Analogies: from Theory to Applications

AR & CBR Tools for Metric and Representation Learning

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The purpose of this workshop is to explore both foundational and application aspects of analogical reasoning by bringing together AI researchers of various fields such as case-based reasoning, machine learning, cognitive psychology, knowledge representation, discovery, and reasoning, as well as industrial practitioners with real-world data and applications. Computational analogy and case-based reasoning (CBR) are closely related research areas. Analogy research often focuses on modeling human cognitive processes and developing computational theories of analogical reasoning, whereas CBR tends to focus more on the conception and knowledge engineering issues that need to be dealt with when implementing analogical reasoning in a computer system. These two focuses are very complementary. As the theme of this year's ICCBR is the place of CBR among modern AI techniques, we are particularly interested in how new computational theories of AR research can help CBR revisit its foundations and play its role in "modern AI". In particular, it aims to address the following challenges: how to represent and maintain cases, how to take into account domain knowledge, how to represent and learn similarity metrics for specific tasks, how to represent and learn adaptation knowledge, and how to derive useful explanations. This asks for a thorough investigation of analogical reasoning in predicting complex solutions, in deriving explanations as well as of the role of analogies in representation learning, in the relation between CBR and attention mechanisms, in the development of case-based prediction algorithms beyond k-Nearest Neighbors, and in novel methods for similarity measure learning.