Niccolò **Marini**

Work Experience

Media Integration and Communication Center: MICC

Florence, Italy

Researcher

Jun. 2024 - on going

- Collaborating with the **Media Integration and Communication Center (MICC)** on the European project **AI4DEBUNK**, focusing on the development of DeepFake detection applications across both video and image domains, enhancing media manipulation detection capabilities with accuracies up to 97%.
- Currently developing a hybrid multi-domain technique that leverages cross-attention between a pixel-domain ResNet and a wavelet packet-based ResNet, with the goal of improving baseline accuracy in cross-dataset and cross-forgery detection. This approach aims to enhance the model's generalization capability across different types of image manipulations.
- Working with an interdisciplinary team to contribute to European efforts in AI-based misinformation detection.

Education

University of Florence

84/110

Expected Graduation Date: December 2025

M.S. in Artificial Intelligence

- **Main Courses:** Generative Models, Computer Vision, Computer Graphics, Statistical Modeling/Learning, DeepLearning, DeepLearning Application, Parallel Programming, Data Mining

B.S. in Computer Science and Engineering

Graduation Date: April 2024

- **Main Courses:** Software Engineering, Network architectures, Algorithms and data structures, Artificial Intelligence, Algorithm optimisation

Recent Projects

DeepFake Detection Tool

Video Demo

Python, Pytorch, PyQT

- Implemented the tool by training five Xception Convolutional Neural Networks (CNNs) on diverse face manipulation methods.
- Leveraged pretraining on the ImageNet dataset, followed by fine-tuning on the FaceForensics++ dataset obtaining 97% of accuracy across all manipulation methods.
- Enabled users to seamlessly detect DeepFake content in real-time by effortlessly loading videos through an intuitive and user-friendly graphical interface.
- Incorporated state-of-the-art image forensics detection techniques from the TruFor paper, enhancing the tool's accuracy in detecting various forgery types.
- Engineered a sophisticated DeepFake detection tool with a user-friendly PyQt GUI. u

Energy, Emissions and Performance: Cross-Language and Cross-Algorithm Analysis in Machine Learning

Repository

C++,Java,Python,R,Matlab

Team Project

- Analyzed the efficiency of machine learning algorithms by implementing CodeCarbon for tracking energy consumption, execution time, and CO2 emissions across different programming languages.
- Implemented logistic regression, decision tree, random forest, and other algorithms in multiple programming languages and on datasets like Breast Cancer, Wine Quality, and Iris, enabling cross-language performance comparisons.
- Achieved insights into trade-offs between performance and environmental impact, contributing to the development of energy-efficient machine learning practices by demonstrating that cpp can be more than 10 times faster and more efficient than python.

Publications

Green AI: Which Programming Language Consumes the Most?

Article

Team Publication

Skills

Programming C++ Python Java Lua MySQL R Matlab LaTeX Javascript
Languages Italian, English (B2)