Amélie LEVRAY

Ph.D. in Computer Sciences

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Current situation

2018 Assistant lecturer in Computer Sciences (Knowledge representation and reasoning)
University/Laboratory : Artois University/CRIL UMR CNRS 8188 (`http://www.cril.fr`)

Academic background

2017 **Ph.D.** – **Computer Sciences**, *Artois University*.
Ph.D. Thesis : "Interval-based possibility theory : Conditioning and probability/possibility transformations" , supervised by Salem Benferhat, and Karim Tabia, CRIL UMR 8188 CNRS

2014 **Second year of Master degree** – **Computer Sciences SIA "Système Intelligents et Applications"**, *Artois University*, *with highest honour*.
Master Thesis : "Probability-possibility transformations and belief graphical models" , supervised by Salem Benferhat, and Karim Tabia, CRIL UMR 8188 CNRS

2013 **First year of Master degree** – **Computer Sciences**, *Artois University*, *with high honours*.
Master Thesis : "Approches fondées sur les logiques formelles en fouille de données", supervised by Lakhdar Sais, Yakoub Salhi and Said Jabbour, CRIL UMR 8188 CNRS

2012 **Bachelor of Computer Sciences**, *Artois University*.

Research Topics

- Possibilistic/Interval-based possibilistic frameworks
- Graphical models
- Uncertainty representations
- Inference in graphical models
- Reasoning tasks

Publications

International Journal

Salem Benferhat, Vladik Kreinovich, Amélie Levray, Karim Tabia : **Qualitative conditioning in an interval-based possibilistic setting**. In Fuzzy Sets and Systems [`https://doi.org/10.1016/j.fss.2017.12.007`] (FSS 2017).

International Conferences

Salem Benferhat, Amélie Levray, Karim Tabia : **Approximating MAP inference in credal networks using probability-possibility transformations**. Proceedings of the 29th International Conference on Tools with Artificial Intelligence (ICTAI 2017).

Maroua Haddad, Philippe Leray, Amélie Levray, Karim Tabia : **Learning the parameters of possibilistic networks from data : Empirical comparison**. Proceedings of the 30th International FLAIRS Conference (FLAIRS 2017).

Salem Benferhat, Vladik Kreinovich, Amélie Levray, Karim Tabia : **Set-Valued Conditioning in a Possibility Theory Setting**. Proceedings of the 22nd European Conference on Artificial Intelligence (ECAI 2016).

Salem Benferhat, Vladik Kreinovich, Amélie Levray, Karim Tabia : **Compatible-Based Conditioning in Interval-Based Possibilistic Logic**. Proceedings of the 24th International Joint Conference on Artificial Intelligence (IJCAI 2015).

Salem Benferhat, Amélie Levray, Karim Tabia : **Probability-Possibility Transformations : Application to Credal Networks**. Proceedings of the 9th International Conference on Scalable Uncertainty Management (SUM 2015).

Salem Benferhat, Amélie Levray, Karim Tabia : **On the Analysis of Probability-Possibility Transformations : Changing Operations and Graphical Models**. Proceedings of the 13th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty (ECSQARU 2015).

National Conferences

Maroua Haddad, Philippe Leray, Amélie Levray, Karim Tabia : **Possibilistic networks parameter learning : Preliminary empirical comparison**. 8ème Journées Francophones sur les Réseaux Bayésiens et les Modèles Graphiques Probabilistes (JFRB 2016).

Salem Benferhat, Amélie Levray, Karim Tabia : **Conditionnement en Logique Possibiliste à Intervalles**. 24ème Conférence sur la Logique Floue et ses Applications (LFA 2015).

Salem Benferhat, Amélie Levray, Karim Tabia : **Transformations probabilistes-possibilistes : conditionnement, inférence et modèles graphiques**. 9ème Journées d'Intelligence Artificielle Fondamentale (JIAF 2015).

Ph.D. Thesis

Title : Interval-based possibility theory : Conditioning and probability/possibility transformations
Supervisors : Salem Benferhat and Karim Tabia

Abstract : This thesis contributes to the development of efficient formalisms to handle uncertain information. Existing formalisms such as probability theory or possibility theory are among the most known and used settings to represent such information. Extensions and generalizations (e.g. imprecise probability theory, interval-based possibilistic theory) have been provided to handle uncertainty such as incomplete and ill-known knowledge and reasoning with the knowledge of a group of experts. We are particularly interested in reasoning tasks within these theories such as conditioning.
The contributions of this thesis are divided in two parts. In the first part, we tackle conditioning in interval-based possibilistic framework and set-valued possibilistic framework. The purpose is to develop a conditioning machinery for interval-based possibilistic logic. Conditioning in a standard possibilistic setting differs whether we consider a qualitative or quantitative scale. Our works deal with both definitions of possibilistic conditioning. This leads us to investigate a new extension of possibilistic logic, defined as set-valued possibilistic logic, and its conditioning machinery in the qualitative possibilistic setting. These results, especially in terms of complexity, lead us to study transformations, more precisely from probability to possibility theories. The second part of our contributions deals with probability-possibility transformation procedures. Indeed, we analyze properties of reasoning tasks such as conditioning and marginalization. We also tackle transformations from imprecise probability theory to possibility theory with a particular interest in MAP inference.

Teachings

2017-2018 **Teachings in Jean Perrin Sciences Faculty of Lens**, *in Computer Science.*
- Lambda calculus and functional programming
- Object-oriented programming
- Database system
- Algorithmic

2017-2018 **Teachings in the Institute of Technology of Lens**, *in Internet and Multimedia Technologies.*

- Introduction to communication protocoles - Computer network

2015-2016 **Teachings in Jean Perrin Sciences Faculty of Lens**, *in Computer Science*.
- Script language for Web
- Advanced Database system

2014-2015 **Teachings in Jean Perrin Sciences Faculty of Lens**, *in Computer Science*.
- Introduction to programming in Python - Algorithmic
- Conception of Documents and Digital Interfaces - Digital culture

Project

2016-2019 **AniAge**.
Member

Other Activities

2017 **30th International Conference on Industrial, Engineering, Other Applications of Applied Intelligent Systems (IEA/AIE'17)**.
Web co-chair

2017 **The International Conference on Digital Arts, Media and Technology (ICDAMT'17)**.
Staff member

Oct. 2015 **Advanced Course on Artificial Intelligence (ACAI'15)**.
Member of the local organization committee

Languages

French **Native language**

English **Professional competence**

Computer skills

Language C, Java, Shell, Prolog, Python, PHP, HTML/CSS, MySQL

Operating system Unix (Linux) , Mac OS X, Windows

Software LaTeX, Suite Office (Microsoft and OpenOffice)