Ruben Ciranni

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Education

ETH Zurich Zurich
Master's Degree in Computer Science (Major in Machine Intelligence) Sep 2024 - Present
Relevant Coursework: Advanced Machine Learning, Probabilistic Artificial Intelligence, Time Series Analysis, Algorithms Lab.

Sapienza University of Rome Rome
Bachelor's in Computer Science and Artificial Intelligence Sep 2021 - July 2024
GPA: 29.65/30, Top 1%, Final Grade: 110/110 with Honours.
I was selected as one of the top 6 students in my cohort to take part in the Honours Program.

Work and Research Experience

GLADIA Research Lab (Sapienza University of Rome) Rome
Research Intern Feb 2024 - Sep 2024

- Conducted research in applications of contrastive learning methods and diffusion models to music audio.
- Designed and implemented COCOLA, a novel contrastive learning method for estimating the harmonic and rhythmic coherence of music audio tracks. The model achieves 93.87% test accuracy on the binary contrastive prediction task.
- First authored a research paper (listed in Publications section) presenting our work, realized in collaboration with Sony Stuggart R&D Labs and Ca' Foscari University of Venice.

Amazon Luxembourg
Software Development Engineer Intern Jun 2023 - Sep 2023

- Re-architectured the Backend API of an internally used AWS web application.
- Proposed and implemented various solutions to improve scalability, efficiency and availability, reducing the average endpoint latency by 50%. Given the impact of the solutions I found, I led a knowledge share that resulted in implementing those solutions across other projects owned by my team.
- After the internship, I received a full-time return offer, but I decided to pursue a master's degree instead.

Publications

Ciranni, Ruben et al. (2024). *COCOLA: Coherence-Oriented Contrastive Learning of Musical Audio Representations*. Preprint, accepted at ICASSP 2025. URL: https://arxiv.org/abs/2404.16969.

Selected Projects

COCOLA
Designed and implemented (Python + PyTorch + Lightning) COCOLA, a contrastive model which estimates the harmonic and rhythmic coherence between pairs of music audio examples. The code and weights of the model are publicly available on the official GitHub repository, which currently counts 21 stars.

Parallel PCA
Designed and implemented (C + MPI + PThreads) with a team of 3 students a parallel algorithm for Principal Component Analysis (PCA) applied to image compression.
Achieved a 2.5x speedup to the serial implementation.

SelfDrivingDrone
Designed and implemented (Python + PyTorch + OpenCV) with a team of 3 students an AI agent that leverages state-of-the-art object detection algorithms, including Faster R-CNN and SSDlite, to enable a mini drone to fly autonomously through an obstacle course.

Skills

Programming Languages:	Python, C/C++, Go, Java, JavaScript, TypeScript, Node.js, R
Parallel and GPU Programming	MPI, PThreads, CUDA
Machine Learning:	PyTorch, Lightning, Tensorflow, Keras, scikit-learn
Data Analysis:	pandas, scikit-learn, R
Cloud	AWS, Google Cloud
Databases:	SQL, MongoDB, Neo4J

Other

I'm a pianist and composer, in July 2022 I was awarded the Trinity LTCL Diploma in Piano with Distinction. I have a music-related YouTube Channel.