A Practical Guide to Knowledge Acquisition. A. Carlisle Scott, Jan E. Clayton and Elizabeth L. Gibson. 509 pp. Addison–Wesley, 1991. $39.75

Building expert systems that perform efficiently at the commercial level has been the most celebrated accomplishment of artificial intelligence. Replicating human expertise in a machine-usable form is no small challenge. The existence of expertise in the shape of a human being complicates that task immensely by adding a sociological component that turns expert-system development into an exercise in human communication. Enter knowledge acquisition, a formal-sounding name for what is really an ad-hoc activity directed at obtaining from human experts the knowledge that drives expert systems.

This book is a how-to guide for knowledge-acquisition. It informs the novice and reminds the veteran about all the steps, nooks, precautions, and yes, even deceptions that are needed to extricate precious knowledge from human experts. It spares no detail. For those who do not possess the requisite common sense, it explains how often to schedule coffee breaks during meetings. And for those knowledge engineers—the sophisticated term that refers to people whose job is to build expert systems and therefore to acquire knowledge—who, by virtue of their trade, lack in social graces, it teaches how to dress for meetings with the human experts.

Above all, this book presents a correct perspective on the difficulty of performing knowledge acquisition. The reader will understand that a knowledge engineer must be a rare mixture of computer scientist, software engineer, diplomat, and trial lawyer. The tactic of the authors is to follow a set of fictional characters (including knowledge engineers and human experts) as they undertake the task of building an expert system for toaster repair. The authors comment on the players activities, and illustrate techniques with detailed transcripts of dialog among these characters. The use of fictional characters in technical books is usually a mixed blessing and here there is no exception. Although the characters lighten the prose and limit abstractness, there is an unavoidable limit to how many times the names “Mr. Fixit” or “Patricia Programmer” can be referenced before we begin to perceive a certain dottiness in the approach.

Even in practical books, there is an underlying philosophy; in this case, it is monotheism, and the deity is the human expert. Consequently, the authors place great emphasis on the interviews that knowledge engineers conduct with human experts. They provide elaborate tables of do’s and don’ts. They issue warnings about possible pitfalls, and explore the subtle nuances of interpersonal communication between strangers. Perhaps most important, they present techniques to sift through the words of the human expert to find the knowledge useful to the expert system. Of course, there are other philosophies of knowledge acquisition in which human experts have a less deified role, in which it is expected that what the expert has to say may be wrong, and in which it is perfectly plausible that experts may be inventing explanations for their actions. Given the practical nature of this book, however, it is understandable that the authors did not address these issues in detail.

If there is one trait in this book that strikes the reader as pervasive, it is the undaunted optimism of the authors that the techniques described in the book, especially for interpersonal relations, can be transported across different projects. Perhaps this is a questionable assumption, but, for novice engineers building their first expert system there are two choices. One is to study treatises on the myriad of subjects, from sociology to artificial intelligence, that touch knowledge acquisition. The other is to listen to experienced engineers recount stories of their trade and the lessons learned from those stories. The latter is exactly what this book offers.

Angel R. Puerta, Medical Computer Science Group, Knowledge Systems Laboratory, Stanford University