Valerio Gherardi

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ABOUT ME

I'm a PhD student in Particle Physics with a strong passion for Machine Learning and Statistical Software development. During my academic career, in part as a support for my research, in part out of sheer curiosity, I have developed programming and data related skills and experience, as well as the facility to communicate my work to both technical and non-technical audiences. My Physics background provides me with a scientific and analytical mindset, which I love being able to apply and transfer to problems and challenges coming from different areas. I am a firm supporter of Open-Source Software, and I enjoy contributing with my own work and to get involved in open projects. In a related vein, I am keen on open online and peer-to-peer learning, and I am often glad to commit some of my time to this activity, both as a student and as a tutor/mentor, in the Computer Science, Physics and Mathematics areas. During my PhD in Trieste I have had the privilege to study in an international, multicultural and multidisciplinary environment. I love and get motivation from finding myself surrounded by people with heterogeneous backgrounds and life experiences. I am a fast and motivate worker and learner, looking for job opportunities in Software Development and Data Science, starting from the end of my doctoral studies in October 2021.

DIGITAL SKILLS

Programming languages

R / C++ / SQL / Python / Wolfram / C / Fortran

Frameworks

Keras (R and Python APIs) / TensorFlow

Data Science and Machine Learning

Classical predictive models / Deep, recurrent and convolutional neural networks / Sentiment Analysis / Language Models / Word Embeddings / Text generation

Programming and Algorithms

Classical Data Structures (queues, stacks, heaps, trees, hash maps) / String algorithms / Graph and network algorithms / NP problems and SAT solvers

Various

Unit and functional testing / Version control (Git) / CI-CD / R Studio Shiny / (R) Markdown / LaTeX

EDUCATION AND TRAINING

PhD in Physics

Scuola Internazionale Superiore di Studi Avanzati [01/10/2017 – Current]

Address: Via Bonomea, 265, 34136 Trieste (Italy)

https://www.sissa.it/tpp/

My Ph.D focuses on current open problems and ongoing developments in Theoretical Particle Physics. My main activities as a doctorate student consisted in scientific research and publishing on the one hand, and scientific communication (with technical and non-technical staff) on the other one, which helped me grow both on the professional and personal front.

Among the skills specific to my scientific work, I would like to mention:

- Statistics and Mathematics, Data Analysis
- Scientific Writing
- Scientific Communication
- Work in small teams

On the personal side, during my research activity I developed a positive and pragmatic approach to new problems, the abilities to learn in a fully autonomous way and to familiarize quickly with the appropriate tools for a given task.

During my Ph.D I published several scientific papers on peer reviewed journals and partecipated to national and international conferences, also as a speaker.

Laurea Magistrale in Fisica

Università La Sapienza [01/10/2015 – 25/09/2017]

Address: Roma (Italy)

Final grade : 110/110 cum laude

Thesis: Solving the homogeneous Bethe-Salpeter equation for a fermion-scalar system in Minkowski space

Laurea Triennale in Fisica

Università La Sapienza [01/10/2012 – 20/10/2015]

Address: Roma (Italy)

Final grade : 110/110 cum laude

Thesis: Teoria della decoerenza quantistica

Deep Learning Specialization (online)
deeplearning.ai

https://coursera.org/share/1a79776ec145f7d140c93b95281f5250

Core subjects of the specialization:

1. *Deep neural networks.* Back-propagation and optimization algorithms, regularization methods and hyperparameter tuning.
2. *Convolutional networks.* Classical examples of CNNs, computer vision applications, image recognition, object identification, ResNets, one-shot learning with siamese networks, neural style transfer.
3. *Recurrent networks.* Sequential models and Natural Language Processing applications, GRU and LSTM units, Sentiment Analysis, Word Embeddings, Language Translation
4. *Deep learning frameworks.* TensorFlow and Keras.

Data Science Specialization (online)
Johns Hopkins University

https://coursera.org/share/3d64e7b0e1038f16fdb2103a71878e53

A comprehensive introduction to Data Science, in the R programming and statistical framework. Core subjects covered by the specialization:

1. Data analysis with R
2. Creating data reports with R Markdown
3. Creation of web content and dashboards with R Studio Shiny
4. Advanced R: S3, S4 and R6 Object-Oriented systems, functional programming, R package development
5. Classical machine learning and language processing models

As a capstone project for this specialization, I developed an R package for text prediction and synthesis, which is available on the public repository CRAN, or on its GitHub repository.

Data Structures and Algorithms Specialization (online)
University of California San Diego

https://coursera.org/share/4fe6c2e914585cb813c93488d20d8f52

Natural Language Processing Specialization (online)
deeplearning.ai

https://coursera.org/share/903e270df65d75737d6c884743509e84

LANGUAGE SKILLS

Mother tongue(s):

Italian

Other language(s):

Spanish

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

English

LISTENING C2 **READING** C2 **WRITING** C2

SPOKEN PRODUCTION C2 **SPOKEN INTERACTION** C2

PROJECTS

r2r

[Current]

R package. An R implementation of Hash Tables.

https://github.com/vgherard/r2r

fcci

R package. Support for building Feldman-Cousins confidence intervals.

https://github.com/vgherard/fcci

kgrams

R package. Utilities for training, evaluating and predicting with k-gram language models.

https://github.com/vgherard/kgrams

sbo

R package. Text prediction and text synthesis with Stupid Back-Off k-gram models.

https://github.com/vgherard/sbo

An Introduction to k-gram language models in R

Blog post on DataScience+. Hands on tutorial on language models.

https://datascienceplus.com/an-introduction-to-k-gram-language-models-in-r/

HONOURS AND AWARDS

"Admeto Pettinari e Paolo Andreini" scolarship

Cassa di Sovvenzione e Risparmio per i dipendenti della Banca d'Italia [01/10/2019]