Farrukh Nauman

AI & Machine Learning Consultant | LLMs, Generative AI & Computer Vision Solutions | PhD

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VALUE PROPOSITION

AI consultant specializing in Gen AI, LLMs, and Computer Vision, translating complex AI capabilities into tangible business value. Proven ability to deliver significant operational improvements:

- 40% reduction in manual inspection costs for textile quality assessment.
- 50%+ reduction in data collection costs through synthetic data generation.
- 90% lower hardware costs for industrial IoT implementations.

CONSULTING OFFERS

- **Proof-of-Concept (Fixed Price/4-weeks)** - dataset audit, model prototype, ROI roadmap.
- **Hourly/Daily Rate Projects** - flexible engagement for ongoing development and implementation.
- **Fractional AI Lead (Retainer)** - steer data teams, drive AI initiatives, governance (1-2 days/week).
- **AI Workshops** - hands-on training in generative AI, vision and LLMs.

SKILLS & TECH STACK

AI & ML	**LLMs**: OpenAI, Gemini, HF Transformers, RAG, Fine-tuning, Synthetic Data, OCR, Vector DBs; **GenAI, Vision**: Text-to-Image, Inpainting, Object Detection, Classification, Segmentation, Edge AI; **Core ML**: Predictive Modeling, Anomaly Detection, Time Series; **Libs/Frameworks**: PyTorch (Expert, 6 yrs), Transformers, Diffusers, LangChain, Weights & Biases
MLOps & Cloud	Azure ML, Docker, CI/CD, Model Monitoring/Serving, Experiment Tracking, Git, REST APIs
Programming	Python (Expert, 8+ yrs), C/C++ (Proficient, 8 yrs), SQL, High Performance Computing (8 years)
Business	Stakeholder Management, Requirements Gathering, Project Scoping, Solution Architecture, Technical Leadership, ROI Analysis, Client Communication
Languages	English (Fluent), Swedish (SFI C2), Urdu (Native)

EXPERIENCE

RISE Research Institutes of Sweden AB — Linköping, Sweden
AI Researcher & Consultant — *Jul 2021 -*

Project Lead: Sustainable Fashion AI Automation (2022-2025: *24 months*): Leading two major initiatives in sustainable fashion: Vinnova: AI for Circular Fashion (**Project Lead**, ∼ 9M SEK) and CISUTAC (AI Lead, ∼ 2M SEK).

- **Challenge**: Manual quality inspection created major bottlenecks in circular fashion supply chain, with 30% inconsistency in assessments and excessive labor costs driving up prices by 25%.
- **Solution**: Designed and implemented end-to-end computer vision system for automated attribute detection.
- **Approach**:
  - **Data**: Custom annotation & collection setup; Cleaning, enrichment.
  - **Model**: Training & optimization; Synthetic data generation.
  - **Deployment**: Pilot deployment and validation.
- **Impact**: 40% reduction in processing time, 50%+ reduction in data collection costs through synthetic data.
- **Technologies**: PyTorch, Vision Transformers, CLIP, Gradio, Docker, Flask, Synthetic Data Generation, Inpainting.
- **Recognition**: 1 of only 5 projects presented at EU sustainable AI (2023) and Vinnova Innovation week (2022).
- **Deliverables**: Pilot-ready AI system, Annotated public dataset, Roadmap for industry adoption.

Project: LLM Implementation for Regional Textile Recycling Network (2024-2025: *4 months*):

- **Challenge**: Clients needed to integrate LLMs into their networking platform for textile recycling in Europe.
- **Solution**: Designed a custom LLM chatbot and retrieval system for both structured and unstructured data.
- **Impact**: Enabled a smart search and retrieval system for connecting textile actors in Europe.
- **Technologies**: Retrieval Augmented Generation, LangChain, Evaluations, Prompt Engineering, Synthetic Data.

Project: Low Energy IoT Solutions for Industrial Clients (2022: *4 months*):

- **Challenge**: Clients needed to process sensor data at the edge with limited energy, preventing real-time analysis.
- **Solution**: Identified energy-efficient AI algorithms (miniROCKET algorithm) for edge devices that is faster than deep learning methods by over 2000x.

- **Impact**: Enabled real-time sensor data analysis with 90% lower hardware costs.
- **Technologies**: Edge AI, Time Series Classification, Anomaly Detection, Low-Energy Computing.

AI Mentorship Program (2023-2024): Established and led mentorship program for Master's thesis students in AI, resulting in 4 industry-applicable projects.

- **Projects**: Damage Detection in Fashion, Generative AI for Fashion, Time Series Forecasting for Fashion Trends, Image Embeddings for Second-Hand Fashion.
- **Activities**: Provided hands-on training in deep learning and AI for advanced industrial AI application.

Other Projects:

- **Aero EDIH (2024)**: Consulted with startups on data/model strategies for on-device drone deployment for vehicle/person detection and runway debris identification. **Tasks**: Object Detection, Edge AI, Diffusion Models.
- **Ramverk (2024)**: Prepared roadmap for air traffic control automation, including reinforcement learning state-of-the-art models and data collection proposal. **Tasks**: Reinforcement Learning, Data Collection.
- **GreenerFlow (2023)**: Factor analysis for traffic congestion in metropolitan areas, led consortium formation for a larger project. **Tasks**: Time Series Analysis, Multi-modal Data.
- **SHOW - Hard Brake Detection (2022)**: Developed time series anomaly detection models to identify hard brakes in autonomous buses. **Tasks**: Time Series Classification, Anomaly Detection.

2MNordic IT Consulting AB   Gothenburg, Sweden
Data Scientist & Data Engineer   *Dec 2019 - Jun 2021*

Project: Early Warning System for Student Performance (*6 months*):

- **Challenge**: Helsingborg school district lacked ability to identify at-risk students early, resulting in up to 40% failure rate in some schools in 9th grade.
- **Solution**: Developed predictive analytics system identifying absence, poor grades in English and Math as the key indicators in 6th grade that predict 9th grade performance, with school-level feature analysis for targeted funding.
- **Impact**: Enabled early intervention for 10% of the student population, and provided data-driven policy recommendations impacting 3,000+ students.
- **Technologies**: Azure DevOps, Azure Functions, Data Factory, Python, SQL, Power BI.

Project: Mathematics Assessment Optimization (*4 months*):

- **Challenge**: New digital mathematics test showed inconsistencies with traditional grading schemes, causing confusion and potential inequities.
- **Solution**: Conducted comprehensive data analysis of test results across 8 schools, identifying specific misalignments between grading schemes.
- **Impact**: Findings led to significant improvement in assessment accuracy and informed critical education policy adjustments affecting district-wide mathematics curriculum.
- **Technologies**: Scikit-learn, Statistical Analysis, Python, Data Visualization, Azure Notebooks.

Previous Research Positions   2009–2019

- **Research Fellow, Chalmers University of Technology**:   Gothenburg, Sweden
  Complex systems modeling, large-scale data analysis   2018–2019
- **Research Scientist, Niels Bohr Institute**:   Copenhagen, Denmark
  Simulation, forecasting, computational modeling   2015–2018
- **Research Assistant/PhD Student, Univ. of Rochester**:   New York, USA
  Data analysis, predictive modeling   2009–2015

EDUCATION & CERTIFICATIONS

Microsoft Certified   Azure
Azure Data Engineer Certificate   *2020*

University of Rochester   Rochester, New York (USA)
PhD in Physics and Astronomy   *Oct 2015*
Focus: Complex Systems Modeling, Data Analysis, Computational Fluid Dynamics, High Performance Computing, C/C++

AWARDS & ACHIEVEMENTS

- Horton fellowship from Laboratory for Laser Energetics - full research funding award.   2010-2015
- Susumu Okubo Prize for highest performance on graduate comprehensive exam and excellence in coursework.   2011