. The system leveraged LLM-integrated agents capable of autonomously executing daily business tasks, including:
- Email parsing and prioritization (using embedded LLMs to read and classify emails & client orders)
- Filling financial forms and submitting applications based on parsed content
- Sending automated responses, scheduling follow-ups, and collecting user feedback
- Tech Stack & Integration:
- Integrated OpenAI Assistants API, LangGraph for multi-agent coordination, and Apache Kafka for real-time data streaming and event-driven execution across microservices.
- Collaborative Agent Design:
- Agents were designed to dynamically collaborate across departments and applications, making autonomous decisions based on real-time priorities, historical context, and financial policies—ensuring both operational agility and governance compliance.
- Business Impact:
- Delivered a 20% boost in budget efficiency by automating core workflows such as forecasting, spend analysis, anomaly detection, and form generation, shifting enterprise finance from a reactive model to a proactive, AI-enhanced strategic operation.

Question/Answering Chatbot (RAG) | HSLU University | Luzern (June–August 2024)

- LLM-Powered Q&A & Feedback Platform for Higher Education
- As the Lead AI Engineer, I designed and deployed a web-based Q&A and feedback collection platform to support student engagement and academic advising at HSLU University. The system allowed students to ask course-related questions and explore study paths more effectively—directly boosting recruitment and optimizing academic planning.
- Technical Highlights:
- Integrated LLaMA 3.2 with Ollama for local and efficient LLM inference
- Built a Retrieval-Augmented Generation (RAG) pipeline using OpenAPI, a vector database, and Streamlit for an intuitive front-end
- Leveraged Python and Pandas for backend logic and conversational analytics
- Impact:
- Improved student experience and retention by offering real-time, LLM-driven academic guidance. The system contributed to enhancing enrollment and supporting HSLU's budgeting strategy through improved student targeting and engagement.

Modernizing Legacy Data Infrastructure | B& H Company | Zurich (February–April 2024)

- As the AI and Data Systems Lead, I transformed Basler & Hofmann's outdated data management practices by designing and deploying a real-time, AI-powered data pipeline and chatbot interface—bridging the gap between non-technical users and complex data systems.
- Key Contributions:
- Replaced legacy, manual data processes with a Kafka-based real-time data pipeline, enabling instant data access and integration across departments
- Developed an AI-powered chatbot connected to the internal database, allowing employees—without SQL expertise—to query, access, and analyze data through natural language conversations
- Enabled intelligent decision-making by integrating real-time data streaming with LLM-driven question answering and context-aware insights
- Business Impact:
- Significantly improved operational efficiency, cross-team collaboration, and data accessibility. Empowered all departments—from engineering to HR—to become data-driven without needing advanced technical skills.

Agentic AI x BIM Automation | Basler & Hofmann | Zurich (Jan 2024)

- As the Lead AI-BIM Integrator, I architected and deployed a hybrid PyRevit + Agentic AI system that revolutionized Revit-based workflows by introducing intelligent, real-time automation and decision support.
- Agentic Workflow Automation:
 - Built an AI agent capable of analyzing historical project data to identify optimal design strategies and enforce best practices—dramatically reducing manual workload and design cycle times.
- Interactive Revit Assistant:
 - Integrated a chat-based interface within Revit, enabling architects and engineers to query models, retrieve project data, and trigger automated tasks—without writing code or navigating complex UI layers.
- System Highlights:
 - Combined PyRevit, LLMs, and Agentic AI orchestration for intelligent in-context task execution
 - Enabled real-time interaction with BIM data for both technical and non-technical team members
 - Improved cross-discipline coordination and boosted overall design efficiency by streamlining decision-making processes

Menopause Onset Prediction App | Startup | Zurich (February 2025)

- Developed a full-stack AI application that predicts the age of menopause onset using synthetic health data, designed to support clinicians and patients with interpretable insights.
- Built a real-time Streamlit web app integrated with a PostgreSQL backend and a machine learning model (Gradient Boosting Regressor, $R^2 > 0.85$).
- Implemented an ETL pipeline for structured ingestion of medical data, including hormone levels, BMI, lifestyle, and family history.
- Engineered features with scaling, imputation, one-hot encoding, and hormonal interaction terms for better prediction accuracy.
- Integrated SHAP visualizations and LLM-powered natural language summaries for user-friendly, explainable output.
- Deployed using Docker for portability and scalability, simulating a clinic-ready decision support tool.

AWARDS AND CERTIFICATION

Certificate of Python (2020)

EDUCBA Python Institute, Toronto, Canada

Certificate in AWS Cloud Architect (2018)

Metro College of Technology, Toronto, Canada

Diploma of Interior Architecture (2012)

George Brown College, Toronto, Canada

ACADEMIC HISTORY

HSLU (Lucerne University of Applied Sciences) | 2022-2025

Master of Science in Data Science

IKIU | 2011

Bachelor of Engineering in Electrical Engineering (Automation & Control Systems)

SKILLS

- **Programming Languages:** Python, Java, C++, JavaScript, TypeScript, Go, Rust, R, SQL, Bash
- **Web & API Development:** Fast API, Flask, Django, Node.js, Express.js, REST APIs, GraphQL, React, Next.js, Vue.js
- **DevOps & Automation:** Docker, Kubernetes, Airflow, GitHub Actions, Jenkins, Docker Compose, Terraform, Ansible, Make files, Shell scripting, CI/CD pipelines
- **Data Science & Machine Learning:** NumPy, Pandas, Dask, Scikit-learn, XGBoost, LightGBM, CatBoost, TensorFlow, Keras, PyTorch, Hugging Face Transformers, RAG, LangChain
- **Natural Language Processing (NLP):** Spacy, NLTK, Gensim, LLaMA, BERT, GPT, Haystack
- **Databases & Big Data:** PostgreSQL, MySQL, SQLite, MongoDB, Cassandra, Redis, Elasticsearch, Snowflake, DuckDB
- **Data Visualization & Dashboards:** Matplotlib, Seaborn, Plotly, Bokeh, Streamlit, Dash, Tableau, Power BI
- **Testing & Validation:** Pytest, unittest, Postman, Newman, Testcontainers