

Luca Baldini

Research interests Pattern recognition on non-metric space, granular computing, multi-agent based algorithms, evolutionary computation, distributed and parallel computing.

Education **Information and Communication Technologies PhD - University of Rome, "La Sapienza"** Rome, Italy
10/2018 – Present

Mentor: Antonello Rizzi

M.Sc on Electronic Engineering University of Rome, "La Sapienza"
Rome, Italy
Thesis: *k*-Medoid hardware acceleration
on Parallella cluster 09/2015 – 07/2018
Mentor: Antonello Rizzi.

B.Sc on Electronic Engineering University of Rome, "La Sapienza"
Rome, Italy
Thesis: Reverb reduction techniques for
sound sources binaural localization 09/2008 – 12/2013
Mentor: Raffaele Parisi.

Publications **Facing Big Data by an agent-based multimodal evolutionary approach to classification**

Mauro Giampieri, Luca Baldini, Enrico De Santis and Antonello Rizzi.
IJCNN 2020 - Proceedings of the International Joint Conference on Neural Networks, 2020

Intrusion detection in wi-fi networks by modular and optimized ensemble of classifiers 10/2020
12th International Joint Conference on Computational Intelligence - NCTA
IJCCI 2020 - Proceedings of the 12th International Joint Conference on Computational Intelligence

Exploiting cliques for granular computing-based graph classification
07/2020
2020 International Joint Conference on Neural Networks, IJCNN 2020 (Glasgow (UK))
IJCNN 2020 - Proceedings of the International Joint Conference on Neural Networks, 2020

Complexity vs. performance in granular embedding spaces for graph classification 7/2020

12th International Joint Conference on Computational Intelligence - NCTA
IJCCI 2020 - Proceedings of the 12th International Joint Conference on Computational Intelligence

Calibration techniques for binary classification problems. A comparative analysis 10/2019

IJCCI 2019 - Proceedings of the 11th International Joint Conference on Computational Intelligence

Stochastic information granules extraction for graph embedding and classification

Luca Baldini, Alessio Martino and Antonello Rizzi
IJCCI 2019 - Proceedings of the 11th International Joint Conference on Computational Intelligence

Research experience

Diet CIPS Lab - Evolutionary Agent Based Classifier

Mentors: Antonello Rizzi (University of Rome, "La Sapienza") 2020 – Present
Developing multi-modal evolutionary strategies for a multi-agent system classifier that deal with high dimensional data. Recently, I became the main software designer and supervisor for its extension toward graph domain as input space of the algorithm.

Diet CIPS Lab - GRanular Approach for Labelled Graphs

Mentors: Antonello Rizzi (University of Rome, "La Sapienza") 2019 – Present
Investigation of granular techniques for graph classification in embedding spaces. I mainly focus on possible solutions for mitigating the heavy computational complexity and memory footprint of the embedding procedure. Later, I explored novel solutions for improving the learning performances and the interpretability of the synthesized model.

Diet CIPS Lab - Hardware Acceleration for Machine Learning algorithm

Mentors: Antonello Rizzi (University of Rome, "La Sapienza") 2019 – 2020
Exploring solutions for parallelization of k-medoid algorithm in a cluster of many-core boards (Parallela). I worked with low-level code of Parallela using openCL-based framework and MPI for between-boards communications.

Teaching experience

Teaching assistant, DIET department (University of Rome, "La Sapienza") Fall 2019 and 2020

Computational Intelligence course hold by Prof. Antonello Rizzi

Skills

Evolutionary optimization techniques: Genetic Algorithms, Particle Swarm Optimization and Ant Colony Optimization. Support for student in homeworks and master thesis.

Programming

Proficient in Object-Oriented Programming paradigm with Python and its main machine learning and linear algebra packages (SKLEARN, SCI-PY, NUMPY)

Familiar with NetworkX python library for graph algorithms.

Familiar with PyTorch Geometric for implementation of Graph Convolutional Neural Networks.

Familiar with Template Programming in C++ and its main standard library (STD LIBRARY). I worked also with BOOST library for dealing with graph data structure

Familiar with parallel programming paradigm for GPU computing (NVIDIA THRUST) and multiprocessing in Python (JOBLIB)

Proficient in scripting languages for scientific computing like MATLAB and OCTAVE

Familiar with BASH scripting, GIT and Linux OS

Proficient user of LATEX for writing technical report and publications

Languages

Italian (native), English (fluent)

Selected coursework

- Deep Learning: Deep Neural Networks with PyTorch (Coursera - IBM), Neural Networks and Deep Learning (Coursera - DeepLearning.ai)
- Machine Learning: Pattern Discovery in Data Mining (Coursera - University of Illinois), Machine Learning (Coursera - Stanford University)
- Algorithmic design: Algorithmic Toolbox (Coursera - UCSanDiego)
- Other relevant courses:
 - Distributed Optimization over Complex network (implementation of a distributed SVM training algorithm using ADMM technique)
 - Algorithm and Circuits for Machine Learning (exploring Deep learning state of the art techniques for graph domain with PyTorch Geometric)
 - Machine Learning for Signal Processing (reviewing a state of the art technique for Metric Learning)

