

# AI Techniques and Methodology

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TWO CLOSELY RELATED ASPECTS of Artificial Intelligence that have received comparatively little attention in the recent literature are research methodology and the analysis of computational techniques that span multiple application areas. We believe both issues to be increasingly significant as Artificial Intelligence matures into a science—and spins off major application efforts. It is imperative to analyze the repertoire of AI methods with respect to past experience, utility in new domains, extensibility, and functional equivalence with other techniques, if AI is to become more effective in building upon prior results rather than continually reinventing the proverbial wheel. Similarly, awareness of research methodology issues can help plan future research by learning from past successes and failures. We view the study of research methodology to be similar to the analysis of operational AI techniques, but at a meta-level; that is, research methodology analyzes the techniques and methods used by the researchers themselves, rather than their programs, to resolve issues of selecting interesting and tractable problems to investigate, and of deciding how to proceed with their investigations. A public articulation of methodological issues that typically remain implicit in the literature may provide some helpful orientation for new researchers and broaden the perspective of many AI practitioners.

Whereas the journal *Artificial Intelligence* serves as a vehicle to disseminate findings from major research efforts, and the *SIGART Newsletter* serves as a general communication medium for the AI community, there seems to be no natural forum for discussing either research methodology or experience gained from using and extending AI techniques. Therefore, we are initiating this column on AI techniques and methodology to fill the perceived need. Of course, response from the AI community will determine whether this experiment continues as a regular feature of *The AI Magazine*. The types of explicit response we would find most helpful are either direct (positive or negative) comments about the utility of this forum, or, better yet, submission of material to be included in the column.

The preferred form for a contribution is a short paper or technical note addressing issues of interest to a substantial segment of the AI community. Of course, longer scholarly papers on techniques or methodology would be highly welcomed, as would commentary or elaboration on previous contributions. The criteria for evaluating contributions are simple: clarity of writing, and perceived benefit to the AI community. Contributions should be mailed to either:

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The first article in the series compares and contrasts several efforts in machine learning and argues retrospectively that they share a common technique applicable to a wider range of problems than had previously been considered. A sampling of topics that provides a flavor of the type of articles we envision for this column includes:

Does AI and, in particular, cognitive modeling, have a coherent research paradigm? Should it have one?

A retrospective analysis of past and present AI efforts from a research methodology perspective, relating AI to other sciences in their nascent stages.

Computational techniques developed outside of AI that bear relevance to AI problems.

What are the common, recurrent themes that underlie the apparent diversity of knowledge representation schemes in AI?