1. Book content and intended audience

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1.1. Table of content (provisional)

- Chapter 1: Book overview (This chapter)
- Chapter 2: Background
- Chapter 3: Getting started
- Chapter 4: Performance metrics
- Chapter 5: Model selection
- Chapter 6: Imbalanced learning
- Chapter 7: Deep learning
- Chapter 8: Interpretability*

(*): Not yet published.

1.2. Intended audience

- Students or professionals, interested in the specific problem of credit card fraud detection from a practical point of view
- More generally, data practitioners and data scientists dealing with machine learning problems that involve tabular sequential data and/or imbalanced classification problems

1.3. Prerequisites

- Familiarity with the Python language, and the scikit-learn library
- Familiarity with data science and machine learning processes

Recommended books:

- Gianluca Bontempi. Statistical foundations of machine learning, 2nd Edition. Université Libre de Bruxelles, 2021 [Bon21]
- Andreas C Müller and Sarah Guido. Introduction to machine learning with Python: a guide for data scientists. O'Reilly Media, Inc., 2016 [MullerG16]
- Wes McKinney. Python for data analysis: Data wrangling with Pandas, NumPy, and IPython - 2nd Edition. O'Reilly Media, Inc., 2017 [McK17]

Machine Learning Group - Recommended publications:

- Wissam Siblini, Guillaume Coter, Rémy Fabry, Liyun He-Guelton, Frédéric Oblé, Bertrand Lebichot, Yann-Aël Le Borgne, and Gianluca Bontempi. Transfer learning for credit card fraud detection: A journey from research to production. In Proceedings of the Data Science and Advanced Analytics (DSAA 2021), 2021 [SCF+21]
- Bertrand Lebichot, Théo Verhelst, Yann-Aël Le Borgne, Liyun He-Guelton, Frédéric Oblé, and Gianluca Bontempi. Transfer learning strategies for credit card fraud detection. IEEE access, 9:114754–114766, 2021 [LVLB+21]
- Bertrand Lebichot, Gian Marco Paldino, W Siblini, L He-Guelton, F Oblé, and G Bontempi. Incremental learning strategies for credit cards fraud detection. International Journal of Data Science and Analytics, pages 1–10, 2021 [LPS+21]
- Bertrand Lebichot, Yann-Aël Le Borgne, Liyun He-Guelton, Frédéric Oblé, and Gianluca Bontempi. Deep-learning domain adaptation techniques for credit cards fraud detection. In INNS Big Data and Deep Learning conference, 78–88. Springer, 2019 [LLBHG+19]

- Fabrizio Carcillo, Yann-Aël Le Borgne, Olivier Caelen, Yacine Kessaci, Frédéric Oblé, and Gianluca Bontempi. Combining unsupervised and supervised learning in credit card fraud detection. Information Sciences, 2019 [CLBC+19]
- Fabrizio Carcillo, Andrea Dal Pozzolo, Yann-Aël Le Borgne, Olivier Caelen, Yannis Mazzer, and Gianluca Bontempi. Scarff: a scalable framework for streaming credit card fraud detection with spark. Information fusion, 41:182–194, 2018 [CDPLB+18]
- Fabrizio Carcillo, Yann-Aël Le Borgne, Olivier Caelen, and Gianluca Bontempi. Streaming active learning strategies for real-life credit card fraud detection: assessment and visualization. International Journal of Data Science and Analytics, 5(4):285–300, 2018 [CLBCB18]
- Fabrizio Carcillo. Beyond Supervised Learning in Credit Card Fraud Detection: A Dive into Semi-supervised and Distributed Learning. Université libre de Bruxelles, 2018 [Car18]
- Andrea Dal Pozzolo, Giacomo Boracchi, Olivier Caelen, Cesare Alippi, and Gianluca Bontempi. Credit card fraud detection: a realistic modeling and a novel learning strategy. IEEE transactions on neural networks and learning systems, 29(8):3784–3797, 2017 [DPBC+17]
- Andrea Dal Pozzolo. Adaptive machine learning for credit card fraud detection. Université libre de Bruxelles, 2015 [DP15]
- Andrea Dal Pozzolo, Olivier Caelen, Yann-Ael Le Borgne, Serge Waterschoot, and Gianluca Bontempi. Learned lessons in credit card fraud detection from a practitioner perspective. Expert systems with applications, 41(10):4915–4928, 2014 [DPCLB+14]

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2. Book contributions