Expertise in Context
Report on the Third
International Workshop on
Human and Machine Cognition

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The Third International Workshop on Human and Machine Cognition was held in Seaside, Florida, on 13–15 May 1993. Each paper session included presentations on cognitive research, educational research, AI theory and logic, and particular knowledge engineering projects. This mixture encouraged the participants from diverse disciplines to listen and respond to one another. These international workshops are held every other year to allow leading scientists, scholars, and practitioners to discuss current issues and research in particular topics in AI and cognitive science.

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One aspect that made this workshop special was the setting. Few will forget lounging on a sunny rooftop that overlooked the turquoise waters and white sands and enjoying heated, yet friendly debates on topics that ranged from what Turing meant by his test to whether heads compute and that involved leading scientists such as William Clancey (Institute for Research on Learning), John McDermott (Yale University), and Pat Hayes (University of Illinois).

Participants at the workshop included AI researchers, cognitive psychologists, social scientists, philosophers, and representatives of many other disciplines interested in expertise. In addition to keynote presentations by Harry Collins (University of Bath, United Kingdom), William Clancey, Neil Agnew (York University, Canada) and Ken Ford (University of West Florida), Vimla Patel (McGill University, Canada), and Micheline Chi (University of Pittsburgh), there were a number of paper sessions; interestingly enough, however, these were not purely topical. Each paper session included presentations on cognitive research, educational research, AI theory and logic, and particular knowledge engineering projects. This mixture encouraged the participants from diverse disciplines to listen and respond to one another, as did the many informal discussion sessions. To be sure, some of the cognitive psychologists in attendance felt lost while they listened to presentations that dove into the gory details of abstract logic. Conversely, some philosophy and logic participants were a bit perplexed by the cognitive psychologists’ insistence on laying out the gory details of research materials, methods, and results. In general, however, there were few genuine instances of miscommunication, and we suspect that there was general agreement that interdisciplinary meetings of this type are important if one seeks to reveal current issues and significant challenges for further work.

As one would suppose from a workshop subtitled “Human and Machine Cognition,” discussions broached many of the broad issues in AI and cognitive science, such as the limits of expert system technology, expertise (or cognition in general) and whether it is computable at all, the relations between AI and cognitive simulation (to what extent are AI models also explanations of cognition), and alternative cognitive models of expertise.

Specific contributions from the perspective of logic and philosophy dealt with the problems of partial entailment, inductive reasoning, fuzzy reasoning, abduction, and abstraction as they are applied to the analysis and description of expertise in particular. Many practical problems were also discussed, such as those involved in prototyping and implementation, the creation of (and need for) intermediate levels of knowledge representation, the avoiding of brittleness, the creation of systems that can be transported into new contexts, uncertain reasoning, and fundamental categories of generic problem-solving methods.

The workshop’s focus on expertise in context was manifested in two ways. First, the participants seemed to take for granted that diverse domains of expertise will have to be studied if the AI–cognitive science community is to get a real handle, let alone a practical one, on the nature of expertise. Reflecting this presupposition, reports were given on studies of expertise in such domains as medi-
There can be little doubt that the concept of expertise drives home the recent and often-touted claim that there is more need for interdisciplinary work.