

# Adele Pia Romano

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## Experience

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### Machine Learning Engineer *Knowlix GmbH*

*Tutzing, Germany*  
*Feb 2023 – Ongoing*

- Designed MCP-compliant AI agents with LangChain and custom retrieval modules, enabling consistent context sharing and multi-tool orchestration across backend systems.
- Implemented a retrieval-augmented generation (RAG) pipeline to enhance chat capabilities with contextual document retrieval.
- Delivered 97% accuracy and 99% recall in document detection through data augmentation and model fine-tuning on AWS, deploying the optimized model to iOS via CoreML.
- Designed and trained a semantic segmentation model achieving 95% pixel-level accuracy in extracting document regions from images.
- Fine-tuned an OCR-free Vision-Language Model (VLM) for key information extraction, achieving 98% accuracy and deploying on AWS SageMaker.
- Optimized and fine-tuned a small language model (SLM) for on-device key information extraction, achieving 96% accuracy and efficient CoreML deployment on iOS.
- Designed and productized custom modules on a Python-based ERP platform, translating business workflows into scalable services and reducing manual ops; built end-to-end CI/CD on AWS for zero-downtime deploys.

### Research Fellow *University of Calabria*

*Rende, Italy*  
*May 2022 – Dec 2022*

- Developed an Audio Enhancement System for music restoration by training a Generative Adversarial Network (GAN) with a Vision Transformer (ViT) generator on spectrogram reconstruction, achieving state-of-the-art performance with a 56% LSD improvement and +2.23 dB SNR gain. Published results in the Journal of Intelligent Information Systems (2023). DOI: [10.1007/s10844-023-00833-w](https://doi.org/10.1007/s10844-023-00833-w) [🔗](#).

## Education

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### University of Calabria *MS in Artificial Intelligence and Machine Learning*

*Sept 2019 – Apr 2022*

- Score: 110/110 cum Laude
- Thesis: "Audio Super-resolution via Vision Transformer"

### University of Calabria *BS in Computer Engineer*

*Sept 2016 – Sept 2019*

- Score: 106/110
- Thesis: "A classification algorithm for gene expression data based on individual networks"

## Skills

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**Machine and Deep Learning:** PyTorch, TensorFlow, JAX, Transformers, CNNs, RNNs, GANs, Vision Transformers (ViT), vLLM, Llama.cpp, CoreML, MLX, ONNX, TorchVision, Scikit-Learn, NumPy, pandas, SciPy, OpenCV, PIL, librosa, NLTK, Matplotlib, Seaborn.

**Large Language Models & Agent Systems:** Pre-Training, Supervised Fine-Tuning (SFT), LoRA, Quantization, LangChain, MCP (Model Context Protocol), Retrieval-Augmented Generation (RAG), Prompt Engineering.

**MLOps & Deployment:** AWS (SageMaker, EC2, S3), Azure ML, Docker, CI/CD, FastAPI, Flask, Jupyter, Git, Model Optimization & Conversion (ONNX, CoreML).

**Programming Languages:** Python, Swift, Java, JavaScript, C, Assembly.

**Databases:** SQL (MySQL, PostgreSQL), NoSQL (MongoDB, DynamoDB).