Sebastijan Dumančić | KU Leuven

Postdoctoral fellow in Artificial intelligence

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Celestijnenlaan 200A, 3001 Heverlee, Belgium
Born 1 January 1991 in Požega, Croatia

Education

2018 – 2014 | **PhD in Computer Science, KU Leuven, Belgium**
- **Advisor:** Professor Hendrik Blockeel
- **Thesis title:** Learning Symbolic Latent Representations for Relational Data
- **Examination Committee:** Jesse Davis, Mathias Niepert, David Poole, Sebastian Riedel, Johan Suykens

2014 – 2012 | **MSc in Computer Science, University of Zagreb, Croatia**
- Spent a year at KU Leuven as an Erasmus exchange student
- Thesis supervisor: Professor Hendrik Blockeel
- Thesis: Classification of human epithelial cell's staining patterns

2012 – 2009 | **BSc in Computer Science, University of Zagreb, Croatia**
- Thesis supervisor: Professor Damir Seršić
- Thesis: Machine learning and signal processing applications to biology and medicine - classification of autoimmune diseases,

Experience

present – 2019 | **Postdoctoral fellow, KU Leuven, Belgium**
- personal research fellowship grant from Research Foundation - Flanders (FWO)
- working with Prof. Hendrik Blockeel and Prof. Luc de Raedt

2018 – 2014 | **Research assistant, KU Leuven, Belgium**

Research visits and internships

2018 | **Visiting Researcher, NEC Labs Europe, Germany**
- Host: Mathias Niepert, PhD

2013 | **Research intern, Jozef Štefan Institute, Slovenia**
- Host: Nada Lavrač, PhD
- Learning approaches for structured relational data

2013 – 2012 | **Software intern, Ericsson Ltd., Croatia**
- Host: Professor Nada Lavrač
- Worked on various projects involving data mining and communication technology

Awards and Recognitions

2021 **IAAI Deployed Application Award** at IAAI-21
2019 **Honourable mention** at the **EurAI AI Dissertation Award**
Distinguished reviewer at IJCAI 2019 (113/2818 reviewers)
2018 **Summa cum laude** distinction for PhD thesis (top 5% of PhD awardees)
Best paper award at Discovery Science 2018
Travel grant for the NAMPI workshop at ICML 2018
2017 **Best student paper award** at ILP 2017
2013 **Erasmus student exchange scholarship**, one year stay at KU Leuven, Belgium

Funding

Neural Probabilistic Logic Programming 2020 - 2023
project co-supervisor with Luc De Raedt and Angelika Kimmig. Research Foundation - Flanders (FWO). *338.800,00 EUR.*

FWO Postdoctoral Fellowship 2019 - 2022
Research Foundation - Flanders (FWO). Success rate: 25 % *salary + bench fee*

Travel grant for the research visit to Mathias Niepert at NEC Laboratories 2018
Research Foundation - Flanders (FWO) *1650,00 EUR*

Publications

Dissertation

Learning Symbolic Latent Representations of Relational Data
Sebastijan Dumančić
KU Leuven, 2018
Summa cum laude *(top 5% of PhD awardees)*

Peer-reviewed Journal Papers

An efficient and expressive similarity measure for relational clustering using neighbourhood trees
Sebastijan Dumančić, Hendrik Blockeel
Machine Learning Journal, 106, pages 1523–1545, 2017

Peer-reviewed Conference Papers

Automated Reasoning and Learning for Automated Payroll Management
Sebastijan Dumančić, Wannes Meert, Stijn Goethals, Tim Stuyckens, Jelle Hutgen, Koen Denies
Annual Conference on Innovative Applications of Artificial Intelligence (IAAI), to appear

Learning Large Logic Programs by Going Beyond Entailment
Andrew Cropper, Sebastijan Dumančić
International Joint Conference on Artificial Intelligence (IJCAI), 2073-2079, 2020

Turning 30: New Ideas in Inductive Logic Programming
Andrew Cropper, Sebastijan Dumančić
International Joint Conference on Artificial Intelligence (IJCAI), Survey Track, 4833-4839, 2020

From Statistical Relational to Neural-Symbolic Artificial Intelligence
Luc De Raedt, Sebastijan Dumančić, Robin Manhaeve, Giuseppe Marra
International Joint Conference on Artificial Intelligence (IJCAI), Survey Track, 4943-4950, 2020

Tackling Noise in Semi-Supervised Clustering
Jonas Soenen, Sebastijan Dumančić, Hendrik Blockeel, Toon Van Craenendonck
European Conference on Machine Learning and Principles of Knowledge Discovery in Databases (ECML), 2020

Learning Relational Representations with Auto-encoding Logic Programs
Sebastijan Dumančić, Tias Guns, Wannes Meert, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 6081-6087, 2019

A Comparative Study of Distributional and Symbolic Paradigms for Relational Learning
Sebastijan Dumančić, Alberto García-Durán, Mathias Niepert
International Joint Conference on Artificial Intelligence (IJCAI), 6088-6094, 2019

DeepProbLog: Neural Probabilistic Logic Programming
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt
Advances in Neural Information Processing Systems (NeurIPS), 3749–3759, 2018

COBRAS: Fast, Iterative, Active Clustering with Pairwise Constraints
Toon Van Craenendonck, Sebastijan Dumančić, Elia Van Wolputte, Hendrik Blockeel
Symposium on Intelligent Data Analysis (IDA), 353–366, 2018

COBRAS-TS: A new approach to Semi-Supervised Clustering of Time Series
Toon Van Craenendonck, Wannes Meert, Sebastijan Dumančić, Hendrik Blockeel
Discovery Science, 179–193, 2018. Best paper award

Learning Sequence Encoders for Temporal Knowledge Graph Completion
Alberto García-Durán, Sebastijan Dumančić, Mathias Niepert
Empirical Methods in Natural Language Processing (EMNLP), 4816–4821, 2018

Demystifying Relational Latent Representations
Sebastijan Dumančić, Hendrik Blockeel
International Conference on Inductive Logic Programming (ILP), 63–77, 2017. Best student paper award

Clustering-Based Relational Unsupervised Representation Learning with an Explicit Distributed Representation
Sebastijan Dumančić, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 1631–1637, 2017.

COBRA: A Fast and Simple Method for Active Clustering with Pairwise Constraints
Toon Van Craenendonck, Sebastijan Dumančić, Hendrik Blockeel
International Joint Conference on Artificial Intelligence (IJCAI), 2871–2877, 2017.

An Efficient and Expressive Similarity Measure for Relational Clustering Using Neighbourhood Trees
Sebastijan Dumančić, Hendrik Blockeel
European Conference on Artificial Intelligence (ECAI), Short paper track, 1674-1675, 2016.

Workshops Papers

Inventing Abstractions by Refactoring Knowledge
Sebastijan Dumančić, Andrew Cropper
Conceptual Abstraction and Analogy in Natural and Artificial Intelligence workshop at AAAI Fall Symposium, 2020

Feature Interactions in XGBoost
Kshitij Goyal, Sebastijan Dumančić, Hendrik Blockeel
AIMLAI workshop at ECML&PKDD, 2019

DeepProbLog: Neural Probabilistic Logic Programming
Robin Manhaeve, Sebastijan Dumančić, Angelika Kimmig, Thomas Demeester, Luc De Raedt
BNAIC/BENELEARN, 2019

On embeddings as an alternative paradigm for relational learning
Sebastijan Dumančić, Alberto García-Durán, Mathias Niepert
8th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI/ICML, 2018

Auto-encoding Logic Programs
Sebastijan Dumančić, Tias Guns, Wannes Meert, Hendrik Blockeel
2nd workshop on Neural Abstract Machines and Program Induction NAMPI at ICML, 2018

Unsupervised Relational Representation Learning via Clustering: Preliminary Results
Sebastijan Dumančić, Hendrik Blockeel
6th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI, 2016

Theory reconstruction: a representation learning view on predicate invention
Sebastijan Dumančić, Wannes Meert, Hendrik Blockeel
6th workshop on Statistical Relational Artificial Intelligence StarAI at IJCAI, 2016

Talks

An Abstraction Tour through Program Induction

- The Computational Cognitive Science Group, MIT, USA 2020

Neural Probabilistic Logic Programming with DeepProblog

- Data and Web Science Group at University of Mannheim, Germany 2020

Crash course on Machine Learning

- European Patent Office, Den Haag, the Netherlands 2020

Constraint Solving with Z3

- Decision Analytics Closing Symposium at KU Leuven, Belgium 2019

Anomaly Detection in Advanced Telecommunication Networks

- Artificial Intelligence Applied in Industry Symposium at KU Leuven, Belgium 2019

Learning Relational Representations with Auto-encoding Logic Programs

- Declarative Learning Based Programming workshop at IJCAI, China 2019
- Data Analytics Lab at VUB, Belgium 2019

Learning Relational Feature Hierarchies

- LICT Deep Learning Symposium at KU Leuven, Belgium 2019

Teaching

Lecturer

Digital Humanities Master programme, KU Leuven

- Scripting languages (B-KUL-G0W95B) 2019 – present

Master of Computer Science, KU Leuven

- Capita Selecta AI: Neural-Symbolic Artificial Intelligence (B-KUL-H05N0A) 2020 – present

Teaching assistant

Department of Computer Science, KU Leuven

- Machine Learning: Project (B-KUL-H0T25A) 2017–present
- Machine Learning and Inductive Inference (B-KUL-H02C1A) 2018–2019
- Knowledge and the Web (B-KUL-G0B34D) 2015–2018
- Introduction to Databases (B-KUL-H01O9A) 2015

Thesis supervision

Department of Computer Science, KU Leuven

- Clara De Smet, ”Improving the initialisation of COBRAS” 2019–2020
- Shanza Iftikhar, ”Metric Learning and Spectral Transformation with COBRAS” 2019–2020
- Jonas Soenen, ”Active semi-supervised clustering with noisy constraints” 2018–2019
- Antoon De Cleen, ”A Machine Learning Approach for the Detection of Airplane Component Degradation” 2018–2019
- Bavo Luysterborg, ”Preventive airplane maintenance” 2018–2019
- Jasper Sarrazin, ”Neurally guided theorem proving in knowledge graphs” 2018–2019
- Victor Gutierrez, ”Neurally guided Inductive Logic Programming” 2018–2019
- Bernd Schrooten, ”An approach to unsupervised feature ranking for predictive airplane maintenance” 2016–2017
- Hannes Busneye, ”Convolutional Neural Networks for fundamental frequency detection in music” 2016–2017
- Jeroen Tempels, ”Automatically constructing deep hierarchies with arbitrary clustering algorithms” 2016–2017

- Servaas Vandecappelle, "Aerospace condition monitoring using Hidden Markov models" 2016–2017
- Tom Van Braband, "Interpreting Deep Neural Networks" 2016–2017
- Thomas Dierckx, "Model merging in relational learning" 2016–2017
- Alexandru Nicolae Onete, "Predicate invention using meta-interpretative learning" 2014–2015
- Philippe Moeyersoms, "Explicit optimal control of a hybrid-electric heavy-duty vehicle" 2014–2015

Professional Activities

Conference Co-Chair

- International Joint Conference on Learning and Reasoning (IJCLR) 2021

Workshop Co-Chair

- Ninth International Workshop on Statistical Relational AI (StarAI) @ AAAI 2020 2020
- Spring Meeting on Mining and Learning (SMiLe), KU Leuven 2015

Senior Program Committee Member

- European Conference on Artificial Intelligence (ECAI) 2020
- AAAI Conference on Artificial Intelligence (AAAI) 2021
- International Joint Conference on Artificial Intelligence (IJCAI) 2021

Program Committee Member

- International Joint Conference on Artificial Intelligence (IJCAI) 2018-2021
- AAAI Conference on Artificial Intelligence (AAAI) 2019-2020
- ECML & PKDD 2019-2020
- International Conference on Principles and Practice of Constraint Programming (CP) 2019
- SIAM International Conference on Data Mining (SDM) 2020

Journal Reviewer

- Journal of Machine Learning Research (JMLR) 2018-2020
- Machine Learning Journal (MLJ) 2017-2020
- Data Mining and Knowledge Discovery 2017

Outreach

- Society for Out-of-frame Education: secretary since 2018; organised the Summer School of Science 2012-now
- Young Mathematicians "Marin Getaldić": organised Young Mathematicians Summer Camp 2010-2012

External Examiner

- Polytechnic University of Valencia, PhD thesis of Lidia Contreras Ochando (supervised by Jose Hernandez Orallo and Cesar Ferri) 2020
- University of Edinburgh, MSc Thesis of Amit Parag (supervised by Vaishak Belle) 2019