Martin **Deudon**

Machine Learining Engineer ·

Toulouse, France

(+33) 0782123398 | martin.deudon@protonmail.com | https://github.com/tinmarD |

https://www.linkedin.com/in/martin-deudon-122a1130/ |

Resume

Data scientist specialized in machine learning and signal processing. I have worked on smart sensor systems for healthcare, developing fall-detection algorithms, optimizing AI models for embedded devices, and building web and mobile applications for real-time monitoring. My research experience at CNRS focused on EEG signal analysis, machine learning for epilepsy detection, and the modeling of spiking neural networks. I also have freelance experience in implementing computer vision algorithms and creating interactive applications. I enjoy designing efficient algorithms, turning raw data into actionable insights, and building reliable end-to-end systems—from hardware all the way to the cloud.

Experience

wiiCare

Toulouse, France

Computer Vision Engineer, Edge AI

Oct. 2020 - Dec. 2024

wiiCare designed smart sensors aimed at improving the quality of life of dependent seniors. These sensors, equipped with a depth camera and placed in living areas, analyze risky behaviors such as falls and send an alert when detected. This anomaly recognition is performed by artificial intelligence directly on the sensor.

Fall Detection

- Design of a fall detection algorithm using various AI models
- State of the art on object detection models, human pose estimation, pose uplifting
- Comparison of different approaches: *Top-Down*, *Bottom-Up*, 2D vs 3D keypoints
- Comparison and implementation of tracking methods
- Development of the software integrating all components

Optimization of AI Models for Embedded Systems

- Model quantization
- Hardware optimization
- Testing of different runtimes and backends

Behavioural Model & Scene Understanding

- Room Layout Estimation and 3D Scene Understanding
- Evaluation of action recognition models (mmaction)
- Implementation of an unsupervised action recognition model from skeleton data
- Anomaly detection

Sensor Management and Monitoring

- Use of *Prometheus*, *Grafana*, *Loki* for sensor monitoring
- Creation of global and sensor-specific dashboards with *Grafana*. Alert creation.
- Containerization of the various modules with *Docker*
- Development of a web and mobile application for alert and sensor monitoring

CNRS - UMR5549 Brain and Cognition Laboratory CerCo

Toulouse, France

Research Engineer

Nov. 2014 - Feb. 2019

At CerCo, I worked on two major projects: the EpiFaR project — Epilepsy and Fast-Ripples — and the M4 project — Memory Mechanisms in Man and Machine. The EpiFaR project aimed to better understand fast-ripples, fast oscillations considered as potential biomarkers of the epileptogenic zone. The project also enabled the validation of a new type of hybrid intracranial electrodes. The M4 project aimed to better understand long-term memory mechanisms.

EpiFaR Project

- Data acquisition and storage. Organization and preprocessing. Noise-level measurement. File conversion.
- Development of an EEG data visualization interface. Visualization in time, frequency, and time-frequency domains. *Code: https://github.com/tinmarD/micmac*
- Design and evaluation of automatic fast-ripple detection algorithms based on the literature.
- Development of the pySAB module for analysis of data from the SAB experiment aimed at evaluating memory mechanisms. *Code: https://github.com/tinmarD/micmac*
  - Analysis of Event-Related Potentials (ERPs)
  - Multivariate Pattern Analysis using SVMs
  - Feature importance using Random Forest Trees
- Analysis of spike-sorting results from micro-electrode data.

M4 Project

- Development of a simple model of the human cochlea. The input audio is converted into a series of pulses (spikes). *Code: https://github.com/tinmarD/simplecochlea*
- Implementation and testing of an unsupervised learning algorithm based on STDP (Spike Timing Dependent Plasticity) for recognizing audio patterns.

Freelance

Toulouse, France

Developer / Computer Vision

Oct. 2013 - Jun. 2014

- Automatic bib number recognition
- Automatic license plate recognition

Education

Grenoble INP, Phelma

Grenoble, France

Engineering Degree – Signal Processing

2010 - 2013

- Track *Signal and Image Processing, Communication Systems and Multimedia*

Aalto University

Espoo, Finland

Erasmus Semester

Sept. 2012 - Dec. 2012

Lycée A. R. Lesage

Vannes, France

Preparatory Classes

2007 - 2010

Skills

Programming Languages and Frameworks

- **Programming Languages**: Python, Matlab, JavaScript, C++.
- **Web backend frameworks**: Django, Flask, FastAPI, Streamlit
- **Web frontend frameworks**: React, NodeJS, React Native, Expo
- **Documentation**: Markdown, LaTeX, Sphinx

Machine Learning and AI

- **Classical algorithms**: Linear Regression, Support Vector Machines (SVM), Clustering algorithms (KNN, K-means)
- **Deep Learning**: Convolutional Neural Networks, Transformers, Embeddings
- **ML libraries**: Scikit-Learn, PyTorch, openMMLAB, HuggingFace, transformers, Tensorflow
- **Edge AI**: onnx, tensorrt, OpenVINO, litert (tensorflow-lite), executorch
- **MLOps**: MLFlow, Data Version Control
- **Data Visualization**: matplotlib, seaborn, networkx, three.js, Voxel

DevOps

- **Version Control, CI/CD**: GitHub Actions
- **Containerization, Hypervisors**: Docker, Proxmox, Portainer
- **Cloud Platforms**: GCP, AWS
- **Automation**: Ansible, n8n
- **Monitoring**: Grafana, Prometheus, Loki, Uptime-Kuma

Academic Papers

2019	**Neuronal spiking activity highlights a gradient of epileptogenicity in human tuberous sclerosis lesions**, Despouy, E. et al.	*Clinical Neurophysiology*
2019	**A Fast Visual Recognition Memory System in Humans Identified Using Intracerebral ERP**, Despouy, E. et al	*Cerebral Cortex*
2020	**Recording local field potential and neuronal activity with tetrodes in epileptic patients**, Despouy, E. et al	*Journal of Neuroscience Methods*
2020	**24-Month-olds and over remember novel object names after a single learning event**, Remon, D. et al.	*Journal of experimental child psychology*