Reda EL HAIL

AI Researcher

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Education

- **Ph.D. in Machine Learning**
  Arenberg Doctoral School, KU Leuven, Belgium
  Thesis: Radar-based Human Activity Recognition using Deep Learning
  2021 – Present

- **Master's in Mathematics and Image Processing**
  ISTIC, Rennes 1 University, France
  2016 – 2019

- **Engineering Diploma in Electrical Engineering**
  Mohammadia School of Engineers, Rabat, Morocco
  2012 – 2016

Professional Experience

- **Machine Learning Engineer**
  KU Leuven, Geel Campus (DTAI-FET)
  2021 – Present
  - Led end-to-end development of machine learning models for human activity recognition (HAR) using radar data, achieving state-of-the-art performance in activity classification and detection in unseen conditions.
  - Designed and executed data collection campaigns, ensuring high-quality datasets for model training and validation.
  - Developed advanced deep learning architectures (CNN-LSTM) for HAR, leveraging TensorFlow for model training, optimization, and deployment.
  - Implemented semi-supervised learning techniques for unsupervised domain adaptation, improving model generalization across diverse environments.
  - Optimized models for edge deployment on Cortex M7 devices, utilizing quantization and pruning techniques (CMSIS-NN) to reduce computational overhead.
  - Built CI/CD pipelines using Docker and GitHub hooks for seamless deployment of machine learning models on edge devices.
  - Collaborated with industry partners (Intec, Televic, Commeto, Sentigrate) to align research objectives with real-world applications, ensuring practical relevance and scalability.
  - Managed codebase and experiments using Git and MIFlow, ensuring reproducibility and efficient tracking of model performance metrics.

- **Machine Learning Engineer (Time Series Analysis)**
  InterDigital R&D, Cesson Sevigne, France
  2019 – 2020
  - Developed machine learning models for human activity recognition using range profile maps, achieving high accuracy in classification tasks.

- Extracted and engineered features from time-series data, employing traditional ML methods (SVM, LDA, KNN) and deep learning approaches (CNN, RNN, Autoencoders).
- Deployed real-time activity recognition systems on Raspberry Pi, demonstrating the feasibility of low-power, edge-based AI solutions.
- Utilized Python, TensorFlow, and scikit-learn for model development, achieving significant improvements in classification accuracy and computational efficiency.

Technical Skills

- **Programming Languages**: Python, MATLAB, SQL
- **Machine Learning Frameworks**: TensorFlow, Keras, Scikit-learn, PyTorch
- **Data Processing & Visualization**: Pandas, NumPy, Matplotlib, Seaborn, Plotly, OpenCV
- **Cloud & DevOps**: Docker, GitHub Workflows, Google Cloud Platform (Vertex AI)
- **Edge AI**: CMSIS-NN, TensorFlow Lite, Raspberry Pi, Cortex M7
- **Tools**: Git, MIFlow, Optuna

Publications

- **Radar-Based Human Activity Recognition: From Classification to Detection**
  Presented at BNAIC/BeNeLearn 2024
  - Introduced novel deep learning techniques for HAR using radar data, achieving significant improvements in detection accuracy and robustness.
- **Radar Based Human Activity Recognition: a Study on Cross-Environment Robustness**
  Submitted to MDPI Journal
  - Discovering new deep learning techniques to improve model robustness to unseen situations during training.

Languages

- **Arabic**: Native
- **English**: Fluent
- **French**: Fluent

Key Achievements

- Successfully deployed machine learning models on edge devices, reducing latency and improving real-time performance.
- Published research on radar-based human activity recognition, contributing to the advancement of AI in sensor-based applications.
- Collaborated with industry leaders to bridge the gap between academic research and industrial applications.