Simone Sorrenti

LinkedIn, GitHub, Website

Location: Milan & Bern (available for relocation)

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SKILLS

- **Programming Languages**: Python, Java, C++, SQL, JavaScript, PHP, HTML, CSS
- **Technologies & Tools**: ROS2, Deep Learning, Computer Vision, CNN, LLM, Transformers, Git, Linux, Vector DBs
- **Frameworks & Libraries**: PyTorch, TensorFlow, OpenCV, HuggingFace, Pandas, NumPy, Matplotlib, NLTK, FAISS
- **Languages**: English (Intermediate), Italian (Native)

EXPERIENCE

- **TXT E-Tech**   Milan, Italy

  *R&D AI Engineer - Aerospace & Defence [**Article**]*   *Jun 2024 — Present*

  - **Robotic Arm for Aircraft Cockpit Testing with Computer Vision and Aural Recognition**:
    - **ROS2 Infrastructure:** Developed C++/Python ROS2 frameworks for data exchange across robotic, visual, and audio modules.
    - **Data Pipelines:** Built data pipelines with augmentation for model training and evaluation.
    - **Object Detection & OCR:** Applied RT-DETRv2 for cockpit component localization and integrated EasyOCR/Florence2 for text recognition, optimizing with CUDA.
    - **Few-Shot Classification of Cockpit Panels:** Developed a pipeline to classify localized avionics panels with only one reference image per class, achieving **99.9% accuracy** while drastically reducing annotation effort.
      - Extracted embeddings with **DINOv3**, stored reference vectors in a FAISS database, and applied a **KNN ranking strategy** combining max similarity, trimmed mean, std, and normalized counts.
      - Enhanced reference robustness through data augmentation (rotation, perspective, brightness, contrast, scale) and improved embedding space with **Proxy-Anchor metric learning** fine-tuning.
    - **Audio Verification:** Created an audio matching system using MFCC, DTW, and cosine similarity.
    - **Dataset Creation:** Led dataset creation, reducing annotation and post-processing time.
  - **Panel Inspection Analysis for Identifying Defective Solar Cells in Satellites**:
    - **Anomaly Detection:** Trained autoencoders/classifiers on patch-based high-res solar images, achieving 95% recall and 75% precision.
    - **Object Detection:** Applied DETR for solar cell localization with optimized inference performance.
    - **Inference Backend:** Built a Python backend for batch processing, optimized pre/post-processing, and real-time anomaly reporting through controller integration.

- **Polytechnic University of Milan**   Milan, Italy

  *Student Researcher - European Project: Waste detection from satellite images [**GitHub**]*   *Feb 2023 — Apr 2024*

  - **Model & Pipeline Development**: Built CNN and Transformer models for waste localization (90% accuracy), with a training pipeline including data augmentation, loss optimization, and hyperparameter tuning.
  - **Weakly Supervised Segmentation**: Applied landfill localization using weak supervision (Hierarchical Heatmap Generation, Multiple Instance Learning, Grad-CAM) without pixel-level annotations.

- **Blue Reply**   Milan, Italy

  IT Consultant - Insurance & Banking   *Jun 2019 — Aug 2020*

  - **Backend & API Development**: Developed backend algorithms and API microservices for customizable document templates, automating layout processing and optimizing system integration.
  - **Frontend Development**: Built dynamic interfaces to enhance user experience and performance.

EDUCATION

- **Polytechnic University of Milan**   Milan, Italy

  MSc in Computer Science; GPA: 3.74 (28.05/30)   *Sep 2020 – Apr 2024*

  - **Thesis**: Perivallon - Detection of Illegal Landfills using Deep Learning: A Weakly Supervised Approach

- **University of Bari Aldo Moro**   Bari, Italy

  BSc in Computer Engineering; GPA: 3.79 (28.45/30)   *Sep 2014 – Oct 2018*

  - **Thesis**: Solar radiation prediction through Machine Learning algorithms

PROJECTS

- **Contrastive Language-Image Pre-Training**: Applied CLIP with contrastive learning for image captioning, zero-shot classification and retrieval. Evaluated ViT, BERT, and ResNet encoders. [**GitHub**]
- **Mathematical Models and Methods for Image Processing**: Implemented denoising, inpainting, and anomaly detection using OMP, KSVD, BM3D, and RANSAC. [**GitHub**]
- **Question Answering System**: Finetuned extractive (BERT, RoBERTa) & generative (GPT2) LLM models, fine-tuned on SQuAD with 82.94 F1. [**GitHub**]