Francesco Caporali

Graduate student in Computational Mathematics

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Education

Laurea Triennale (B.Sc.) in Mathematics

University of Pisa

September 2018 – May 2022 | Pisa, Italy

- Final grade: **110/110 cum laude** (a.y. 2020/21)
- Computational curriculum
- Core classes:
  - **Probability**
  - Scientific Computing
  - **Numerical methods for ODEs**
  - Algorithms and Data Structures
  - Operational Research
  - Computational Laboratory

Liceo Scientifico (scienze applicate)

Liceo Scientifico Paolo Ruffini

September 2013 – July 2018 | Viterbo, Italy

- Final grade: **100/100**

Bachelor's Thesis

Reti neurali profonde: capacità di approssimazione e convergenza a processi gaussiani

Deep neural networks: approximation capabilities and gaussian behaviour

Supervisor: Prof. Dario Trevisan

Description: Reviewing some relevant theoretical results, we analysed neural networks (NNs) as a formal model. We presented some versions of the density result of the functions that can be generated by NNs in L^p spaces and in $C(X)$ with X compact in $\mathbb{R}^k$. Then we studied the Gaussian asymptotic behaviour of random NNs. The work includes experiments developed independently using Python's PyTorch module.

Extracurriculars

PHC Systems administrator

Department of Mathematics, University of Pisa

December 2018 – May 2022 | Pisa, Italy

- Member of a group of technicians that maintains a network of Linux computers and offers various services for mathematics students
- Maintenance of the web server poisson.phc.dm.unipi.it

Early experiences

2017 –2018

- Participation in several editions of the *Olimpiadi della Matematica*, both individually and in teams
- Participation in a Mathematics and Physics summer campus in Bardonecchia (TO)

Projects

Undergraduate works

University of Pisa

2018 – 2021

- **Scientific Computing:** a *preconditioned conjugate gradient algorithm* for GeneRank (Matlab).
- **Algorithms and Data Structures:** implementation of an *urban route planner* (C++).
- **Computational Laboratory:** implementation and analysis of *simulated annealing* (Python).

Skills

Programming Languages

Proficient:	Basic:
Python (PyTorch)	PHP
Matlab	JavaScript
C, C++	OCaml

Markup Languages

Proficient:	Basic:
LaTeX	HTML

Other computer skills

- Microsoft Office
- Operating systems: Linux (all major distributions), Windows, macOS

Languages

- **Italian:** mother tongue
- **English:** B2 level

Certifications

First Certificate in English (FCE)

Cambridge English

October 2017

- Grade: **178/190**

Academic Interests

- Probability theory
- Real Analysis
- Neural Networks
- Data Structures
- Programming

Other Interests

- Computers
- Running
- Board games and Videogames