Maksymilian Mroczkowski

Machine Learning Engineer

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EDUCATION

Imperial College London Oct 2023 - June 2026
BSc Bioengineering
• Relevant modules: Algorithms & Data Structures, Probability & Statistics, Linear Algebra, Machine Learning, Databases

WORK EXPERIENCE

Purdue University **Data Science Intern** May 2025 - August 2025

• Selected as 1 out of 300 applicants for the Purdue Engineering SURF programme in the United States
• Improved an in-house nnU-Net PyTorch deep learning model, achieving a 12% boost in segmentation accuracy
• Built Dockerized Jupyter pipelines linking PostgreSQL metadata with local MRI files to segment 180 pancreatic scans
• Accelerated GPU inference (CUDA), reducing segmentation time by 1.5×

PROJECTS

Industrial Equipment Predictive Maintenance Platform Code

• Trained XGBoost and fine-tuned Temporal Fusion Transformer models using MLflow, achieving a 92% failure prediction
• Implemented Evidently AI drift detection and automated retraining pipeline, reducing manual model updates by 90%
• Engineered 60+ time-series features with rolling statistics and FFT analysis for consistent train-serve prediction pipelines
• Deployed A/B testing framework on Kubernetes with FastAPI, processing 5,000+ predictions/min with <80ms p95 latency

LLM-Powered Document Processing Agent Code

• Developed an end-to-end document processing platform using FastAPI, React, PostgreSQL, and LangChain
• Integrated OpenAI GPT and HuggingFace models for intelligent document analysis and automated workflow decisions
• Implemented Celery and Redis for asynchronous multi-document extraction of invoices, contracts, and insurance claims
• Deployed via Docker Compose with MinIO S3 storage and ChromaDB for semantic search and document similarity

Autonomous RL Trading Agent Code

• Developed a JAX-based reinforcement learning agent to autonomously optimize portfolio allocations using market data
• Built scalable data pipelines on AWS (Kinesis, Lambda, S3) to preprocess market feeds and generate training environments
• Implemented CI/CD pipelines to automate model retraining, validation, and deployment trading policies
• Monitored agent performance with AWS CloudWatch, enabling safe and continuous evaluation of trading strategies

Retrieval Augmented Generation System for Document QA Code

• Developed a full-stack RAG application using Flask REST API, React, TypeScript, LangChain and ChromaDB
• The application was tested by 40 university classmates, achieving validation in an educational setting
• Using Groq's LLaMA API key, the application enables semantic search and question-answering over educational materials
• The UI allows the user to upload PDF lecture content, the content is then chunked, tokenized and stored in a vector DB

PUBLICATIONS

Prompt injection attacks on vision-language models for surgical decision support DOI

• Co-authored a pre-print on arXiv with the Translational Medical Image Computing Lab at Purdue University
• This research aims to find the vulnerabilities in the usage of vision-language models in surgery

LEADERSHIP

Department of Bioengineering Student Ambassador Sep 2024 - Present

• I represent the Imperial college London Department of Bioengineering in outreach, and recruitment efforts
• Participated in open days, Q&A panels, and academic showcases involving hundreds of students from around the UK