Andrea Cossu

Curriculum Vitae

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Personal Statement

I am a PhD Student in Data Science, under the supervision of Prof. Davide Bacciu, Dr. Vincenzo Lomonaco and Dr. Anna Monreale. My research focuses on Continual Learning, with applications to Recurrent Neural Networks models and sequential data processing.

Education

2019–2022 (ongoing) **PhD in Data Science**, *Scuola Normale Superiore and University of Pisa*, Italy.
Continual learning with applications to sequential data processing and recurrent models

2017–2019 **Master Degree in Computer Science - AI curriculum**, *University of Pisa*, Italy.
Thesis on continual learning with recurrent neural networks

2014–2017 **Bachelor Degree in Computer Science**, *University of Pisa*, Italy.
Thesis on novelty detection with Echo State Networks

Affiliations

Phd student, *Scuola Normale Superiore and University of Pisa*.

Board Member and Treasurer, *ContinualAI*, non-profit organization.
ContinualAI is the world's largest organization on continual learning, gathering together more than 1000 researchers and enthusiasts.

Member, *Pervasive AI (PAI) Lab*, University of Pisa and CNR.

Member, *Computational Intelligence and Machine Learning (CIML) group*, University of Pisa.

Visiting

Feb-Apr 2022 **Visiting researcher**, *KU Leuven*, ESAT department, PSI group, Prof. Tinne Tuytelaars.
Continual Learning with pretrained models and transformers for NLP and Vision

Awards

2021 **Best library award**, *CLVision workshop at CVPR*, Avalanche: an End-to-End library for Continual learning.

Supervision

2021 **Gabriele Merlin**, *Master Degree in Computer Science*, University of Pisa, Replay-based Approaches for Continual Learning.
Co-supervised with Vincenzo Lomonaco, Davide Bacciu, Antonio Carta

Andrea Rosasco, *Master Degree in Computer Science*, University of Pisa, Distilled Replay: mitigating forgetting through dataset distillation.
Co-supervised with Davide Bacciu and Antonio Carta

Newsha Ozgoli, *Master Degree in Computer Science*, University of Pisa, Evaluation of catastrophic forgetting in Echo State Networks.
Co-supervised with Davide Bacciu and Claudio Gallicchio

Teaching

2021 **Teacher**, *Deep Learning laboratory*, Master in Big Data, University of Pisa.

Teaching assistant, *Continual Learning: On Machines that can Learn Continually*, University of Pisa, ContinualAI.
First world's open-access course on Continual Learning
`https://course.continualai.org/`

Teacher, *Continual Learning nanolecture*, Neuromatch academy.

2020 **Teaching assistant**, *Computer Programming Laboratory 1*, Bachelor degree in Computer Science, University of Pisa.

Teacher, *Machine Learning module*, Data Science course, Tree s.r.l..

2019 **Teaching assistant**, *Smart Applications*, Master degree in Computer Science, University of Pisa.

Events organization

2022 **Co-Organizer**, *Continual Learning and Emergence of Intelligent Systems: Theory and Application, Special Session*, 2022 IEEE World Congress on Computational Intelligence (WCCI).

Co-Organizer, *Advances in Continual Learning: beyond Catastrophic Forgetting, Special Session*, 2022 IEEE International Conference on Evolving and Adaptive Intelligent Systems (EAIS).

2021 **PC member**, *International Conference on AI for People (CAIP)*.

Technical & web chair, *Continual Learning in Computer Vision (CLVISION) workshop*, CVPR 2021.

PC member, *International Workshop on Continual Semi-Supervised learning (CSSL)*, IJCAI 2021.

PC member, *AI for People special issue*, AI & Society Journal of Culture, Knowledge and Communication, Springer.

Projects

Avalanche, *Maintainer*.
Open-source library for continual learning
`https://github.com/ContinualAI/avalanche`

ContinualAI wiki, *Main maintainer*.
Resources and papers on continual learning
`https://wiki.continualai.org/`

Reproducible Continual Learning.
Reproducing continual learning experiments with Avalanche
`https://github.com/ContinualAI/reproducible-continual-learning`

Publications

2022 A. Carta et al. "Catastrophic Forgetting in Deep Graph Networks: A Graph Classification Benchmark". In: *Frontiers in Artificial Intelligence* 5 (2022).

2021 A. Carta et al. "Catastrophic Forgetting in Deep Graph Networks: an Introductory Benchmark for Graph Classification". In: *The 2021 Web Conference (WWW) Workshop on Graph Benchmarks Learning (GLB)*. version: 1. 2021.

A. Carta et al. "Ex-Model: Continual Learning from a Stream of Trained Models". In: *arXiv:2112.06511 [cs]* (Dec. 13, 2021).

A. Cossu, M. Ziosi, and V. Lomonaco. "Sustainable Artificial Intelligence through Continual Learning". In: Proceedings of the 1st International Conference on AI for People: Towards Sustainable AI. EAI, 2021.

A. Cossu et al. "Continual learning for recurrent neural networks: An empirical evaluation". In: *Neural Networks* 143 (Nov. 1, 2021), pp. 607–627. DOI: 10.1016/j.neunet.2021.07.021.

A. Cossu et al. "Continual Learning with Echo State Networks". In: European Symposium on Artificial Neural Networks (ESANN). version: 1. 2021. DOI: https://doi.org/10.14428/esann/2021.ES2021-80.

A. Cossu et al. "Is Class-Incremental Enough for Continual Learning?" In: *arXiv* (2021).

V. Lomonaco et al. "Avalanche: an End-to-End Library for Continual Learning". In: *CLVision Workshop at CVPR*. 2021.

A. Rosasco et al. "Distilled Replay: Overcoming Forgetting through Synthetic Samples". In: *1st International Workshop on Continual Semi-Supervised Learning (CSSL) at IJCAI*. 2021.

2020 A. Cossu, A. Carta, and D. Bacciu. "Continual Learning with Gated Incremental Memories for sequential data processing". In: *2020 International Joint Conference on Neural Networks (IJCNN)*. 2020 International Joint Conference on Neural Networks (IJCNN). ISSN: 2161-4407. July 2020, pp. 1–8. DOI: 10.1109/IJCNN48605.2020.9207550.

Working Experience

2014–2019 **R&D partner**, KLINK, Florence, Italy.
I designed and implemented the KLINK services related to network analysis and agent-based modelling and simulation. I participated in the sales activity and worked on a number of different projects based on these services for companies and organizations. In most cases, I took care of the final dissemination of the results directly to the client.

Programming languages and frameworks

Python, Tensorflow, Keras, Pytorch, experienced user.

C, Java, former user.

Languages

Italian Mother tongue

English Professional knowledge

French Basic knowledge