MARCO CANTONE

PhD in Computer Engineering specializing in medical image analysis and deep learning. Fluent in English, experienced in international collaboration and scientific publishing. I am familiar with some widely used programming languages, including C++ and Python, and have experience with libraries and frameworks used in machine and deep learning such as pandas, scikit-learn, and PyTorch. My research mainly focuses on medical image analysis, in particular breast cancer detection. Within this field, I address various tasks like classification and object detection using different models including CNNs and Transformers.

EDUCATION

Bachelor's Degree in Computer and Telecommunications Engineering
University of Cassino and Southern Lazio, Cassino, Italy
09/2015 – 12/2019
Final mark: 110/110
Thesis title: Deep learning using 2D Sinc convolutional filters for image classification.

The thesis focused on developing a convolutional Sinc filter acting as a bandpass filter in the frequency domain. The convolutional layer filters are unlearnable and are constructed from the upper and lower cut-off frequencies of the BPF, which are the learned parameters. The Sinc filter is used as the filter layer of a CNN, acting as a preprocessing stage capable of highlighting different frequency components of the input image. This preliminary study led to the publication of the article Learnable DoG convolutional filters for microcalcification detection.

Master's Degree in Computer Engineering
University of Cassino and Southern Lazio, Cassino, Italy
12/2019 – 04/2022
Final mark: 110/110 cum laude
Thesis title: Mammography Classification with Convolutional and Attentional Neural Networks.

This master thesis focused on the study and application of the convolutional and attentional paradigm for the classification of FFDM in normal/malignant based on the presence and type of the lesion in the input image. This work was further developed during a research fellowship and conducted to the publication of the article Convolutional Networks and Transformers for Mammography Classification: An Experimental Study.

RESEARCH EXPERIENCE

Research Fellowship
University of Cassino and Southern Lazio, Cassino, Italy
06/2022 – 10/2022
Title: Image processing with convolutional networks and attentional networks.

During this period we continued the work started in master thesis about the application of CNNs and Visual Transformers for the classification of FFDM. We extend the research exploring the relationship between the two

diverse image process paradigms and different types of lesions (masses, calcifications, architectural distortions, and focal asymmetries). We also assess the impact of input resolution on the classification performance. This research fellowship which culminated with the publication of Convolutional Networks and Transformers for Mammography Classification: An Experimental Study.

PhD course in Methods, Models, and Technologies for Engineering
University of Cassino and Southern Lazio, Cassino, Italy
11/2022 – 10/2025

For roughly the first year of the PhD program, the research focused on the application of Machine and Deep Learning for the real-time detection of network attacks. Network traffic acquisition, feature extraction, and the application of machine learning models were evaluated. The research mainly focused on the generalization capability of ML models between publicly available NIDS datasets. We investigate feature redundancies and data heterogeneity, concluding with the writing of the article Machine Learning in Network Intrusion Detection: A Cross-Dataset Generalization Study.
After this, we shifted our focus to Deep Learning for medical image analysis, especially in the field of breast cancer. We are currently designing custom transformer models for Digital Breast Tomosynthesis classification with an emphasis on explainability and models for vessel segmentation and removal in Breast MRI.

International Experience
Radboudumc, Nijmegen, Netherlands
09/2024 – 03/2025
During my PhD, I spent six months at Radboud University Medical Center in the Netherlands as a visiting researcher. There, I collaborated with a team of radiologists on a research project focused on vessel segmentation and removal in breast MRI.

PUBLICATIONS

Convolutional Networks and Transformers for Mammography Classification: An Experimental Study
Sensors
January 2023

Learnable DoG convolutional filters for microcalcification detection
Artificial Intelligence in Medicine
July 2023

Machine Learning in Network Intrusion Detection: A Cross-Dataset Generalization Study
IEEE Access
October 2024

Transformer Models for Enhanced Calcifications Detection in Mammography
ICPR 2024
December 2024

Deep learning for DBT classification with saliency-guided 2D synthesis
Pattern Recognition
April 2026

DeepVEST: Deep Learning-based Vessel Segmentation and Erasure in Breast MRI for Improved Lesion Assessment
Radiology: Artificial Intelligence
Under review

Cassino, 22/10/2025