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Introduction

Most machine learning research has been primarily concerned with the development of systems that implement one type of inference within a single computational paradigm. Such systems, which can be called *monostrategy* learning systems, include those for empirical induction of decision trees or rules, explanation-based generalization, neural net learning from examples, genetic algorithm-based learning, and others. Monostrategy learning systems can be very effective and useful, if the learning problems they are applied to are sufficiently narrowly defined.

Many real-world applications, however, pose learning problems that go beyond the capability of monostrategy learning methods. In view of this, recent years have witnessed a growing interest in developing *multistrategy systems* that integrate two or more inference types and/or computational paradigms in one learning system. Such multistrategy systems take advantage of the complementarity of different inference types of representational mechanisms. Therefore, they have a potential to be more versatile and more powerful than monostrategy systems. On the other hand, due to their greater complexity, their development is significantly more difficult and represents a new great challenge to the machine learning community.

This special issue contains a sample of articles characteristic of the current research in this area. Most of the articles in this issue are improved and updated versions of papers that were originally presented at the *First International Workshop on Multistrategy Learning* (MSL-91), organized by George Mason University in Harpers Ferry, WV, November 7–9, 1991. The Workshop Proceedings contained a great number of excellent contributions to this area; therefore it was not possible to select papers that could qualify as the "best." The papers included in this issue were selected to illustrate well the diversity and richness of the current research in this area. To assure the superior quality of the contributions, all papers have been rigorously reviewed for the special issue. The review of the editor's article was handled by T. Dietterich and G. Tecuci. The editor expresses his sincere thanks to all the reviewers for their diligent and careful reviews.

The opening article by the editor serves as an introduction and presents a general conceptual framework for analyzing inferential capabilities of learning methods and for developing multistrategy learning systems. Saitta and Botta describe the system WHY, which combines symbolic deduction, inductive generalization, and abductive derivation strategies and which uitlizes a causal model of the application domain.

Maclin and Shavlik explore "knowledge-based" neural networks, which resulted from their attempt to combine explanation-based learning with neural learning. Pazzani's article investigates an incremental, theory-driven method for creating rules that predict effects of actions.

Morik describes a system for supporting a "balanced cooperation" among different learning mechanisms, including the user as one of them, in the process of building a model or knowledge base. Finally, Tecuci describes a multistrategy task-adaptive method that aims at integrating a range of learning strategies based on a justification tree approach.

Presenting this first special issue on multistrategy learning, its editor hopes that it will stimulate the reader's interest in this novel and remarkably challenging subarea of machine learning.

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Reference

Michalski, R.S., & Tecuci, G. (Eds.), *Proceedings of the First International Workshop on Multistrategy Learning*, Fairfax, VA: Center for Artificial Intelligence, George Mason University.