Nicolas Hug

Machine learning PhD
Software engineer

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Experience

Postdoctoral researcher
2018 – Present
I am currently a postdoctoral researcher at the Data Science Institute of Columbia University in New York. My work is focused on developing and maintaining the scikit-learn library.

Data scientist
2018 – 5 months
I was lead data scientist at Pluvio, where I built scalable machine-learning-based recommender systems in Python.

Machine Learning PhD
2014–2017
I studied analogical classifiers—somehow related to k-NN learners—from a theoretical point of view in terms of convergence, error rate and inference principle. I also applied analogical learning to recommender systems, which led me to develop Surprise: a popular Python package for recommendation (see below for details and publications). *University of Toulouse III, France.*

ML Research Intern
2014, 6 months
I designed and developed a classifier for monophonic musical instrument sounds, mostly using linear models. *University of Bristol, UK.*

C development Intern
2013, 6 months
I developed a prototype for an embedded automotive application on a Freescale PowerPC chip. *Laboratory for Analysis and Architectures of Systems (LAAS), France.*

Technical skills

- **Software engineer background**: highly proficient in Python and C
- Familiar with Python scientific tools: Scikit-learn, TensorFlow, numpy, matplotlib, Cython...
- Well-versed in machine learning and recommender systems
- **Solid theoretical background**: statistics, linear algebra, optimization

Open-source projects

Recommender Systems: I developed and now maintain Surprise, a popular Python library to build and analyze recommender systems (**2k+ stars on GitHub**). This project gave me the opportunity to combine my theoretical understanding of machine learning and my programming abilities into a **complete, useful and easy-to-use software**.

OS development: with three other students, we designed and developed in C++ the graphical user interface for a students' OS. We developed the whole stack, from graphics drivers (VGA and VESA) to widget toolkits and end-user applications: terminal emulator, file explorer, image viewer and paint-like program.

Others: I also contribute to other OSS during my free time (see my GitHub profile for details).

Talks Blogging Teaching

I enjoy **communicating about my work** and usually receive positive feedback about it, e.g.:

- this blog post on matrix factorization for recommendation (Reddit discussion)
- this talk at PyData Paris'17 about recommender systems in Python

I gave lessons to university students:

- **undergraduate**: concurrency and threads in C, programming basics (OCaml, Python, Ada), general AI
- **postgraduate**: reinforcement learning, graph theory, linear programming

About me

During my free time, you may find me rock climbing or hiking, lost somewhere in the mountains... I always enjoy any kind of outdoor activity, which is quite fortunate given one of my other passions: food!

Education

Machine Learning PhD 2014–2017
Supervised by Henri Prade, Gilles Richard, and Mathieu Serrurier at the Research Institute in Computer Science of Toulouse (IRIT), University of Toulouse III - France

Master's Degree 2014
Artificial Intelligence at University of Toulouse III, valedictorian (over ten students)

Master's Degree 2013
Computer Science Engineering at Institut National des Sciences Appliquées of Toulouse, specialized in critical embedded systems and software development

Exchange Program 2012
I studied one semester at the Faculty of Engineering of the University of Buenos Aires (Argentina)

Publications

[1] N. Hug, *Contributions to the use of analogical proportions for machine learning: Theoretical properties and application to recommendation.* PhD Thesis, TBP.

[2] M. Couceiro & N. Hug & H. Prade & G. Richard, *Analogy-preserving functions: A way to extend Boolean samples.* IJCAI 2017: 1575-1581. link.

[3] N. Hug & H. Prade & G. Richard & M. Serrurier, *Analogical classifiers: A theoretical perspective.* ECAI 2016: 689-697. link.

[4] N. Hug & H. Prade & G. Richard & M. Serrurier, *Analogy in recommendation. Numerical vs. ordinal: A discussion.* FUZZ-IEEE 2016: 2220-2226. link.

[5] N. Hug & H. Prade & G. Richard & M. Serrurier, *Experimenting analogical reasoning in recommendation.* ISMIS 2015: 69-78 link.