Davide **Talon**

PhD Student in Machine Learning

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Education

2020 - Today | **PhD Student in Machine Learning** | *Istituto Italiano di Tecnologia (IIT)*

Third year PhD student at University of Genova.

Pattern Analysis and Computer Vision Group, advised by Dr. Alessio del Bue and Dr. Stuart James. Working on representation learning for causality and disentanglement in visual data. Submitting the thesis in December 2023, dissertation defense planned for February/March 2024.

Jan 2023 - June 2023 | **Visiting student** | *INDELab - University of Amsterdam (UvA)*

Working with Prof. Sara Magliacane on efficient adaptatation of Causal Representations for new unseen environments.

2017 - 2020 | **M.S. Computer Engineering** | *University of Padova*, 110 *cum laude*

Thesis: "Contextual Multi-task Learning via Regularization",

Advisor: Alessandro Chiuso.

Coursework: Data structures and Algorithms, Advanced Algorithms, Big Data Computing, Parallel Computing, Machine Learning, Computational Neuroscience, Operations Research, Intelligent Systems [Github], Human Data Analytics [Github].

2013 - 2017 | **B.S. Information Engineering** | *University of Padova*, 103/110

Thesis: "Experimental study of adaptative video streaming algorithms",

Advisor: Andrea Zanella.

Relevant Working Experiences

Charanga Ltd Software Developer Intern

June 2012 | *Brighton, UK*

Initial prototype development of the Digital Assets Management System of the company (Ruby on Rails, SQLite).

Skills

Computer skills

Over 5000 lines: Python, Java, Matlab. Proficient with Pytorch, Numpy, HPC (PBS)

Soft skills

Team working, leadership, open-mindness, self-motivation, self-management, curiosity, problem setting, problem solving, persistence.

Selected projects

Causality and disentanglement

Currently working on Causal Representation Learning: from raw observations understand the underlying concepts and the causal relationships between them. In a second step, build on the modular nature of causal relationships to efficiently adapt to a new setting. *Under review.*

Puzzle Solving

Solving Jigsaw puzzles with a generative approach. Starting from patches, a generative model estimates their global placement. Assignment of pieces to slots is here framed as one-to-one assignment using a differentiable supervised approximation of the Hungarian algorithm.

Regularization in MTL

This work investigated how pre-trained single-task models can account for shared information with other tasks to improve their performance. To this end, we build on the conditioning capabilities of batch normalization parameters to align feature statistics of the multiple tasks [Github]

Raw Audio Generation

Development of a music generation system with a Generative Adversarial Network. The project aimed to generate fake music in the raw audio domain, which has the challenging problem of patterns at different time scales [Github]

Publications

Talon, D., Lippe, P., James, S., Del Bue, A. and Magliacane, S. "Towards the Reusability and Compositionality of Causal Representations." *NeurIPS Workshop on Causal Representation Learning*, 2023.

Maracani, A., Camoriano, R., Maiettini, E., Talon, D., Rosasco, L., & Natale, L. "Key Design Choices for Double-Transfer in Source-Free Unsupervised Domain Adaptation." *ECML Workshop on Reliable Multimodal Learning Across Domains*, 2023.

Talon, Davide, Alessio Del Bue, and Stuart James. "GANzzle: Reframing jigsaw puzzle solving as a retrieval task using a generative mental image." *IEEE International Conference on Image Processing (ICIP)*, 2022.

Talon, D., Attanasio, L., Chiariotti, F., Gadaleta, M., Zanella, A., Rossi, M. "Comparing dash adaptation algorithms in a real network environment." *European Wireless*, 2019.

Other activities

- Partecipant of Eastern European Machine Learning Summer School (EEML21).
- Partecipant of VISMAC23 Summer school.
- Reviewer for BMVC21, MULA@CVPR22, Pattern Recognition, CRL@UAI22, VISART@ECCV2022, nCSI@NeurIPS22, MULA@CVPR23, AtC@ECLMPKDD23, CRL@NeurIPS23