BERTRAND LEBICHOT, DATA MINING RESEARCH ASSISTANT

PERSONAL INFORMATION

Born in Belgium, January 14th, 1986

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GOAL

I am a PhD student specialized in data mining and machine learning. My research interest are big data, graph mining and fraud detection. The thesis is currently on its last part, and I will be fully available in April. Therefore, I am also searching for new challenges.

WORK EXPERIENCE

Part-time lecturer

2018–Present UNIVERSITÉ CATHOLIQUE DE LOUVAIN – LSM

MLSMM2154 Machine Learning (Business analytics major).

Research Assistant

2015–Present UNIVERSITÉ CATHOLIQUE DE LOUVAIN – ICTEAM

Design of various graph-based fraud detection systems in collaboration with Worldline SA/NV. One of them is currently implemented in production. Funded by Innoviris.

Research & Teaching Assistant

2011–2015 UNIVERSITÉ CATHOLIQUE DE LOUVAIN – ILSM

Organize and teach practical sessions in LSM-UCL for following courses (mainly): LECGE1215: Informatique en économie et gestion, LINGE1225: Algorithmique et programmation en économie et gestion, LSINF1250: Mathématique pour l'informatique, LSMF2013: Analyse de données quantitatives, LSINF2275: Data mining and decision making.

R&D Internship

Summer 2010 GSK-BIO – EPL

Setting of a bio-chemical & analytic device to quantify polysaccharides and amino acids in solutions.

EDUCATION

Doctor of Engineering Science

2011-2018 UNIVERSITÉ CATHOLIQUE DE LOUVAIN – EPL

Thesis: *Network analysis based on bag-of-paths : classification, node criticality and randomized policies.* (Advisor: Prof. Marco SAERENS)
The bag-of-paths framework defines a family of graph-based distances interpolating between the shortest path and the commute-time distances, taking into account both node proximity and amount of connectivity. Three applications are proposed. Two others, closely related, are also investigated.

Biomedical Engineer (with honors)

2004-2011 UNIVERSITÉ CATHOLIQUE DE LOUVAIN – EPL

Thesis: *Traitement automatique du signal ECG pour l'aide au diagnostic de pathologies cardiaques.* (Advisor: Prof. Michel VERLEYSEN)
Automatically detecting a few abnormal heart beats using ECG on different patients is a challenging problem. We developed an undersampling method based on k-NN to reduce the information loss, balance learning classes and therefore enhance baseline results.

PUBLICATIONS

IEEE Transactions on Neural Networks and Learning Systems

June 2014 **Semi-Supervised Classification through the Bag-of-Paths Group Betweenness**

We introduce a new betweenness and a group betweenness measure, for semi-supervised classification on weighted graphs. Experiments on real-world data sets show that it out-performs all compared state-of-the-art methods.
Authors: Bertrand Lebichot, Illka Kivimaki, Kevin Francoisse, Marco Saerens

Scientific Reports

Feb. 2016 **Two Betweenness Centrality Measures based on Randomized Shortest Paths**

Two new betweenness centrality measures are introduced and tested on real world examples. They combine the ideas of using the shortest path and/or random paths for analyzing network nodes.
Authors: Illka Kivimaki, Bertrand Lebichot, Jari Saramaki, Marco Saerens

Complex Networks

Dec. 2016 **A Graph-Based, Semi-Supervised, Credit Card Fraud Detection System**

We propose several improvements to APATE, a graph-based fraud detection system, to fit to e-commerce field reality. Those improvements multiply the Precision@100 by three on a three months real-life e-commerce transactions.
Authors: Bertrand Lebichot, Marco Saerens

IEA/AIE

June 2017 **Improving Card Fraud Detection through Suspicious Pattern Discovery**

Can we find compromised credit cards by looking at shops appearing in their recent transaction records? We show that suspicious patterns can be identified and help to improve state-of-the-art aggregated transaction features.
Authors: Fabian Braun, Olivier Caelen, Evgueni Smirnov, Steven Kelk, Bertrand Lebichot, Marco Saerens

Neurocomputing

June 2017 **A Bag-of-Paths Node Criticality Measure**

To what extend is a node critical for a network? We introduce a new criticality measure (and a faster approximation) based on the Bag-of-Paths framework. Simulations show that it outperforms all other measures on generated graphs.
Authors: Bertrand Lebichot, Marco Saerens

Information Fusion

Under review **Graph-based Semi-Supervised Classification with Additional Nodes Information.**

This paper focuses on classification using both regular plain data and structural information coming from graph structures. Thirteen techniques are investigated and compared. Furthermore, usage of dimensionality reduction is also studied.
Authors: Bertrand Lebichot, Marco Saerens

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In preparation **Optimally Randomized Markov Decision Processes.**

Extending the randomized shortest-path, an optimal, mixed, policy for solving Markov decision is obtained and allows to balance exploitation and exploration. Simulation results on simple, illustrative, examples are included.
Authors: Bertrand Lebichot, Guillaume Guex, Marco Saerens

COMPUTER SKILLS

Advanced	PYTHON, R, MATLAB, JAVA, Great expertise in Machine learning (supervised, unsupervised and semi-supervised) and Data mining, Big Data, Microsoft Office, Microsoft Windows
Intermediate	LaTeX, Linux, VBA, SAS EM, Android App development
Basic	SAS, SPSS

OTHER INFORMATION

Languages	FRENCH · Mothertongue
	ENGLISH · English TOEFL iBT Certificate (equivalent to C1 CEFR level)
	DUTCH · Intermediate (B1 CEFR level)
	GERMAN · Basic (A1 CEFR level)