

Workshop on Analogies: Integrating Multiple Cognitive Abilities (AnICA07)

Angela Schwering, Ulf Krumnack, Kai-Uwe Kühnberger, Helmar Gust
(aschweri | krumnack | kkuehnbe | hgust@uos.de)

Institute for Cognitive Science, Albrechtstr. 28
Osnabrueck, 49076, Germany

Keywords: Analogical reasoning; learning; adaptation; memory; context; human level intelligence.

Abstract

Analogical reasoning is a highly sophisticated cognitive process in which two domains are compared and analyzed for common patterns. The workshop focuses on analogical reasoning as an integrating basis for human cognition. Particularly, the potential of analogical reasoning to integrate learning and abstraction, memory, context, adaptation, and general intelligence in large-scale systems is examined and assessed.

Introduction

In many current approaches, cognitive abilities are examined in isolation from related issues in order to control the environment and the underlying context. Although these research endeavors clearly are successful in various aspects and applications, it seems as if each result of modeling a particular ability minimizes the chances to reach overall goals like modeling human-level intelligence (Cassimatis & Winston, 2004).

Analogical reasoning is the adaptation of knowledge about one domain so that it can be applied to the second domain and new analogous inferences can be drawn. It differs from standard forms of reasoning, e.g. it does not require a large number of examples (as inductive learning does) and it is not truth-preserving (different to deductive reasoning). On the other hand, analogical reasoning meets exactly certain requirements where standard reasoning fails: it has the ability to handle vagueness, to adapt knowledge to different contexts and to generate new knowledge in a creative process (Indurkha, 1992; Kokinov, 2001).

Workshop Aims and Goals

The workshop aims to gather researchers who are working in the field of analogical reasoning and are relating their models to other cognitive abilities. It focuses on analogy as an integrating basis for human cognition. Therefore researchers who attempt to use analogies for the modeling of other cognitive abilities are particularly considered as a special target group.

Analogical reasoning could be the missing link for the understanding of cognitive abilities in natural complex systems (Gentner et al., 2001). The workshop assesses and evaluates the relation between analogies and other cognitive abilities as well as the possibility of using analogies for the integration of various cognitive capacities.

Workshop Format

General Set-Up

The full-day workshop is divided into three sessions. At the beginning of each session an invited speaker will give his view on the field in a 30 minutes talk. The sessions are complemented by 20 minutes talks given by speakers working in the field and a panel discussion.

Session 1: Analogies, Learning and Abstraction, introduced by Keith Holyoak from the University of California, Los Angeles, USA.

Session 2: Analogies, Memory, Context, and Adaptation, introduced by Boicho Kokinov from the New Bulgarian University, Bulgaria.

Session 3: Analogies and Intelligence, introduced by Ken Forbus from the Northwestern University, USA.

The idea is that general positions are exchanged based on practical applications, theoretical considerations, or experimental studies.

Intended Audience

The workshop is open to researchers working on analogical reasoning and its relation to other cognitive abilities. There is no restriction with respect to particular disciplines. Researchers from psychology and artificial intelligence are likewise welcome as researchers from linguistics, neuroscientists, and other disciplines.

Publication

The proceedings of the workshop is made accessible to the public by an online publication in PICS (ISSN 1610-5389). Authors of accepted papers are invited to submit a full paper after the workshop for journal publication.

References

- Cassimatis, N. & Winston, P. (eds.) (2004). *Achieving human-level intelligence through integrated systems and research*. AAAI, Report FS-04-01.
- Gentner, D., Holyoak, K. & Kokinov, B. (eds) (2001). *The analogical mind: Perspectives from cognitive science*, MIT Press: Cambridge, MA.
- Kokinov, B. & Petrov, A. (2001). *Integration of memory and reasoning in analogy-making: The AMBR model*. In *The analogical mind: Perspectives from cognitive science*, D. Gentner, K. Holyoak, and B. Kokinov, Editors. 2001, MIT Press: Cambridge, MA.