

# Hamza Elshafie

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## 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.
  - Collaborated with the R&D team to explore extending the conversion to multispectral imagery.
- 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.
  - Contributed to my team's existing project 'stitcher', which provides solutions to the construction industry using automation and parametric design.

## PROJECTS

- Attention-Enhanced CNNs vs Spectral-Spatial Transformers for Precise Crop Classification from UAV-borne Hyperspectral Images:** Developed deep learning architectures to enhance agricultural monitoring, achieving classification accuracies of up to 99.72%. Utilised spectral-spatial transformers and attention-enhanced CNNs, and improved transformer baseline performance by 0.2-0.6% by through streamlining preprocessing with internal 3D convolution kernels to reduce spectral dimensions within the network. (September '24) [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 '24) [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 with 2D/3D biplots and determined optimal components using cumulative variance plots and vector loadings. (January '24) [Paper](#) [GitHub](#)
- Comparison of Machine Learning Algorithms for Diabetes Prediction:** Implemented and compared ML algorithms for diabetes prediction as part of my Bachelor's thesis, using the Pima Indians Diabetes Database. Preprocessed data to enhance accuracy, trained Decision Trees, K-Nearest Neighbors, and Support Vector Classifiers, and evaluated model performance. (May '23) [Paper](#)

## SKILLS SUMMARY

- Languages:** Python, Java, C#
- Frameworks:** PyTorch, TensorFlow, Keras, Anaconda, Keras, Scikit
- Tools:** Pandas, SciPy, GIT, Matplotlib, NumPy, Test-driven Development, Agile Methodologies
- Development Environments:** PyCharm, IntelliJ IDEA, Visual Studio Code, Google Colab
- Soft Skills:** Communication, Critical Thinking, Teamwork, Problem solving, Time Management
- Linguistic Proficiencies:** English (Fluent), Arabic (Native)

## VOLUNTEER EXPERIENCE

- Head - Community Development Project (Cairo, Egypt):** Led 50 volunteers to teach English and Arabic to school matrons. Developed educational content, managed tasks with logistical plans, and organised events to support the initiative.
- Organiser - Orphanage Renovation Project (Cairo, Egypt):** Coordinated materials and donations for an orphanage renovation, designed fundraising events, and facilitated communication between the team and contractors.