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A methodology for developing environmental information systems with software agents

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Abstract. This chapter presents a unifying methodology for developing environmental information systems with software agents. Based on the experience reported in recent literature, we abstract common requirements of environmental information systems into agent types, combine state-of-the-art tools from computer science, service-oriented software engineering and artificial intelligence domains, as software agents and machine learning, and illustrate their potential for solving real-world problems. Specifically, two generic agent types are specified that behave as information carriers and decision makers, which provide an appropriate abstraction for deployment with added-value services in environmental management information systems.

A concrete pathway for applying these instruments throughout the software lifecycle of an environmental management information system is outlined, along with suggestions for software specification and deployment. The method is demonstrated in two application domains: one for air quality assessment and another for meteorological radar data surveillance.

Keywords. Intelligent information systems; Agent-oriented software engineering; Environmental data management, integration and reporting; Methodological tools; Agent architectures.

1. Introduction

1.1. Environmental Information Systems: Scope and challenges

Environmental Information Systems (EIS) is a broad term used for a range of IT systems related to natural resources data management. A working definition, given in [4] is the following one. *An Environmental Management Information System can be considered as an enterprise information system that provides efficient and accurate access to knowledge elements related to information about the natural environment.*

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