Benjamin Sanati

Machine Learning Engineer

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Electronic Engineering with AI masters graduate skilled in machine learning, deep learning, and data science. Passionate about deep reinforcement learning, and eager to find a PhD program to improve my personal and research capabilities.

WORK EXPERIENCE

Senior Research Assistant KTA in Machine Learning — 03/24 – 07/24

University of Southampton

- Selected to research a knowledge transfer project with an industry client funded by Innovate UK, focusing on enhancing machine learning applications in railway maintenance
- Responsible for developing a mobile 3D scanning and SLAM system and creating an end-to-end data lake architecture to centralise data, facilitating industry access and enabling revenue generation for the client
- By project completion, I will have authored comprehensive project documentation and delivered presentations detailing technical results and strategic insights to stakeholders and industry professionals

Data Science Intern — 07/23 – 09/23

Cirium, London

- Awarded a Data Science internship due to my team's performance in an AI hackathon
- Executed time-series forecasting and geospatial analysis using temporal and spatiotemporal machine/deep learning techniques within an agile management framework to steer project success
- Acquired industry experience using AWS Athena, S3, Databricks, Spark, SQL, PyTorch, TensorFlow, Pandas and NumPy on large, real-world data

Undergraduate Research Scholar — 06/22 – 09/22

University of Southampton

- Conducted research and trained efficient computer vision architectures, specializing in object detection and vision transformers, allowing me to develop proficiency in transfer learning
- Investigated novel sparse temporal sampling modules, reducing compute demands during inference
- Presented project insights to students & academics, showcasing strong presentation capabilities

EDUCATION

University of Southampton, Southampton — 09/19 – 06/23

MEng (Hons) — Electronic Engineering with Artificial Intelligence (1st: 79%)

Hills Road Sixth Form College, Cambridge — 09/17 – 06/19

A Levels – Physics, Chemistry, Mathematics

PROJECT EXPERIENCE

Masters Group Design Project — 10/22 – 01/23

University Project - https://github.com/TrainOrg52/AutoSign

- Utilized state-of-the-art object detection and image classification models to develop a proof-of-concept mobile application, automating the labour-intensive train sign inspection process for an industrial partner
- The project garnered a final report score of 90%, and I secured an overall module grade of 87%, reflecting my substantial contribution to the project
- Fine-tuned pre-trained object detection (YOLOv7) and image classification (BEiT) models using a curated custom dataset, achieving more than 0.92mAP@0.5 and 97% classification accuracy respectively
- Orchestrated the integration of the machine learning workflow with Firestore and the mobile application, ensuring a robust and efficient final system poised for rigorous testing

- Presented the project's scope, methodologies, and findings to academic mentors and fellow cohort members

Year 3 Dissertation – Dynamic DNNs 09/21 – 05/22

University Project – (private repo)

- Drafted a research paper and currently in talks for a potential submission
- Undertook a comprehensive investigation, delving into the nuanced trade-off between classification accuracy, specificity and latency in early-exiting dynamic Deep Neural Networks (DNNs)
- Crafted a novel Convolutional Neural Network (CNN) architecture distinguished by its ability to confer adaptable classifications with varying levels of granularity during inference
- Conducted an exhaustive comparative analysis of the devised model against analogous architectures, thereby presenting a comprehensive evaluation of its efficacy and performance characteristics
- Conveyed research findings and their implications to esteemed academics during the project viva, achieving an overall mark of 83%

SMALLER NOTABLE PROJECTS

Deep Learning Reproducibility Challenge

https://github.com/ben-sanati/Deep-Learning-Reproducibility-Challenge

Empirically reproduced the Chandra et al. (2022) paper to verify their assertions on hyperoptimizers in deep learning. The reproduction included experimental replication and result visualization, detailing the results in a report with insights and recommendations for future research paths.

Data Mining: Forecasting the Performance of the Fashion Industry

https://github.com/ben-sanati/COMP6237-Data-Mining-Project

Curated a bespoke dataset for performance forecasting of the luxury fashion industry. Thorough preprocessing and a variety of time-series models were implemented, achieving a final MAPE of 11.36%.

AI Hackathon

https://github.com/ben-sanati/HackAI-23

Developed an LSTM solution to tackle a flight load factor forecasting challenge, outperforming competitors by 3% and resulting in a summer internship at Cirium.

AWARDS AND CERTIFICATIONS

Undergraduate Research Scholarship

University of Southampton - https://github.com/ben-sanati/ViT-MOT

Awarded a £5000 scholarship by the UG Research Scholarship Panel to conduct an independent research project of my choosing over the summer.

Coursera Certifications

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Convolutional Neural Networks

SKILLS & OTHER

Machine/Deep Learning Technologies: PyTorch, PyTorch Lightning, Optuna, PySpark, Pandas, NumPy, SciKit-Learn, Scrapy, Redis
Relevant University Modules: Foundations of ML, Advanced ML, Computational Finance, Differentiable Programming and Deep Learning, Data Mining, Advanced Computer Architecture, Computer Engineering
Tools: Python, AWS, SQL, Terraform (IaC), Databricks, Git, Linux, C++, Databricks, Slurm, LaTeX
Hobbies and Interests: Technology, Entrepreneurship, Music, Football, Tennis, Swimming, Reading, Piano