Editorial

Special Issue on Probabilistic Logic Programming (PLP 2018)

We are pleased to present this Special Issue of the International Journal of Approximate Reasoning on Probabilistic Logic Programming, PLP 2018.

The field of Probabilistic Logic Programming has seen significant advances in the last 20 years, with many proposals for languages that combine probability with logic programming, allowing the representation of both complex relations among entities and uncertainty over them.
Due to logic programming's strong theoretical underpinnings, PLP is one of the more disciplined areas of probabilistic programming. It builds upon and benefits from the large body of existing work in logic programming, both in semantics and implementation, but also presents new challenges to the field.

This special issue followed the 5th Workshop on Probabilistic Logic Programming, held in Ferrara, Italy (September 1, 2018) and welcomed original papers, gathering both extended versions of papers submitted at PLP 2018 and new submissions.
In the open call for papers, we solicited submissions on all aspects of PLP, including theoretical work, system implementations and applications, but also interactions between theoretical and applied research.
This Special Issue contains eight high-quality papers which were accepted for publication, and were peer-reviewed according to the journal's high standards:

- *Semiring Programming: A Semantic Framework for Generalized Sum Product Problems,* by Vaishak Belle and Luc de Raedt, proposes a new declarative programming framework providing abstractions of well-known problems such as SAT, Bayesian inference, generative models, learning and convex optimization. Programs are understood in terms of first-order logic structures with semiring labels, which allow one to freely combine and integrate problems from different AI disciplines and represent non-standard problems over unbounded domains;
- *Incremental Reasoning in Probabilistic Signal Temporal Logic,* by Mattias Tiger and Fredrik Heintz, proposes Probabilistic Signal Temporal Logic (ProbSTL) by extending STL with a sub-language to allow statements over probabilities, observations and predictions, in an attempt to handle the uncertain and changing nature of the environment in intelligent autonomous systems;
- *Non-Parametric Learning of Lifted Restricted Boltzmann Machines,* by Navdeep Kaur, Gautam Kunapuli and Sriraam Natarajan, develops a gradient-boosted approach that performs parameter and structure discriminative learning of Restricted Boltzmann Machines in the presence of relational data;
- *A Rule-based Framework for Risk Assessment in the Health Domain,* by Luca Cattelani, Federico Chesani, Luca Palmerini, Pierpaolo Palumbo, Lorenzo Chiari, Stefania Bandinelli, presents a Framework for the Assessment of Risk of adverse Events (FARE) and its concrete applications FRAT-up and DRAT-up, which were used for fall and depression risk assessment in older persons and validated on several European epidemiological datasets;
- *Partially Observable Game-Theoretic Agent Programming in Golog,* by Alberto Finzi and Thomas Lukasiewicz, presents the agent programming language POGTGolog (Partially Observable Game-Theoretic Golog), which integrates explicit agent programming in Golog with game-theoretic multi-agent planning in partially observable stochastic games;

- *Probabilistic Abstract Argumentation Frameworks, A Possible World View,* by Theofrastos Mantadelis and Stefano Bistarelli*,* in the setting of constellation Probabilistic Abstract Argumentation Frameworks, makes the connection of possible worlds and constellation semantics, and illustrate its connection with Probabilistic Logic Programming; it discusses the probabilistic argument normal form for the constellation semantics and proves its equivalent properties. Also, it introduces a new probabilistic structure for the constellation semantics;
- *A Correctness Result for Synthesizing Plans With Loops in Stochastic Domains,* by Laszlo Treszkaia and Vaishak Belle, presents new theoretical results on a generic technique for synthesizing Finite-state controllers (FSCs), such as plans with loops, in stochastic environments, allowing for highly granular specifications on termination and goal satisfaction. FSCs are powerful and compact representations of action selection widely used in robotics, video games and logistics;
- *Complexity Results for Probabilistic Answer Set Programming,* by Denis Deratani Mauá and Fabio Gagliardi Cozman*,* analyzes the computational complexity of probabilistic logic programming with constraints, disjunctive heads, and aggregates such as sum and max under Lukasiewicz's credal semantics.

We would like to thank all the people who keep the PLP community live and in particular the authors whose works are presented in this volume and the reviewers. Also we express special thanks to Prof. Thierry Denoeux, the editor-in-chief of the International Journal of Approximate Reasoning.

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