Pascual Merita Torres

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Education

The University of Edinburgh September 2023 – August 2024
MSc Artificial Intelligence (First Class Honours Predicted) *Edinburgh, United Kingdom*

- **Notable Courses:** Accelerated Natural Language Processing, Natural Language Understanding and Generation, Machine Learning and Pattern Recognition, Automatic Speech Recognition

King's College London September 2020 – May 2023
BSc Computer Science and Artificial Intelligence (First Class Honours) *London, United Kingdom*

- **Notable Courses:** Machine Learning, Optimisation Methods, AI Planning, Data Structures and Algorithms

Projects

Adaptive Merging and Pruning in Vision Transformers | *PyTorch* March 2024 – Present

- Developed a novel method for Vision Transformers (ViTs), designed to dynamically learn pruning and merging ratios on an end-to-end basis. My method finetunes the ViT to adapt these ratios for each input image, utilising a multi-layer perceptron for soft-pruning and cross-attention for soft-merging.
- Experiments demonstrate a reduction in inference-time token usage of 40%, with less than a 1% drop in model accuracy, thus significantly reducing both the overall FLOPs and computation time.
- Implemented across multiple GPUs on a high performance cluster.

LLM Probing as a Method for Hallucination Detection | *PyTorch* January 2024 – March 2024

- Worked in a team of 3 to develop machine learning models that are trained on the latent activations of LLMs to detect hallucinations. Our results indicate that these models generalise effectively to ambiguous and more complex datasets and that there is indeed a notion of hallucination engrained in the LLM activations.
- Implemented across multiple GPUs on a high performance cluster.
- Won the IBM prize for best machine learning practical project. Currently preparing the submission of our findings to workshops alongside our supervisor

Learning Unsupervised Audio Embeddings | *PyTorch* December 2023 – Present

- Conducted extensive research to identify a compelling topic and successfully presented a detailed proposal to a Research Scientist at Amazon Music US, resulting in a collaborative effort.
- Developed a Siamese Neural Network using contrastive learning and a Vision Transformer backbone to leverage the distributional hypothesis in audio playlists, generating unsupervised similarity-based embeddings.

Content-based Deep Learning Music Recommendation System | *PyTorch* February 2023 – April 2023

- Developed a Convolutional Neural Network in PyTorch to extract features from songs' spectrograms at different levels of granularity, and then employed a custom filtering and similarity-based system to recommend similar songs to an input song.
- Received a nomination for the 'Best Dissertation Prize' in the King's College London 2023 CS cohort.

Experience

The University of Edinburgh December 2023 – Present
President and Co-Founder of The AI Society (Part-time) *Edinburgh, United Kingdom*

- Led a team of 5 to become the fastest growing society across the university – Over 200 members in just 7 weeks.
- Fostered researchers to work together and secured £5k in funding through strategic proposals.
- Organised talks and workshops presented by Amazon, Cohere, Spotify, and WolframAlpha.

Rey Juan Carlos University June 2023 – December 2023
Research Assistant (Part-Time) *Remote*

- Conducted the first research study in Spain analysing the relationship between pollution and traffic levels in the city of Madrid.
- Collaborated with my supervisor to visualise data using Python, utilise complex network analysis for feature engineering, and train a time series forecasting model to predict pollution levels based on traffic patterns.

Correcto June 2022 – August 2022
Software Engineer (Internship) *London, United Kingdom / Madrid, Spain*

- Developed a new scalable webpage and Chrome extension architecture in Angular, to accommodate their exponential growth from 2,000 to 70,000 users.
- Optimised their word-suggestion algorithm in Python, and improved its efficiency by 3%.
- Collaborated directly with the CTO and CEO to gain industry insights. Their mentorship provided the opportunity to help pitching their start-up to a US investor, helping raise funds in their £7 million seed round.

Nunsys July 2021 – August 2021
Machine Learning Engineer (Internship) *Valencia, Spain*

- Performed data exploration, cleansing, transformation, and validation of over 1 million clinical records using Pandas and NumPy.
- Implemented a Random Forest classifier using Scikit-Learn to predict patient itineraries and more efficiently allocate hospital staff.

Awards, Talks and Qualifications

Nova 111 Student List | *Award* March 2024

- Recognised as one of the top 10 students with the highest potential in Computer Science across Spain.
- Selected from over 3000 nominees through multiple rigorous selection rounds, with an overall analysis of over 200 data points per candidate.

International Workshop on Efficient Generative AI | *Talk and Poster Session* May 2024

- Presented my Master thesis on 'Adaptive Merging and Pruning in Vision Transformers' to an audience of over 300 academics from The University of Edinburgh, Imperial College London, MIT, UC Berkeley and other institutions.

The University of Edinburgh Annual Department of Informatics Event | *Talk* October 2023

- Presented on the challenges and importance of explainable AI in black-box recommendation systems.
- Received commendation from Professor Helen Hastie, Head of the School of Informatics, for the insightful presentation.

King's College London AI Society Kaggle Competition | *Award* April 2023

- Secured 1st place in the annual AI Society Kaggle competition featuring over 100+ contestants, spanning from undergraduates to PhD students.
- Built a music emotion classifier with grid-search and cross-validation for improved performance using Scikit-Learn.

Professional Studies in the Specialty of Piano (Grade 8 ABRSM equivalent) | *Qualification* August 2020

- Performed quarterly concerts for more than 200 people.
- Cultivated organisation skills by successfully balancing over 20 hours per week of intensive music studies with academic commitments throughout high-school and university.

Other

Languages: English (Professional Proficiency) | Spanish (Native Speaker) | German (Conversational Proficiency)
Volunteering: The Duke of Edinburgh Gold Certificate. 80+ hours tutoring children from challenging backgrounds