Editorial

Special Issue on the Twelfth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty (ECSQARU 2013)

This special issue of the International Journal of Approximate Reasoning is devoted to a selection of papers presented at the Twelfth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty (ECSQARU 2013), which took place in Utrecht, The Netherlands, on July 7th to July 10th, 2013.[1]

In total, 89 manuscripts were submitted to the conference. After a rigorous review process, 44 of the 89 submissions were accepted for presentation at the conference. Eight papers were selected for plenary presentation to do justice to their high quality. All accepted papers were published in the Springer Lecture Notes in Computer Science [1]. Based upon the scientific quality and the potential for extension of their contribution, the authors of nine papers were invited to submit a revised version of their paper to this special issue. Seven submissions were received from these nine invitations and went through the full reviewing process following the IJAR standards. Finally, six papers were accepted for publication in this special issue. The diversity of these six papers reflects the wide scope of the different approaches to reasoning under uncertainty covered by the community of ECSQARU. Three papers concern different aspects of a probabilistic approach, whereas the other three papers deal with non-probabilistic approaches.

The paper by Dubois, Prade and Rico (Representing qualitative capacities as families of possibility measures) studies fuzzy measures with a finite range of totally ordered values. These so-called qualitative capacities are monotonic set-functions that lack a number of notions required for encoding them as a family of probability distributions. The authors demonstrate and exploit the fact that, similar to imprecise probability theory, any qualitative capacity can be viewed as either a lower possibility measure or an upper necessity measure with respect to certain families of possibility distributions.

The paper by Antonucci, De Campos, Huber and Zaffalon (Approximate credal network updating by linear programming with applications to decision making) concerns credal networks, which are probabilistic graphical models based on imprecise probability. The authors present a competitive approximate inference algorithm for credal networks, which uses a constraint-based specification. This specification allows for solving a sequence of compact linear programming problems and does not suffer from large credal sets. The paper extends the authors' best paper award winning conference contribution by discussing classification using credal networks and by showing that this decision task can be tackled by their proposed algorithm.

Sonntag and Peña (Chain graph interpretations and their relations revisited) also focus on a particular type of probabilistic graphical model: the chain graph. In fact, they focus on the three different interpretations of chain graphs and the concepts from Bayesian networks that were extended to fit one or more of these interpretations. The authors provide a coherent overview of how each of these concepts is extended for each of the different chain-graph interpretations, filling in the gaps for cases where a particular concept had not previously been extended to a certain interpretation. The paper covers more concepts, and includes more examples and proofs than the conference version, which won a best student paper award.

The paper by Cozman and Fargoni di Ianni (Probabilistic satisfiability and coherence checking through integer programming) concerns probabilistic satisfiability and coherence checking. The authors first show that PSAT can be cast as an integer linear program, polynomial in the size of the original problem. This allows for easy implementation of small to medium sized problems in standard linear solvers. Moreover, an empirical evaluation of the method shows evidence of phase transitions between regions with parameters for which the probability of satisfiability of the corresponding problem approaches one, and regions where that probability tends to zero. The authors subsequently discuss the extension of their approach to coherence checking for conditional probabilities, both in Kolmogorovian and De Finettian settings.

Coherence in a De Finettian setting is also the basis of the research presented in the paper by Flaminio, Godo and Hosni (Coherence in the aggregate: a betting method for belief functions on many-valued events). The paper concerns betting methods, of which De Finetti's Dutch Book is the most well-known. The authors generalise the classical Dutch Book method by introducing a general betting method that gives an interpretation and a notion of coherence similar to De Finetti for a number of measures of uncertainty that are more expressive than subjective probability. In particular, the authors focus on the many-valued extension of Dempster–Shafer belief functions and on the theory of states, and succeed in isolating a corresponding coherence criterion, coined 'coherence in the aggregate'.

Finally, the paper by Caminada, Sá, Alcântara and Dvořák (On the equivalence between logic programming semantics and argumentation semantics) concerns logic programming and argumentation. More specifically, the authors study various connections between abstract argumentation semantics and logic programming semantics, and investigate where and why the semantics coincide. The authors are thus able to explain one of the essential differences between argumentation and logic programming: where argumentation semantics maximise and minimise labels at the argument level, logic programming semantics achieve this at the conclusion level. The obtained correspondences between logic programming and argumentation allows for future exchange of techniques between the two fields.

We are grateful to the PC members of ECSQARU 2013 and the additional reviewers, whose efforts and competence have made the conference very successful and this special issue possible. We are also grateful to Linda van der Gaag, ECSQARU 2013 general chair and our program co-chair, for aiding in the initial selection of papers for this special issue and for her advice on various decisions we had to make. We finally wish to thank Thierry Denoeux, editor-in-chief of IJAR, for the chance to publish this special issue and for guiding us through the whole process of managing and editing it. Thank you.

References

[1] L.C. van der Gaag (Ed.), Proceedings of the Twelfth European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, ECSQARU 2013, Lecture Notes in Computer Science, vol. 7958, Springer-Verlag, Berlin, Heidelberg, 2013.

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