PIOTR SYNAK, PhD

AI & DATA SYSTEMS ARCHITECT | R&D LEADER

SUMMARY

AI and data systems architect with over **20 years of experience** in software engineering and applied AI, including more than **7 years in senior R&D leadership** roles. Specialized in designing **production-grade AI systems** that integrate **large-scale data platforms**, databases, and modern LLM-based solutions.

Combines deep expertise in databases and distributed systems with **hands-on AI engineering**, while providing strategic and technical leadership for complex AI platforms. Proven track record in delivering reliable, scalable systems beyond PoC, with long-term operational value in **enterprise environments**.

CONTACT & INFO

Email:
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Address:
Winterthur, Switzerland

Website
https://www.researchgate.net/profile/Piotr-Synak

Personal
- Polish/Swiss citizenship

SKILLS

- AI/ML System Design & Deployment
- Agile & Project Management (Scrum, Kanban)
- Cross-functional Team Leadership
- Software Architecture & Engineering
- AI-based Anomaly Detection
- Grant Writing & R&D Strategy
- CI/CD, Quality Assurance & Automation
- Innovation and Creativity
- Cybersecurity Applications

EDUCATION

xMBA Agile Business, Startup Skills
SAQ Swiss Association for Quality
2025

PhD/COMPUTER SCIENCE
Institute of Computer Science, Polish Academy of Sciences, Poland

M.Sc./MATHEMATICS
Faculty of Mathematics, Informatics, and Mechanics, Warsaw University, Poland

SELECTED ACHIEVEMENTS

- DeepSeas (2022-2024) – Architected **AI/ML-driven** volumetric anomaly-detection platform, cutting alert latency by 80 % and scaling to 10 B+ logs/day on AWS.
- Security On-Demand (2017-2022) – Created an **approximate query database engine**; reduced large-scale threat-hunting queries from hours to seconds.
- Infobright (2005-2017) – Co-founded and led design of **C++ columnar database** adopted by Fortune 500 analytics workloads.

EXPERIENCE

AI CONSULTANT AND RESEARCH ENGINEER
Portfolio Career / Switzerland / 2025 –

Guided a pre-seed-stage startup in architecting an **LLM-powered** platform that transforms internal documentation into rich knowledge graphs, dramatically accelerating new-hire onboarding.
- **NLP**: Custom spaCy pipelines for entity extraction and relation linking
- **LLM stack**: OpenAI (GPT-5 family), Anthropic (Claude 4), Google Gemini
- **Embeddings**: Sentence Transformers, OpenAI Embeddings

Designed and implemented a proprietary local Retrieval-Augmented Generation (RAG) pipeline and agentic architecture for a new startup.
- **Agentic orchestration**: Applied multi-step reasoning using custom agents built with LangGraph and LlamaIndex.
- Demonstrates deep expertise in designing AI-enabled knowledge systems and agent architectures for real-world enterprise scenarios.

DIRECTOR / MANAGING DIRECTOR OF RESEARCH AND DEVELOPMENT
Security On-Demand (acquired and rebranded as DeepSeas in 2022) / USA-Poland-Switzerland / 2017 – 2024

Chief architect and R&D lead at Security On-Demand/DeepSeas, a globally distributed managed security services provider delivering 24/7 threat monitoring and response. Developed an **AI-driven** Approximate Query database and anomaly-detection engine for real-time analysis of billions of security logs.

- Led **AI/ML** development of a **volumetric anomaly detection** system for cybersecurity, processing billions of logs daily.
- Architected and designed the **Approximate Query (AQ) database engine** for cybersecurity log analytics and anomaly detection.
- Designed an **AI/ML-driven data analysis** system for high-throughput, real-time log processing using approximation queries.
- Managed the end-to-end roadmap for AQ database development using AWS cloud-native architecture.
- Managed international R&D teams and Agile processes, and implemented automated **CI/CD pipelines** using Jenkins.

TECHNICAL SKILLS

- Platforms:
  Windows, Linux
- Languages:
  C / C++, Python, SQL, Java
- Databases:
  Infobright, Postgresql, MySql,
  SQLServer
- AI/ML Frameworks:
  PyTorch, LangGraph, LlamaIndex
- Tools:
  Cursor, KiloCode, Windsurf, Bolt.new,
  svn, GitHub, Azure DevOps (ADO),
  RallyDev, Jenkins, Confluence, Visual
  Studio, Eclipse

SCIENTIFIC AREAS

- Artificial Intelligence & Machine
  Learning
- Rough Sets
- Database Engine Design
- Temporal Data Analysis
- Multi-agent Systems
- Data Mining
- Soft Computing

INTERESTS

- Mastering sushi
- Ferroequinologist
- Japanese model trains
- Butoh
- Judo
- Football
- Hiking
- Photography

LANGUAGES

- Polish — mother tongue
- English — fluent
- German — intermediate

EXPERIENCE - CONTINUED -

CO-FOUNDER, CHIEF ARCHITECT AND LEAD DESIGNER
Infobright / Canada-Poland / 2005 – 2017

Chief software architect, lead designer, and developer of Infobright — an **AI-powered columnar database** engine written in C++ with Postgresql/MySQL frontend (Windows, Linux) for high-speed processing of large amounts of data. Designed and implemented core data structures and algorithms for query execution, including query execution plans, rough queries, correlated sub-queries, joins, and aggregation.

- Participated in key architectural discussions and decisions regarding query execution engines, parallelization, memory optimization, scaling (out and up), partitioning, high availability, and open-source transition.
- Served as Scrum Master for the database design group, leading a cross-functional team to develop core query engine functionality and implement Agile methodology.
- Supported sales engineers in resolving issues/requests filed by customers.

LEAD DESIGNER AND DEVELOPER
Cognitron / Canada-Poland / 1997 – 2004

Led the design and development of RS Explorer — an AI/ML system for data exploration and mining, implementing ideas of the theory of rough sets.

ASSISTANT / ADJUNCT PROFESSOR
Polish-Japanese Academy of Information Technology / Poland / 1996 – 2009

Conducted lectures and labs on Data Mining, AI, Algorithms, C++, and Java.

PATENTS AND RESEARCH

- Participated in over **15 research projects** and EU grants.
- Presented at several international conferences.
- Published more than **60 research papers**, including book chapters, journal articles, and conference proceedings.
- Co-inventor of **three patents** and **one patent application** in the area of databases: US8700579, US8838593, US11301467, US20150088807A1.
- Co-author of AI/ML systems: RSES (www.mimuw.edu.pl/~szczuka/rses) and Rosetta (bioinf.icm.uu.se/rosetta).
- xMBA Startup-Coach and Agile Business Expert (SAQ-certified)
- Visiting Assistant, University of North Carolina at Charlotte, USA
- Awarded the Japan International Cooperation Agency's scholarship for multimedia training at Saitama University, Saitama, Japan.
- Visiting assistant, Norwegian University of Science and Technology, Trondheim, Norway.
- Awarded a Tempus scholarship for software engineering training at Italsiel/Finsiel, Rome, Italy.

REFERENCES

RICK GLICK	JOEL HOLLAND	DOMINIK ŚLĘZAK
Former CTO	CTO	CEO
Teradata	DeepSeas	QED Software