Hamza Elshafie

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Professional Summary

Machine Learning Engineer with a Master's in Machine Learning and a Computer Science background. Skilled in deep learning, with experience developing and optimising AI models using PyTorch, TensorFlow, and 3 years of Python experience. Focused on the low level implementation of machine learning systems, with experience in GPU programming and performance optimisation. Eager to contribute to impactful projects while continuously improving my skills and knowledge.

Education

- **University of Nottingham** — Nottingham, UK
  Master of Science - Machine Learning in Science — *September 2023 - September 2024*
  Relevant modules: *Machine Learning in Science P1 & P2, Applied Statistics and Probability, Scientific Programming in Python, Computer Vision, Neural Computation*
- **Royal Holloway, University of London** — Surrey, UK
  Bachelor of Science - Computer Science (Artificial Intelligence) — *September 2020 - July 2023*
  Relevant modules: *Multi-dimensional Data Processing, Advanced Algorithms & Complexity, Machine Learning, Databases, Artificial Intelligence, Computational Finance, Software Engineering*

Experience

- **PwC ETIC** — On-site
  AI Engineer — *June 2025 - Present*
  - Contributing to internal initiatives exploring agentic AI applications to enhance PwC client service workflows.
  - Assisting in the development of AI agents using LangChain and Retrieval-Augmented Generation (RAG) for automating knowledge retrieval and reasoning tasks.
- **EcoMetric Ltd** — Hybrid
  Machine Learning Researcher (Placement) — *April 2024 - September 2024*
  - Developed a Proof of Concept (POC) framework using Pix2Pix cGAN to convert SAR imagery to optical (RGB), improving the visual interpretability of satellite data for agricultural fields and mitigating cloud cover issues.
  - Integrated multi-spectral image conversion techniques, extending model capabilities to generate spectrally more accurate imagery, enabling remote measurement of soil organic carbon and improving precision in environmental monitoring.

Projects

- **High Performance GEMM CUDA Kernel on NVIDIA H100 (Ongoing)**: Designing and implementing a custom CUDA kernel for general matrix multiplication (GEMM), optimised for a fixed matrix shape on NVIDIA's Hopper H100 architecture. Focused on maximising compute throughput and memory efficiency by tailoring execution to hardware characteristics. Benchmarking performance against cuBLAS to evaluate speedup and utilisation under realistic workloads. (Ongoing) - **Skills:** GPU optimisation, CUDA, High-Performance Computing GitHub
- **Attention-Enhanced CNNs vs Spectral-Spatial Transformers for Precise Crop Classification from UAV-borne Hyperspectral Images**: Designed and implemented deep learning models for precision agriculture, achieving 99.72% classification accuracy. Enhanced spectral-spatial transformers and attention-CNNs, improving baseline performance by 0.2–0.6%. Integrated 3D convolution kernels for in-network spectral dimension reduction, enhancing feature extraction. (September 2024) - **Skills:** Computer Vision, Segmentation, Hyperspectral Image Classification, Vision Transformers, CNNs, Python, PyTorch Paper GitHub
- **Convolutional Neural Networks for Scaled Autonomous Driving Using PiCar**: Trained CNNs for edge and object detection to navigate a Raspberry Pi Car, achieving real-time performance and placing 4th place in a Kaggle competition with a loss of 0.0127. Optimised ResNet and MobileNet models using TensorFlow Lite with quantisation for faster inference. (May 2024) - **Skills:** Computer Vision, Model Quantisation, TensorFlow, Keras, CNNs, Object Detection, Edge Detection, Python Paper GitHub

Skills Summary

- **Programming Languages**: Python, Java, C++
- **Frameworks & Libraries**: PyTorch, TensorFlow, Triton, CUDA, Hugging Face Transformers, Scikit-learn, NumPy, Pandas, SciPy, Matplotlib
- **Development Tools & Methodologies**: Git (Version Control), Test-Driven Development (TDD), Agile Methodologies
- **Languages**: English (Fluent), Arabic (Native)
- **Soft Skills**: Communication, Critical Thinking, Teamwork, Problem Solving, Time Management