

Vusal Babashov

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PRINCIPAL DATA SCIENTIST | RETAIL AI/ML, FORECASTING, OPTIMIZATION & ANALYTICS DELIVERY

PROFESSIONAL SUMMARY

Principal Data Scientist / Senior AI/ML Engineer with 10+ years of experience designing, building, validating, and deploying production-grade machine learning, optimization, forecasting, and AI solutions across retail, healthcare, and public-sector environments. Strong hands-on experience owning end-to-end analytical workflows—from data ingestion, exploration, feature engineering, and model development to output validation, QA, deployment, and stakeholder-facing insight generation. Deep expertise in Python, SQL, Spark, Databricks, MLflow, and statistical / machine learning methods, with a strong track record of translating ambiguous business problems into scalable solutions and measurable outcomes. Particularly strong in retail analytics, POS and promotional data workflows, decision optimization, production ML pipelines, mentoring junior data scientists, and communicating findings clearly to technical and non-technical audiences.

CORE STRENGTHS

- End-to-end ownership of AI/ML and advanced analytics solutions from discovery to production delivery
- Retail analytics using POS transaction data, promotional calendar data, forecasting, optimization, and decision support workflows
- Production model development, QA, validation against business logic, and scalable inference workflows
- Large-scale data processing with Python, SQL, PySpark, Spark, Databricks, and Azure
- Analytical methodology spanning gradient boosting, forecasting, simulation, optimization, and deep learning
- Cross-functional collaboration with engineering, analytics, product, and business stakeholders
- Mentoring junior data scientists through code reviews, technical guidance, and structured knowledge transfer
- Clear communication of technical outputs, tradeoffs, and business recommendations to non-technical audiences

TECHNICAL SKILLS

Programming & Analysis: Python, SQL, PySpark, R, Java, SAS

Machine Learning / AI: Scikit-learn, XGBoost, CatBoost, LightGBM, Keras, AutoML, recommender systems, reinforcement learning, foundation model fine-tuning

Data & Cloud Platforms: Databricks, Spark, Azure, Ray, MongoDB Vector Search

MLOps / Delivery: MLflow, Git, GitHub, Azure DevOps, Streamlit

Optimization / Decision Science: Gurobi, CPLEX, Simul8, Simio, VSOptima, Arena

Generative AI / Applied NLP: RAG, Agentic RAG, LangChain, Agents SDK, prompt orchestration, evaluation workflows, LoRA/QLoRA, ReAct, LLM-as-a-Judge

PROFESSIONAL EXPERIENCE

Canadian Tire Corporation — Senior AI/ML Engineer (Senior Data Scientist)

Feb 2022 – Present | Ottawa, ON

- Led the development of recommender systems for loyalty customers using POS transaction data and promotional calendar data, driving more relevant weekly offer personalization and improving conversion through stronger alignment of promotions with customer purchasing behavior.
- Owned the development and deployment of a production ML model using POS transaction data to identify false in-stock signals, turning a high-impact retail inventory challenge into a scalable inference solution that helped prevent approximately \$13M in annual lost sales.
- Led the engineering of reusable ETL and feature pipelines using POS transaction data and promotional calendar data in Spark and SQL, enabling scalable model training, inference, KPI reporting, and faster iteration across retail ML use cases.
- Designed and implemented a decision-optimization system in Python and Gurobi to improve staff scheduling and operational planning, delivering approximately \$1M in annual savings.
- Built a discrete-event simulation model to optimize labor allocation across retail stores, increasing average net earnings by 5.5% through improved staffing efficiency and better operational planning.
- Mentored junior data scientists across project delivery, code quality, feature engineering, model development, and stakeholder communication, helping improve team capability and consistency.
- Designed and prototyped an agentic RAG-based AI system using MongoDB Vector Search, MLflow, and Streamlit to improve product discovery and enable richer customer interactions; built retrieval pipelines, prompt orchestration, and evaluation workflows for a production-oriented architecture.
- Built a production-oriented RAG workflow for automated product ratings and review analysis, improving information retrieval quality, reasoning consistency, and analyst productivity for customer and brand teams.

- Fine-tuned Mixtral, BERT, and Flan-T5 models using LoRA/QLoRA to classify the domain and subdomain of cloud-migrated data tables, improving metadata classification efficiency and streamlining Data Steward workflows.
- Developed automated evaluation workflows, structured error analysis processes, and LLM-as-a-Judge approaches to assess output quality, compare model and prompt variants, and support systematic iteration across prompts, retrieval, and model behavior.

Telfer School of Management, University of Ottawa — Research Assistant / Lecturer

Sep 2015 – Jan 2021 | Ottawa, ON

- Developed an advanced analytics solution combining discrete-event simulation, generalized linear modeling, and inverse optimization in R, Python, Keras, and Gurobi to redesign clinic operations; reduced total patient wait time and overtime costs by 60% at The Ottawa Hospital rheumatology clinic.
- Implemented a reinforcement learning–based decision system using value function approximation and column generation in Java and CPLEX to optimize healthcare capacity allocation and reduce operational costs in a complex, high-constraint environment.
- Designed a multi-criteria decision analysis framework in R to support formulary decisions for public and private drug plans, streamlining the drug evaluation and listing process.

Bank of Canada — Data Scientist

Sep 2019 – Aug 2020 | Ottawa, ON

- Built production-ready time series forecasting models in Python and R using STL, dynamic harmonic regression, TBATS, Random Forest, and LSTM to support capacity planning and demand forecasting, improving forecast accuracy by 10–15%.

Pivina Consulting Inc. / Ontario Health — Data Scientist (HEOR)

Sep 2012 – Jun 2014 | Ontario

- Developed health economic evaluation models using decision trees, Markov chains, cohort simulations, and SAS to support evidence-based reimbursement decisions for new drugs and medical technologies.

Department of Epidemiology & Biostatistics, Western University — Research Assistant

Sep 2010 – May 2012 | London, ON

- Built a cost-effectiveness model using survival analysis, Markov models, cohort simulation, SAS, and Ontario health datasets, informing a reimbursement recommendation in the Canadian healthcare system.
- Developed a discrete-event simulation model to optimize staffing and reduce wait times for radiation treatment, improving patient throughput and resource utilization.

CERTIFICATIONS AND TRAINING

- Agentic AI Bootcamp, Vector AI Bootcamp — September 2025
- Azure Fundamentals, Microsoft — May 2025
- Microsoft Azure OpenAI Hackathon, Microsoft — December 2023
- Generative AI Fundamentals, Databricks Academy — August 2023

EDUCATION

- Ph.D. in Management (Operations Research) — University of Ottawa
- M.Sc. in Epidemiology & Biostatistics (Health Economics) — Western University
- M.Sc. in Industrial Engineering — University of Pittsburgh
- B.Sc. in Industrial Engineering — Qafqaz University