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. Eager to contribute to impactful projects while continuously enhancing my skills and knowledge to drive innovation.

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

- **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.
- **Elibre DMCC** — On-site
  Software Engineer (Internship) — *August 2022 - September 2022*
  - Used C# to write scripts for automating geometry changes in parametric design workflows for construction projects.

Projects

- **FlashAttention 2 Optimisation with Triton**: Implementing and analysing FlashAttention 2 using Triton to optimise memory efficiency and inference speed for Transformer models overcoming the memory-bound constraint of the original attention computation. Benchmarking performance against PyTorch's standard attention mechanism. (Ongoing) - **Skills:** GPU optimisation, CUDA, Triton, PyTorch
- **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
- **PCA and KMeans Clustering Analysis of Breast Cancer Wisconsin Data**: Implemented PCA and KMeans from scratch on the Wisconsin Breast Cancer dataset, achieving a silhouette score of 0.68. Visualised data using 2D/3D biplots and identified optimal components via cumulative variance plots and vector loadings. (January 2024) - **Skills:** Dimensionality Reduction, Data Visualization, Clustering, Python Paper GitHub
- **Comparison of Machine Learning Algorithms for Diabetes Prediction**: Evaluated Decision Trees, KNN, and SVM on the Pima Indians Diabetes Database for my Bachelor's thesis. Preprocessed data to enhance accuracy and assessed model performance. (May 2023) - **Skills:** Machine Learning, Data Preprocessing, Model Evaluation, Python Paper

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