Peter Harfouche

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EXPERIENCE

Enedis – Paris, France

Data Management and Valorization – AutoML Internship *2023 – 2024*

- Reduced memory usage by 20 GB and computing time by 60% in French NLP models (like CamemBERT and FlauBERT). Achieved this through advanced quantization techniques and PEFT methods like QLoRA
- Boosted model efficiency and accuracy by over 92% in three different use-cases. This was done by developing and fine-tuning automated hyperparameters, leading to better accuracy and performance metrics
- Improved the scalability and reliability of benchmarking tools. Made workflow operations and troubleshooting smoother by using Airflow for orchestration and experimenting with Fully Sharded Data Parallelism (FSDP)

HumanTech Insitute & HES-SO – Fribourg, Switzerland (Remote)

Recommender System for Powered-Solar Smart Homes – Final Year Project (Collaborative) *2022*

- Created a solar-powered smart home recommendation system. Used a dataset with weather information to simulate user profiles, aiming for a 15% decrease in traditional energy use
- Used machine learning to forecast solar energy output and user habits. Also developed a user-friendly web interface, based on user-feedback, to improve energy management and increase user involvement

PROJECTS

Data Challenges – Paris, France *2023 - 2024*

- Secured 2nd place with a 92.17% score in **Idemia's Unknown Face Images Classification** challenge, through the development of a Vision Transformer-based model for fair and unbiased gender recognition
- Achieved 2nd place among 39 participants in **Télécom Paris's histopathological image classification** challenge, employing SIFT visual embeddings and advanced image processing techniques for breast tumor analysis

Action Recognition in Videos Using Pedestrian Keypoints – Paris, France *Oct 2022 – Jun 2023*

- Partnered with **Idemia** to annotate a dataset of 350 videos, utilizing MMPOSE to extract keypoints for advanced action recognition aimed at mitigating security risks from abandoned luggage, in a Python and PyTorch framework
- Trained an LSTM model to identify potential security threats, achieving varied performances across different scenarios (16 classes), highlighting the need for optimization in critical classes
- Utilized the 2sAGCN model, outperforming the LSTM in custom-labeled action classes, achieving an average of 85% across all related metrics, indicating its superior capability in skeleton-based action recognition and spatial-temporal information processing

Reinforcement Learning on Poppy Torso – Paris, France *May 2023*

- As part of a team at **ENSTA Paris**, I contributed to enhancing a humanoid robot, Poppy Torso, to mimic human movements from videos with high accuracy and responsiveness, by integrating Blazepose and FrankMocap for movement extraction and employing advanced Reinforcement Learning techniques in a custom-made Gym environment.

Semi Supervised Learning Using Fixmatch – Paris, France *Mar 2023*

- Trained at **ENSTA Paris** a WideResNet 28-2 model on the CIFAR-10 dataset with only 25 labels per class, applying the FixMatch algorithm and data augmentation strategies, resulting in a significantly reduced error rate of 4.7%, demonstrating effective semi-supervised learning and model robustness

EDUCATION

Télécom Paris & ENSTA Paris – Paris, France

Post Master's degree in Artificial Intelligence • GPA: 4.0/4.0 *2022 – 2024*

- *Relevant coursework*: Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, GPGPU Programming, Reinforcement Learning, Robotics, Probability and Statistics

École Supérieure des Ingénieurs de Beyrouth (ESIB) – Beirut, Lebanon *2019 – 2022*

Master of Engineering in Computer and Communications (CCE)

- Valedictorian of the Multidisciplinary Project

AWARDS AND UNIQUE SKILLS

Awards: Patrick and Lina Drahi Scholarship for the Best Entrepreneurial Project (2022)**, Murex Award** for the best collaborative and innovative project (2021)
Technical: Python, PyTorch, Sklearn, Transformers, PEFT, Git, Docker, LaTeX, Java, C#, PostgreSQL, Airflow
Languages: Native in French, Fluent in English, Conversational Proficiency in Arabic