Alexandru-Stefan Buburuzan

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EDUCATION

The University of Manchester Sep 2021 – Jun 2025
BSc(Hons) Artificial Intelligence with Industrial Experience Manchester, UK

- **First year: 90.33%** average grade (First-Class Honours), **ranked 2nd out of 486 (top 0.5%)** first-year CS students, recipient of the **Golden Anniversary and Netcraft Awards.**
- **Courses:** Machine Learning, Intro to AI, Knowledge Based AI, Visual Computing, Data Science, Mathematics, Programming (Python, Java, C, C++), Software Engineering, Computation, Operating Systems, Computer Architecture, Computer Engineering.

"Grigore Moisil" Theoretical High School Sep 2017 – Jun 2021
Computer Science and Mathematics Timisoara, Romania

- **Valedictorian**, Romanian Baccalaureate with 10/10 in Mathematics and in Computer Science.
- **Bronze Medal** at the National Olympiad in Mathematics (Apr 2021) and the National Olympiad in Informatics (Apr 2018).
- Qualified for the National Olympiad in Informatics in 2021, 2020 (**9th in national ranking**) and 2018.

EXPERIENCE

Rayscape Jul 2021 – Present
Research Engineer Remote

- Developed a CE-marked 3D Deep Learning algorithm for the **segmentation of nodules on lung CT scans** that helps **radiologists from over 100 medical institutions and 5 countries** fare better at diagnosing lung cancer by providing precise measurements.
- **Decreased the error of the predicted measurements (L1) by a factor of 2** compared to the previous model by using a decoder-style sub-network which exploits pre-existing feature maps and implements a **segmentation refinement mechanism**.
- Improved the metrics of a **nodule malignancy classification** algorithm by 3% using **Vision Transformers**.

Rayscape Mar 2020 – Sep 2020
Machine Learning Intern Timisoara, Romania

- Conducted **interdisciplinary work** with radiologists towards building a robust and time-efficient AI model for the **detection of intracranial haemorrhages** meant for **speeding up the triaging process**.
- Developed three Computer Vision algorithms as part of my initial training: **lung segmentation** (U-Net), **pathology classification** (CNN classifiers) and **foreign objects detection** (Faster R-CNN) on X-ray scans.

SUMMER SCHOOLS & COURSES

Cambridge Centre for AI in Medicine Summer School Sep 2022

- Attended lectures on Interpretability, Graph Neural Networks, Medical Image Analysis, Causal Inference, Timeseries Forecasting.

Eastern European Machine Learning Summer School (credential) Jul 2022

- Attended lectures and tutorials on Deep Learning Theory, Reinforcement Learning, Computer Vision, Explainability, Graph Neural Networks, Speech Recognition, NLP, Causality.
- Mentored by one of the creators of Vision Transformers (ViT).

Introduction to Quantum Computing (credential) Oct 2020 – May 2021

- Organized by IBM Quantum and The Coding School, the course delivered a foundational understanding of quantum computing with topics including linear algebra, quantum algorithms and quantum applications.

PROJECTS

Manchester University Data Science Society Jun 2022 - Present

- As a **Workshops Executive**, I will be teaching a short course on Medical Image Analysis using Convolutional Neural Networks.
- Prepared an educational Jupyter Notebook consisting of a PyTorch pipeline used to train an organ classification algorithm.

SaferWalk - first-year team project Oct 2021 - May 2022

- Built a website capable of **recommending safer routes to pedestrians** based on data provided by the Police.
- Deployed the graph-based algorithm on a **Google Virtual Machine** using Python, Flask, OpenStreetMap and NetworkX to allow for a more **flexible architecture design**.
- Analysed the data using **K-means clustering** and approximated a bivariate multimodal probability distribution using SciPy.
- **Reduced the Flask API response time by a factor of 4** by approximating the heuristic function of the **A* algorithm** using Riemann sums and by pre-processing lattice points values.

Climate Hack.AI Jan 2022 – March 2022

- Ranked 6^{th} out of the 25 top universities from the UK, US and Canada.
- Developed a model in PyTorch to predict solar **photovoltaic power production using satellite imagery**.
- **Increased the receptive field of the sequence-to-sequence model** using UNet-inspired components and **improved the gradient flow** of the network by making use of residual connections, which led to a **10% increase** in the validation metric.

SKILLS

Algorithms, Data structures, Mathematics, Machine Learning, Deep Learning, Computer Vision, Artificial Intelligence
Programming languages: Python, C++, Java
Frameworks and libraries: PyTorch, PyTorch Lightning, NumPy, Pandas, Flask, OSMnx
Languages: English (IELTS credential), Romanian (native)