Hacene TERBOUCHE

Deep & Machine Learning Engineer

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Experience

Experience	
Junior Deep Learning Engineer Powder Al Team	Oct. 2021 – Present Paris, Algeria
Rebased the developed self-supervised research into a clean installable python package.	
• Conducted Video Summarization Research on two public datasets (TVSum and SumMe) with focus on Transformer models and	d Multi-Annotation learning.
• Participated in the development and maintenance of the code-base (cleaning code, writing tests, code review, etc).	
• Technical topics include: hierarchical image classification for video highlighting, audio event detection, deployment on edge dev	vices and cloud.
Deep Learning Research Intern	April. 2021 – Sept. 2021
Powder AI Team, Self-Supervised Audio-Visual Representation Learning	Paris, France
• Research into self-supervised learning for audio-visual learning led to a significant reduction in the amount of labels required f	for training models.
• Proposed, designed and trained a deep learning system to learn audio-visual features from unlabeled video games data.	
• Applied the resulting features to different downstream tasks for highlight detection; first author of a published paper (see Publi	cations).
Technical stack: Pytorch, Pytorch Lightning, Librosa, Slurm, Multi-GPU training.	
Research Engineer Intern	Mar. 2020 – Aug. 2020
LDCCP Laboratory , Deep Learning for Epileptic Seizure Prediction using EEG Signals 🔀	Algiers, Algeria
Conducted Seizure Prediction Research with focus on cutting-edge deep learning models and minimal signal processing steps.	
• Effected data processing (temporal windowing) and resampling techniques to overcome imbalanced dataset.	
 Proposed and implemented two deep learning models based on Convolutional Neural Networks (CNN) and Recurrent Neural Ne	etwork (RNN) for seizure prediction based
• Trained and Tuned hyper-parameters using TensorFlow and Tensor-Board Toolkit on the American Epilepsy Society Seizure	e Prediction Challenge dataset.
Research Engineer Intern	Feb. 2019 – . May. 2019
LDCCP Laboratory, Extraction of personal information from the biometric identity card (OCR) 🔉	Algeria, Algeria

- · Collected and manually annotated image data (pictures of the back side of ID cards).
- · Performed image processing techniques such as filtering and morphological operations using OpenCV on images.
- Built a CNN model for classification different characters using TensorFlow and deployed the developed system using Streamlit .

Publications

H. Terbouche, L. Schoneveld, O. Benson and A. Othmani, "Comparing Learning Methodologies for Self-Supervised Audio-Visual Representation Learning," in IEEE Access, vol. 10, pp. 41622-41638, 2022, doi: 10.1109/ACCESS.2022.3164745.

Education

M.Sc.	in	Data	Science	&	Artificial	Intelligence	(TRIED)
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Télécom SudParis & Paris-Saclay University, scholarship of Excellence.

• Courses: Statistical learning, Machine Learning, Deep Learning, Data Bases, Big Data, Patterns Recognition, Advanced Image Processing, Sensors.

Eng. in Electronics Engineering & M.Sc. in Signal and Telecommunication

Ecole Nationale Polytechnique, Algeria's top Grandes Ecoles, valedictorian.

• Courses: Signal and Image Processing, Information Theory, Detection and Estimation Theory, Machine Learning, Embedded Systems.

Skills

Languages : Python, SQL, SAS, C/C++, Matlab, R, Latex.

DL Libraries : Pytorch/Pytorch Lightning, TensorFlow/Keras, HuggingFace Transformers.

Experiment Tracking : Comet-ml, MLFlow, Weights & Biases.

Data/ML Libraries : Numpy, Sklearn, Pandas, Scipy, OpenCV, Librosa, NLTK, XGBoost, CatBoost, LightGBM.

Data Visualization : Matplotlib, Seaborn, Streamlit, Plotly.

Machine Learning : Logistic Regression, Linear Regression, KNN, PCA, Decision Trees, Random Forest, Gradient Boosting, Clustering.

Development Tools : CLI, Anaconda, VScode, Git/Github, CI/CD (Github Actions), Terraform.

MLOps : Docker, Kubernettes, DVC, TFX, FastAPI, Poetry, ONNX, TensorRT.

Cloud AWS : EC2, SageMaker, S3, Lambda.

Project Management : Agile Scrum with Jira.

Projects

Image Generation using StyleGAN ()

Personal

- · Implemented from scratch StyleGAN1 using Pytorch and Pytorch Lightning
- Fine-tuned the StyleGAN2 model on a custom dataset to generate anime images.

Audio Keyword Spotting 🖓

Personal

- · Built an audio key-word classification model based on HuBERT using SpeechCommands dataset.
- Deploy the model using ONNX, FastAPI, Docker compose and Nginx .

Sept. 2015 - Sept. 2020

Sept. 2020 - Sept. 2021

Paris, France

Algiers, Algeria

Mar. 2022

NLP Sentiment Analysis of Product Reviews 🔿

Personal

- Built and trained a RoBERTa model to classify the sentiment of the reviews of the Amazon Product Reviews dataset
- Deployed the trained model using FastAPI and Docker & Implemented a Streamlit app to showcase the model.

Face Emotion Detection

Télécom SudParis

- · Research into emotion recognition from face videos in order to model the temporal aspect of the emotions through the videos
- Developed a CNN-LSTM model based on a pretrained Xception encoder on the EMMPATHIC dataset.

Languages

English : Advanced French : Advanced Arabic : Native

Certifications

DeepLearning.AI TensorFlow Developer on <u>Coursera</u> Deep Learning Specialisation by Andrew Ng on <u>Coursera</u> Statistics with Python Specialisation by University of Michigan on <u>Coursera</u> Mathematics for Machine Learning Specialisation by Imperial College London on <u>Coursera</u> Machine Learning by Andrew Ng on <u>Coursera</u> MLOps (Machine Learning Operations) Fundamentals on <u>Coursera</u> Deep Learning with Python and PyTorch on <u>edX</u> Build Basic Generative Adversarial Networks (GANs) on <u>Coursera</u> Build Better Generative Adversarial Networks (GANs) on <u>Coursera</u> Hands-on Machine Learning with AWS and NVIDIA on <u>Coursera</u>

Interests

Deep Learning: Self-Supervised Learning, Few-shot Learning, Active Learning, Multi-modal Modeling, Generative models. Sport: Football, Gym.

Mar. 2021