Special Issue of the International Journal of Environment and Pollution on "Application of Artificial Intelligence on Environmental Prediction"

Editorial

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During the past few decades, extensive research efforts have been placed on the use of mathematical models and systems analysis for the quantitative description of ecosystems, the impact assessment of environmental pollution and the management of resources. These computer-aided decision-making tools are primarily modelled algorithmically and are often not user-friendly enough. They are inevitably too specialized that can only be manipulated by experienced engineers. This may produce inferior design and cause the under-utilization, or even total failure of these models by novice users.

The information revolution of the past decade has fundamentally altered the conventional planning, modelling, and decision-making methodologies of environmental sciences and technologies. The general availability of sophisticated personal computers with ever-expanding capabilities has given rise to an increasing complexity in terms of computational ability in the storage, retrieval, and manipulation of information flows.

Thus recently, in addition to the need for better models, there is an increasing demand for a more integrated approach. The problem becomes to represent the information, knowledge and heuristic experience in such a format to facilitate the comprehension of a broad range of users ranging from novices to experts. Artificial Intelligence (AI), being a new and emerging technology, has since been one of the most important branches of research to address a whole range of hitherto intractable environmental problems.

It is worthwhile to bridge the existing gap between researchers and practitioners. The integration of recent AI technologies with environmental modelling has a strong potential in addressing a better understanding or prediction of the behaviour of environmental systems. This will certainly expedite the planning and control processes and increase the value of decision-making tools for environmental management and control.

This special issue of the International Journal of Environment and Pollution presents a representative mix of application of AI on environmental prediction. Original research papers in the following areas are addressed:

- Knowledge processing, self-learning, knowledge elicitation and acquisition, knowledge representation, reasoning methods in intelligent environmental systems
- Integration of knowledge-based expert systems and environmental modelling
- Use of neural networks or other pattern recognition techniques on calibration of real-time environmental models

- Development of fuzzy systems on simulation of the ambiguity and uncertainty in formulation of inference rules used by human environmental experts
- Incorporation of genetic algorithms on optimization of parameter in environmental systems
- Implementation of geographic information systems on remote sensing, large scale database management and visualization of modelling systems
- Performance and evaluation of automated real-time decision-support systems for effective environmental management and control
- Application of advanced and/or hybrid AI techniques on environmental management and impact assessment for different types of pollution

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