Farrukh Nauman

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

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Value Proposition

PhD-level AI consultant specializing in Generative AI, Computer Vision and Large Language Models. I help organizations leverage AI to automate processes, enhance decision-making, and unlock insights from complex data. Drawing on experience delivering state-of-the-art vision systems that reduce processing time by 40% and custom LLM solutions for knowledge management, I excel at translating complex business needs into scalable AI architectures. Led Vinnova-funded AI projects and contributed technical expertise to EU initiatives.
Available for consultancy engagements focused on leveraging AI for measurable business impact.

Key Services

- **LLMs & Generative AI Solutions**: Tailored language model implementation for synthetic data generation, knowledge management, and intelligent assistants.
- **Computer Vision**: Design and deployment for automated inspection, quality control, and process optimization (demonstrated impact: up to 40-60% reduction in manual inspection costs).
- **Retrieval Augmented Generation (RAG)**: Smart knowledge management and document Q&A systems integrating domain-specific data with large language models.
- **AI Strategy & Technical Advisory**: Strategic guidance from feasibility assessment to deployment roadmaps, with focus on ROI and practical implementation.

Skills & Tech Stack

- **LLM & GenAI**: OpenAI, Gemini, Hugging Face Transformers | RAG Pipelines | Fine-tuning | Synthetic Data Generation | Text-to-Image Models | Inpainting | Vector DBs.
- **Vision & Multimodal**: PyTorch | TorchVision | OpenCV | ViT | YOLO | CLIP | SAM | Object Detection | Image Classification | Segmentation | OCR | Edge AI.
- **MLOps & Cloud**: Azure ML | Docker | CI/CD Pipelines | Model Monitoring | Experiment Tracking | Git | REST APIs | Model Serving.
- **Programming**: Python (8+ years) | C/C++ (8 years) | SQL | Pandas | PyTorch (6 years) | High Performance Computing (9 years).
- **Business/Consulting**: Stakeholder Management | Requirements Gathering | Project Scoping | Technical Leadership | ROI Analysis | Solution Architecture.

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 Resource Efficient Circular Fashion - Project Lead, CISUTAC - Technical Lead).

- **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 with comprehensive data infrastructure.
- **Approach**:
  - Phase 1: Custom Data Annotation Tool Development (Flask, Streamlit, Docker). (***6 months***)
  - Phase 2: Dataset enhancement and optimization (Custom apps for human in-the-loop data improvement). (***4 months***)
  - Phase 3: AI model development and optimization (Pytorch, ViT, ConvNeXt, CLIP). (***6 months***)
  - Phase 4: Synthetic data framework implementation (Text-to-Image models, Flux Inpainting). (***4 months***)
  - Phase 5: Pilot deployment and validation (Gradio, Docker). (***4 months***)
- **Impact**: 40% reduction in processing time, 50%+ reduction in data collection costs through synthetic data generation.
- **Technologies**: PyTorch, Vision Transformers, CLIP, Gradio, Docker, Flask, Synthetic Data Generation.
- **Recognition**: Selected as 1 of only 5 projects presented at EU event on sustainability and AI (May 2023) and Vinnova Innovation week (Sep. 2022).
- **Deliverables**: Pilot-ready AI system, Annotated public dataset, Roadmap for industry adoption.

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

- **Challenge**: Clients needed to process sensor data at the edge with severe energy constraints, 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 Analysis, Low-Energy Computing.

Project: RegioGreenTex LLM Implementation (2024-2025: *4 months*):

- **Challenge**: Clients needed AI experts to integrate LLMs into their networking platform for textile reuse and 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**: RAG, LangChain, Vector Databases, LLM Fine-tuning.

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.

Additional Project Experience:

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

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, Power BI, Azure Functions, Data Factory, Python, SQL.

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**: Statistical Analysis, Python, Data Visualization, Azure Analytics.

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

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++

Microsoft Certified Azure
Azure Data Engineer Certificate *2020*

Awards & Achievements

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