Marco Lam

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Skills

Languages	**Python, Rust, CUDA**, C++, F#, SQL, R, Matlab
Frameworks & Libraries	**Pytorch, Tensorflow**, PySpark, Scikit-learn, Pandas, NumPy
Tools & Platforms	**GCP, Git, GitHub Actions, Docker**, devcontainer, CI/CD, Terraform, RESTful APIs, JIRA, Confluence

Experience

Machine Learning Engineer — *Dublin, Ireland*

Vaultree — *Oct 2024 - Current*

- Developed **Nvidia GPU** support for Vaultree's **proprietary Fully Homophoric Encryption** from academic papers.
- Bridged **Rust and CUDA** using rust-bindgen, ctypes, and nvcc. Developed **benchmarking** tools to evaluate performance.
- **Developed, automated builds and published** a **Python library** integrating Rust using Maturin, PyO3 and **GitHub Actions**.
- Planned and managed the development roadmap for the **in-house Machine Learning capabilities** leveraging FHE, CUDA, and Rust.
- **Engineered and implemented** a custom PyTorch training pipeline, adapting loss functions to use FHE-compatible arithmetic.
- **Designed** an end-to-end Machine Learning pipeline integrating HashiCorp KMS and GCP Buckets for secure data handling.
- **Engineered and deployed** a GCP-hosted Jupyter Notebook demo environment using Terraform and Docker.
- **Represented the engineering team** in external partnership calls, technical discussions.
- Attended industry conferences including the **Europol Cybercrime Conference**.

Data Analyst — *Dublin, Ireland*

Allied Irish Banks (AIB) — *Sept 2020 - Sept 2022*

- **Designed and built ETL pipelines** for regulatory risk assessments and reports using Teradata Data Warehouse and MS SQL Server.
- **Integrated CI/CD practices** with JIRA and custom version control systems.
- Supported system upgrade and migration projects for core data infrastructure.

Projects

Brain Tumour Segmentation Prediction — *Feb 2024 - Apr 2024*

- Developed a **light weight deep learning computer vision pipeline** with a Convolutional-Autoencoder and a U-Net model.
- Identified the **region and segmentation** of brain tumours through MRI scans.
- Achieved a **test accuracy of 98%** using Pytorch.

Algorithmic Approach to 15 Minute City — *Jan 2024 - Jul 2024*

- Designed an efficient algorithm to generalise the "15-Minute City" concept for any map.
- Modified popular **graph search algorithms** (Dijkstra's, Johnson's) to minimise computational complexity
- Implemented solution in **Rust**.

Meta Functional Language Interpreter — *Oct 2022 - Jan 2023*

- Built an interpreter in F# for a meta functional language following theoretical type inference and evaluation rules.
- Implemented with a **type inference mechanism** to ensure absolute type safety within expressions.
- Developed understanding of the functioning of programming language compilers.

Latent Position Models — *June 2019 - Aug 2019*

- Conducted research on **Latent Position Models**, applied **Game Theory and Bayesian Risk Theory** to compare statistical models.
- **Optimised algorithms** to reduce computational overhead and improve model performance.

Education

MSc Computer Science, University of Padua, Italy — *Oct 2022 - July 2024*

1st Class Honours, 110/110 cum Laude

MSc Data & Computational Science, University College Dublin, Ireland — *Sept 2019 - Sept 2020*

1st Class Honours, GPA 3.99

BSc Financial Mathematics, University College Dublin, Ireland — *Sept 2015 - May 2019*

Upper 2nd Class Honours (2.1), GPA 3.45