Pierfrancesco Beneventano

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website

Researching on mathematics of deep learning following up on my research at ETH Zurich.
Interested in explainability of AI and in theoretical guarantees for machine learning (ML).
The focuses of my studies are statistics, probability, computational mathematics, and theoretical ML.

Education

2020 – curr. **PhD in Operation Research and Financial Engineering**, Princeton University, NJ, USA, Interest: Mathematics of machine learning, Deep learning, Statistics, Computational Mathematics.

2018 – 2020 **MSc in Mathematics**, *Statistics, Probability, Computational Mathematics, and Deep Learning*, Final grade 5.92/6 (summa cum laude), ETH Zurich, Switzerland.
Theses:
- Deep neural network approximations for high-dimensional functions.
- Deep neural network approximations for high-dimensional first order Kolmogorov PDEs.

Supervisors: Prof. Arnulf Jentzen, Prof. Patrick Cheridito.

2015 – 2018 **BSc in Mathematics**, *Computational Mathematics Curriculum*, final grade: 110/110 summa cum laude, Università di Pisa, Italy.
- Thesis on numerical methods for Markov chains (Italian). **Sup.** Prof. Dario A. Bini.
- INdAM Merit Scholarship, best 40 freshmen in math all-over Italy (2015–2018).
- INdAM Summer School in Mathematics (2016, 2017).

Experiences

2020 **Machine Learning Research Intern**, *Daedalean AI*, Zurich, Switzerland.
- *Explainability of AI.*
- *Theoretical Guarantees for Neural Networks (Generalizability).*

My work was part of the project Concepts of Design Assurance for Neural Networks (CoDANN) in partnership with EASA, European Union Aviation Safety Agency, which will lead to the first guidelines for *AI certification in safety critical system*.

2019 - 2020 **Teaching Assistant**, *ETH Zurich, Switzerland.*
- Computational Methods in Engineering and Applications.
- Numerical Methods for Partial Differential Equations.
- Translator and Proofreader of a book on Calculus.

Courses for, among others: Physics MSc, Data Science MSc, CSE BSc, Mech. Eng. BSc. Taught at the exercise lectures of the courses (both theory and C++ for problems.

Coding skills

Proficient *C, Matlab,* LaTeX.
Experiences *C++, R, Java, Python.*

Languages

Native Italian.
Fluent English, 7.5/9 Academic IELTS

Other activities

2020 Organizing Committee Member of the conference **"Forecasting the future for sustainable development: New Approaches to Modeling and the Science of Prediction"**, *moderator and organizer of the panel on Explainable AI*. OECD, Paris, France. *Postponed, TBD.*

2020 **Student Project: Machine Learning in Finance**, Zurich, Switzerland.
Developing DL algorithms to find optimal strategies in finance. Goal: infer the relevant economical factors in our cases.

2017 **Project: Algorithms and Data Structures**, Università di Pisa, Italy.
Coded a routing algorithm for openstreetmap. Programming language: C.

Selected Mathematical competitions

- Stats, 2015, 1st place at the Semifinal, 4th at the Final of Italian Statistics Olympiad.
- Math, 2013–2015, Finalist at the National Individual Competition.
- Math, Team Member (2013–2014) and Captain (2015) for the National Team Competition (ranked 4th-4th-3rd all-over Italy).
- Kangourou Math, 2012, 2014, and 2015, National finalist of the mathematical competition (scoring in the top 5 of my age for the first two years).

Other

- Intel® Edge AI Scholarship, Udacity.
- Attended conferences on Complexity economics, Mathematics, Machine Learning.
- Soccer referee (AIA - FIGC, 2013 – 2016).