

Francesco Cappio Borlino

PHD STUDENT AT POLITECNICO DI TORINO

✉ francesco.cappio@polito.it | 🏠 francescocappio.github.io | 📧 FrancescoCappio | 🎓 Google Scholar



Summary

I am a Ph.D. student in Computer And Control Engineering at Politecnico di Torino. I work on Deep Learning based techniques for Computer Vision tasks, mainly visual object recognition and detection. My research focus is on robustness of models across semantic and visual domain shifts: I work on semantic anomaly detection and visual domain adaptation and generalization. My purpose is to build models that are ready for real world applications.

Skills

Programming Languages	Python, Java, C, C++, Bash, SQL, Javascript, PHP
Technologies and Frameworks	Linux, PyTorch, Jax+Flax, Hadoop, Spark, Android Studio
Languages	Italian: Native English: level B2-C1 (First CE) French level: B2-C1
Interests	Technology Deep/Machine Learning Free Software Hiking Cooking Reading

Education

Politecnico di Torino

PHD IN COMPUTER AND CONTROL ENGINEERING

Turin, Italy

May, 2020 - Ongoing

- Research in Deep Learning for Computer Vision

4th International School on Deep Learning

DEEPLearn 2021 SUMMER

Las Palmas de Gran Canaria, Spain

July 26-30, 2021

Politecnico di Torino

MASTER'S DEGREE IN COMPUTER ENGINEERING

Turin, Italy

Oct. 2017 - Dec. 2019

- **Thesis:** "Visual object detection across different domains by solving self supervised tasks".
Abstract: Deep Neural Network models based on convolutions need a large dataset to be trained successfully. In the Computer Vision context this implies that a lot of labeled images have to be collected in order to obtain a model with good performances. A trained model is then often unusable when exploited in a visual domain which is different from the training one; moreover the data collection and labeling process can be physically or economically impossible in some visual domains. From these considerations the need to develop algorithms robust to visual domain shifts. Self supervised tasks have shown a great potential as a strategy to learn useful features from unlabeled images. They can therefore be used in cross domain analysis as a method to obtain feature alignment between different domains. The purpose of this thesis is to study how self supervised tasks can be used to develop well performing visual object detection models in various cross domain analysis settings: Domain Generalization, Domain Adaptation and a new more general and challenging setting called One-Sample adaptation.
Supervisors: Barbara Caputo, Tatiana Tommasi, Antonio D'Innocente.

- **Final mark:** 110L/110

Politecnico di Torino

BACHELOR'S DEGREE IN COMPUTER ENGINEERING

Turin, Italy

Oct. 2014 - Sept. 2017

- **Final Mark:** 107/110

Publications

One-shot unsupervised cross-domain detection

2020

AUTHORS: ANTONIO D'INNOCENTE, FRANCESCO CAPPIO BORLINO, SILVIA BUCCI, BARBARA CAPUTO, AND TATIANA TOMMASI

Link

In: European Conference on Computer Vision, ECCV 2020

Domain Generalization vs Data Augmentation: An Unbiased Perspective

AUTHORS: FRANCESCO CAPPIO BORLINO, ANTONIO D'INNOCENTE, AND TATIANA TOMMASI.

In: Computer Vision – ECCV 2020 Workshops

2020

[Link](#)

Rethinking Domain Generalization Baselines

AUTHORS: FRANCESCO CAPPIO BORLINO, ANTONIO D'INNOCENTE, AND TATIANA TOMMASI.

In: 25th International Conference on Pattern Recognition, ICPR 2020

2021

[Link](#)

Distance-based Hyperspherical Classification for Multi-source Open-Set Domain Adaptation

AUTHORS: SILVIA BUCCI, FRANCESCO CAPPIO BORLINO, BARBARA CAPUTO, AND TATIANA TOMMASI

In: Winter Conference on Applications of Computer Vision, WACV 2022

2022

[Link](#)

Contrastive Learning for Cross-Domain Open World Recognition

AUTHORS: FRANCESCO CAPPIO BORLINO, S. BUCCI, T. TOMMASI

In: The 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022)

2022

[Link](#)

Semantic Novelty Detection via Relational Reasoning

AUTHORS: FRANCESCO CAPPIO BORLINO, S. BUCCI, T. TOMMASI

In: European Conference on Computer Vision, ECCV 2022

2022

[Link](#)

Self-Supervision & Meta-Learning for One-Shot Unsupervised Cross-Domain Detection

AUTHORS: FRANCESCO CAPPIO BORLINO, S. POLIZZOTTO, B. CAPUTO, T. TOMMASI

In: Computer Vision and Image Understanding Journal (CVIU)

2022

[Link](#)

Towards Open Set 3D Learning: Benchmarking and Understanding Semantic Novelty Detection on Pointclouds

AUTHORS: A. ALLIEGRO, FRANCESCO CAPPIO BORLINO, T. TOMMASI

In: Proceedings of the Neural Information Processing Systems (NeurIPS) Track on Datasets and Benchmarks, 2022

2022

[Link](#)

Work Experience

Politecnico di Torino

PHD STUDENT

[Turin, Italy](#)

May. 2020 - Ongoing

- **Teaching Assistant:**
 - 2020-2021: master course on Artificial Intelligence and Machine Learning
 - 2021-2022: master course on Artificial Intelligence and Machine
- **Reviewer:** ECCV 2020, TASKCV 2020, NeurIPS 2020, ICRA 2021, CVPR 2021, ICCV 2021, WACV 2022, Pattern Recognition Journal, ICPR 2022

Italian Institute of Technology

RESEARCHER

[Turin, Italy](#)

Feb. 2020 - Apr. 2020

- Further development of my Master's Degree Thesis project in visual object detection across domains.

Feedback Italia Srl

SOFTWARE DEVELOPER

[Moncalieri, TO | Italy](#)

Mar. 2017 - Jan. 2019

- I did a curricular Internship and I was then offered a job as a software developer that I kept while studying for my Master's Degree. I worked almost two years developing a messaging application for Android and a C/C++ based service for a Linux embedded system. I left this position to work on my Master's Degree thesis.

Projects

Tracking of WiFi devices using broadcasted packets

C++, C, QT, SQL, EMBEDDED SYSTEMS

2019

- Development of a system based on cheap COTS microcontrollers able to track WiFi devices by capturing and analyzing broadcasted packets (Probe requests)

Eat@Home: Android application for Food Delivery

ANDROID DEVELOPMENT

2019

- Development of an Android Application for food delivery based on the Firebase Cloud Storage. The app allows customers to place orders, restaurators to manage them and riders to deliver them with map directions