Environmental Engineering and Management Journal

February 2010, Vol. 9, No.2, 189-195
http://omicron.ch.tuiasi.ro/EEMJ/

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ENVIRONMENTAL DECISION SUPPORT SYSTEMS BASED ON MODELS AND MODEL-BASED REASONING

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Abstract

Decision trees and rule-based systems including variants based on propositional and fuzzy logic have been the method of choice for knowledge representation in many applications of environmental decision support systems. Reasons are the ease of use, the capability of representing uncertainty, and the fast computation of results at runtime when using decision trees, rule-based systems, or other similar means for knowledge representation. Unfortunately there are drawbacks related with these modeling paradigms. For example, the cause-effect relationships between quantities are not captured correctly. The resulting model is well appropriated for a certain purpose but can hardly be re-used. Moreover, maintaining the knowledge base can be an intricate task. This paper is focused on the problems related to rule-based systems in the context of environmental decision support systems using an example from the domain. It further presents abductive reasoning as an alternative for decision trees and rule-based systems and discuss experiences when teaching modeling using abductive reasoning.

Key words: abductive reasoning, environmental decision support systems, modeling

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