LREV Special Issue on
Commonsense Knowledge Representation and Reasoning

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Rationale

The AI gold rush has become increasingly intense for the huge potential AI offers for human development and growth. Most of what is considered AI today is actually subsymbolic AI, i.e., machine learning: an extremely powerful tool for exploring large amounts of data and, for instance, making predictions, suggestions, and categorizations based on them. All such classifications are made by transforming real items that need to be classified into numbers or features in order to later calculate distances between them. While this is good for making comparison between such items and cluster them accordingly, it does not tell us much about the items themselves.

Thanks to machine learning, we may find out that apples are similar to oranges but this information is only useful to cluster oranges and apples together: it does not actually tell us what an apple is, what it is usually used for, where it is usually found, how does it taste, etc. Throughout the span of our lives, we learn a lot of things by example but many others are learnt via our own personal (kinaesthetic) experience of the world and taught to us by our parents, mentors, and friends. If we want to replicate human intelligence into a machine, we cannot avoid implementing this kind of top-down learning, also known as commonsense knowledge representation & reasoning (CKRR).

As mentioned by Oren Etzioni, commonsense is the dark matter of AI: it is a little bit ineffable, but you see its effects on everything. Commonsense is a kind of knowledge that sounds obvious and natural to us but it is actually daedal and multifaceted: the illusion of simplicity comes from the fact that, as each new group of skills matures, we build more layers on top of them and tend to forget about the previous layers. Today computers lack this kind of knowledge. They do only what they are programmed to do: they only have one way to deal with a problem and, if something goes wrong, they get stuck.

In this sense, CKRR is key for the future of AI research. Emerging embedding-based methods for CKRR have shown their ability to capture relational facts and model different scenarios with heterogenous information. By combining symbolic reasoning methods or Bayesian models, deep representation learning techniques on knowledge graphs attempt to handle complex reasoning with relational path and symbolic logic. CKRR can be one of the paths towards the emulation of high-level cognition and human-level intelligence. CKRR can also be seen as a means to tackle the problem of explainability in AI.

This special issue focuses on emerging techniques and trendy applications of AI for CKRR in fields such as natural language processing, computer vision, bioinformatics, and more. Mostly, we expect to receive papers on deep representation learning techniques for CKRR. Old-school, purely symbolic approaches to CKRR will be desk-rejected. However, we do welcome hybrid (symbolic and subsymbolic) approaches to CKRR.

Topics of Interest
This special issue focuses on emerging techniques and trendy applications of AI for CKRR in fields such as natural language processing, computer vision, bioinformatics, and more. Works on the creation, use, and evaluation of CKRR resources, e.g., knowledge graphs, ontologies, are also welcome. These could be in English as well as in other languages. Mostly, we expect to receive works on textual CKRR, but papers on multimodal CKRR will also be considered. The topics of this special issue include but are not limited to:

- Deep representation learning for CKRR
- Hybrid (symbolic and subsymbolic) CKRR
- Creation, use, and evaluation of CKRR resources
- Multilingual CKRR
- Multimodal CKRR
- Time-evolving CKRR
- Large-scale CKRR
- Domain-specific CKRR
- SenticNet 6 and other commonsense knowledge bases for sentiment analysis
- Sentic LSTM and other commonsense-based deep nets for sentiment analysis
- CKRR for recommendation systems
- CKRR for question answering and dialogue systems
- CKRR for neural machine translation
- CKRR for optical character recognition
- CKRR for automatic speech recognition
- CKRR for digital health, e.g., healthcare and medical diagnosis
- CKRR for explainable artificial intelligence

Important Dates
Paper submission: 28 February 2021
Initial review feedback: 1 June 2021
Revision: 15 August 2021
Publication date: October 2021

Composition and Review Procedures
The Special Issue will consist of papers on novel methods and techniques that further develop and apply knowledge graph representation and reasoning for the development of intelligent tools, techniques, and applications. Some papers may survey various aspects of the topic. The balance between these will be adjusted to maximize the issue's impact. Paper submissions should follow the submission format and guidelines for regular papers and submitted at www.editorialmanager.com/lrev. All the papers will be peer-reviewed following LREV reviewing procedures. Guest editors will make an initial assessment of the suitability and scope of all submissions. Papers will be evaluated based on their originality, presentation, relevance and contributions, as well as their suitability to the special issue. Papers that either lack originality, clarity in presentation or fall outside the scope of the special issue will not be sent for review. Authors should select "SI: CKRR" when they reach the "Article Type" step in the submission process. The submitted papers must propose original research that has not been published nor currently under review in other venues. Previously published conference papers should be clearly identified by the authors at the submission stage and an explanation should be provided about how such papers have been extended. Such contributions must have at least 50% difference from the research work they stem from.