Marco **Mistretta**

PhD student in Artificial Intelligence at Media Integration and Communication Center - Florence - Italy

About me

I'm an AI engineer with a strong focus on Deep Learning, Multimodal Learning, Natural Language Processing, Contrastive Self-Supervised Learning, and Incremental Learning. I have worked on several AI projects during my Master's degree and I'm eager to deepen my knowledge through research.

Research Interests

My research interests lie in the wide-ranging application of Multimodal Learning with Language Models across a multitude of sectors. A prime example is their potential use in healthcare, where these advanced technologies could be pivotal in enhancing medical diagnostics, treatment methodologies, and the overall quality of patient care. My aspiration is to broaden the scope of such high-impact applications to encompass an even more diverse array of fields.

Personal

Marco Mistretta
Nationality: Italian
Gender: male (he/him)
Born: 14/04/99
Location: Foiano della Chiana (Arezzo, AR)

Interests

Chorister at "Coro Giovanile Effetti Sonori" (National Competition Winner), Guitarist for "I Green Clouds" (Provincial Competition Winner), Casual Gamer

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Degrees

2018–2021	**Computer Engineering** B.Sc. · University of Florence Graduated: 27/09/2021 (105/110)	
2021–2023	**Artificial Intelligence** M.Sc. · University of Florence Graduated: 17/07/2023 (**magna cum laude**)	

Projects

- **Incremental Med-CLIP** (master's thesis): explores the fine-tuning of pre-trained multi-modal medical vision-language models for multilabel classification of CheXpert chest X-rays in incremental learning scenarios. The proposed approach involves freezing the backbones and training simple architectures on top of the encoders, ensuring privacy and data security while reducing computational requirements. The thesis demonstrates that complex incremental learning techniques are unnecessary, as the proposed simple method achieves baseline performance on par with CheXpert (Python, PyTorch)
- **Contrastive Learning for Medical Image Classification**: an unified re-implementation of the 2 famous frameworks for contrastive learning: SimCLR and MoCo for Image Classification of CheXpert X-rays and Retina images (Python, Pytorch)
- **Quantum Computing for Reinforcement Learning**: a variational quantum algorithm for deep Q-learning to learn the Cart Pole Environment (Python, PyTorch, Qiskit)
- **FreeParksPrediction**: I trained an LSTM to predict the exact numbers of free parks in the parks of Florence within 24hrs in advance obtaining satisfactory results (Python, Keras)
- **Escape The Camera Cafe VR**: an Escape Room VR Game office themed (C#, Unity)
- **TFT analisys**: a statistical data analysis of Teamfight Tactics players matches. The project involves the training of statistical models to gain insights into the game-play (Python, R)
- **PICK-IT!**: a web app to manage the champion selection of the famous League of Legends PC-game with your smartphone (HTML, Javascript, Python, Flask)
- **Generative Music** (bachelor's thesis): an alternative solution for generating musical sequences by modelling a directed weighted graph where each node is an available musical pattern, and the weights represent the affinity between patterns. To do that I trained a CNN to predict the quality of musical transitions, from a measure A to a measure B, modelling every MIDI musical pattern as an RGB image. (Python, Tensorflow)
- **Stochastic Markovian Fault Trees Analyzer**: A package that facilitates modeling of SMFTs while enabling definition of confidence intervals for the expected value of the operating state, and assessment of their ergodic nature (Java, Oris, Sirio)
- **Simple Drum Machine**: A Windows/Ubuntu drum machine application that allows easy creation of drum sequences tailored to your preferred sound style (C++, Qt)

Pubblications

NeurIPS 2023	**Presented at Medical Imaging meets NeurIPS** · New Orleans, LA RE-tune: Incremental Fine Tuning of Biomedical Vision-Language Models for Multi-label Chest X-ray Classification

Languages

Italian	C2	Mother tongue
English	B2	Upper Intermediate

Achievements

4th place	**AI&Games Jam (2022)** hide-and-seek game where hiders are controlled through DRL

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