Fundamenta Informaticae 176 (2020) i-ii
DOI 10.3233/FI-2020-1971
IOS Press

Special issue devoted to the best paper presented at the 32nd Italian Conference on Computational Logic (CILC 2017)

Preface

This special issue contains 6 papers selected among the contributions presented during the *32nd Italian Conference on Computational Logic* (*CILC 2017*), which was held in Naples (Italy) on September 26–28, 2017.

CILC is the annual conference organized by GULP (Group of researchers and Users of Logic Programming, `www.programmazionelogica.it`). Since the first event of the series, which took place in Genoa in 1986, the annual GULP conference represents a valuable opportunity for users, researchers and developers working in the field of computational logic to meet and exchange ideas. Over the years, the conference broadened its horizons from the specific field of logic programming to include both foundational and applied work that uses logics as a tool for representation and computation, such as declarative programming and its applications in artificial intelligence and deductive databases.

The 32nd edition of CILC was held jointly with the *18th Italian Conference on Theoretical Computer Science* (*ICTCS 2017*) and co-located with the *2017 IEEE International Workshop on Measurements and Networking* (*M&N 2017*). The program of the event included 20 selected presentations and 4 invited talks. The authors of 6 of the featured presentations were invited to contribute to this special issue, by submitting a revised and extended version of their work. The submitted papers went through a careful review process.

The collection of papers in this issue covers several topics in logic programming and computational logic. A brief overview of the papers is as follows.

In the paper *A Unifying Approach for Nonmonotonic S4F, (Reflexive) Autoepistemic Logic, and ASP*, Ezgi Iraz Su proposes a general methodology to capture nonmonotonic inference and minimal model reasoning via embedding into monotonic bimodal logic, thus providing a unitary view on various nonmonotonic formalisms in a single monotonic modal setting.

In the paper *Reasoning about exceptions in ontologies: from the lexicographic closure to the skeptical closure*, Laura Giordano and Valentina Gliozzi propose a preferential approach to deal with exception in ontologies. More precisely, they introduce the notion of skeptical closure, which represents a tradeoff between rational closure and lexicographic one: it is more credulous than the former but still more skeptical than the latter. The new notion of closure aims at overcoming the problem with independent inheritance of different defeasible properties inherent in rational closure, while being computationally more attractive than existing approaches based on lexicographic closure. The authors also develop a new bi-preference semantics, used to provide a semantic characterization of the new closure.

In the paper *Unsatisfiable Core Analysis and Aggregates for Optimum Stable Model Search*, Mario Alviano and Carmine Dodaro study different algorithms for the computation of optimum stable models in Answer Set Programming, based on unsatisfiable core analysis. In particular, a comparison between existing algorithms OLL and ONE is presented: it is shown that OLL has better propagation properties than ONE; however, unlike ONE, it may encode unsatisfiable cores by structurally close yet distinct count aggregates. The authors present two new algorithms: K is the porting to the ASP context of a state-of-the-art algorithm developed for solving MaxSAT problems; OLL-IN-ONE shares propagation properties with OLL but does not introduce distinct structurally close count aggregates, thus combining strengths of both OLL and ONE algorithms. The new algorithms are implemented in the WASP system and empirically evaluated, showing that OLL-IN-ONE outperforms other algorithms.

The paper *Towards a Logic Programming tool for cancer data analysis*, by Alice Tarzariol, Eugenia Zanazzo, Agostino Dovier, and Alberto Policriti, concerns possible applications of automated reasoning in e-health. The objective is to search for malignant genetic mutations in DNA-sequences. The tool consists of a modular system where different reasoning approaches can be plugged in to carry out data mining. In particular, the authors propose two possible options based on Answer Set Programming and probabilistic inductive logic programming, respectively.

The work *Dischargeable Obligations in the SCIFF framework*, co-authored by Marco Alberti, Marco Gavanelli, Evelina Lamma, Fabrizio Riguzzi, Ken Satoh, and Riccardo Zese, addresses the problem of representing dischargeable obligations in normative reasoning. More specifically, the authors extend $\mathcal{S}$CIFF, a normative reasoner based on Abductive Logic Programming, by allowing abductive expectations to be qualified as dischargeable. The expressiveness of the resulting framework, named $\mathcal{S}$CIFF^D, is then evaluated by modeling a fragment of the Japanese Civil Code.

In *A set-theoretic approach to reasoning services for the description logic* $\mathcal{DL}_{\mathbf{D}}^{4,\times}$, Domenico Cantone, Marianna Nicolosi Asmundo, and Daniele Francesco Santamaria focus on $\mathcal{DL}_{\mathbf{D}}^{4,\times}$, a formal language which enhances the Semantic Web Rule Language with common operators taken from Description Logics. Notably, $\mathcal{DL}_{\mathbf{D}}^{4,\times}$ preserves the decidability of standard TBox and ABox reasoning tasks. The authors also introduce a tailored tableaux-based reasoner for $\mathcal{DL}_{\mathbf{D}}^{4,\times}$ implemented in C++. An experimental assessment shows that, in sevaral cases, this reasoner significantly outperforms its competitors.

We would like to thank the authors for the quality of their contributions and the anonymous reviewers for their invaluable work in refereeing the papers. We would also like to thank Damian Niwiński for his kindness and competence in assisting us to prepare this special issue.

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