Reviews of Books

The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World. EDWARD FEIGENBAUM & PAMELA MCCORDUCK. Addison-Wesley, 1983. 240 pp , $15 55.

The Japanese Fifth Generation Project appears to be only a stimulus for this book. Clearly it is an important stimulus, and the book describes it in considerable detail as it covers both technical and managerial/social aspects of the Japanese project. But the book goes much beyond a description and an evaluation of the Fifth Generation Project In building the background of the project's significance, the book describes the current state of work in artificial intelligence (AI) in the US and abroad, it outlines the history of AI, it focuses on developments in Expert Systems, it comments on the social and political environment in which AI is growing, and it provides glimpses of the type of future that AI may help us to create. Also, the relative state of industrial development in Japan and the US are analyzed, and many observations are made about styles of planning, value systems, and attitudes to education in the two countries. The book conveys very well the sense of intellectual excitement that characterizes work in AI, and the variety of viewpoints (and concerns) within the field about the possible impact on our lives of mass-produced knowledge technology. We are reminded that human beings are very good at inventing the forces that will shape their future, but very limited at anticipating the long-term effects of these forces.

The book is full of interesting anecdotes; it informs and it educates; it engages in various polemics , and it has strong opinions about almost every controversial issue that surrounds today's computer culture. Throughout all this, however, emerges a clear line of argument that leads steadily to the urgent message that the authors present as a tangible response to the Fifth Generation stimulus. The message is that it is essential for America's national interest that a large-scale concentrated project be mounted, similar to the Fifth Generation Project I see the book as an unambiguous plea for rational planning and serious preparation for the "real computer revolution" which will come with the mass production of machine intelligence.

I expect continuing disagreement about when this revolution will come, but diminishing disagreement about whether it will come The "when" depends to a large extent on the rate of progress in AI The US continues to be the unquestionable leader in this field There has been enormous progress in AI and its applications in the last decade; but there are still many fundamental problems in the field that require intensive research. Because of the expected impact of AI on society, it is important that people in general — not only researchers in the field — be informed of what goes on in AI, and get a sense of its methods, its achievements and its problems The book makes an important contribution in this direction. In particular, it gives an excellent account of work in Expert Systems. This is one of the most dynamic subfields of AI, which was pioneered by Feigenbaum about fifteen years ago. It is also an area that shows the most promise from the point of view of applications. It is stressed in the book that knowledge acquisition remains our great research problem in this area; and much basic work on this problem is needed before we can move from today's stage of work with experimental expert systems to a stage where expert systems will be used widely as an integral part of many of our activities. I completely agree with this evaluation

The book contains descriptions of the "knowledge engineer" (a term coined by Feigenbaum) at work that are most interesting and true to life. The description of Penny Nii, a researcher in knowledge engineering, trying to "mine the mind of a human expert" for nuggets of knowledge to incorporate into a machine expert system, is absolutely delightful. One can see clearly here that this is the type of demanding activity that we usually associate with a theorist — whose aim in this case is to understand the judgmental knowledge of a human expert in terms that can be effectively represented in the computer. We have a very limited number of good theorists of this type at present; and the situation is not improving because of the current crisis in Computer Science education — which is well documented in the book. Even without limitations in available AI manpower, we would still need more powerful machine aids for building and refining the knowledge bases of the expert systems. These machine aids will be themselves AI systems for building and improving expert systems. Work has already started on systems of this type, but much more remains to be done.

The authors make a convincing case for maintaining and exploiting the US momentum in AI and in other areas of computer science and technology They take the Japanese Fifth Generation challenge very seriously, and they advocate shaking the "business as usual" attitude in the face of this challenge In general, I find the book thought provoking at various levels both in terms of immediate issues and in terms of issues that are more long-term, but that we must face as part of our dealing with the emerging computer revolution (and these issues will be with us regardless of the Fifth Generation Project). I think it is very important that the book goes beyond an analysis of issues; it also proposes a course of action. If the reader disagrees with the special recommendations for action, then at least he has a tangible starting point for discussion, and he is challenged to present alternatives.

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