

Book reviews

The reliability of expert systems. Reviewed by Jerome Ravetz.

Knowledge acquisition for expert systems (2nd edition). Reviewed by Ian Neale.

Benefits and risks of knowledge-based systems. Reviewed by: (1) Richard Thomas; (2) Jim Hawkins; (3) John Nicholls.

Benefits and risks of knowledge-based systems Report by a Working Party, UK Council for Science and Society, OUP, Oxford 1989, pp 76, £6.95.

The Council for Science and Society has the object of “promoting the study of, and research into, the social effects of science and technology, and of disseminating the results thereof to the public”. Its working party on the Benefits and Risks of KBSs consisted of distinguished people who are actively engaged in AI research as well as lay people: the report reflects this membership.

The report is very strong in as much as it avoids hype and seeks to explain the terms it uses, except in a few notable cases. It starts off with a chapter on How Knowledge-Based Systems Work, which would be easily understood by the lay reader. It was encouraging to read on page 5 that they are at their most effective as knowledgeable assistants to a human expert and that the Japanese phrase “Job Assistant System” seems appropriate. Disappointingly, I did not feel much wiser about this aspect by the end of the report. This chapter also lacks depth on the difficulty of engineering reliable systems.

There is then a chapter on four application domains. That of finance was probably written before the crash of 1987: it seems dated already. The section on health mentions the Third World in the first sentence but does not then give it any special consideration; it does, however, have a revealing discussion on psychotherapy. The coverage on education would have been improved with more on implications. This section on military applications is slightly emotionally charged and the argument about battlefield management systems needs a stronger technical basis than is provided in chapter one. The discussion on the law is most authoritative, assessing the potential of KBSs in various application domains, but it is the presentation of the argument which is particularly instructive in its own right. It would have been valuable to compare and contrast current and projected KBSs in the Law with those in the military because they span widely different roles from job assistant through to autonomous decision maker.

The chapter on the benefits and dangers of KBSs is more stimulating. Attitudes towards KBSs are discussed under the heading of “Believer”, “Social Critic” and “Disbeliever”. It is probably too much to expect a lengthy argument from the disbelievers, but it might have given the report more long term value as it would help to delimit the application of KBSs. As someone who once worked on the maintenance of large, long-standing on-line dp systems, I felt that most of the points made by the social critics could be addressed over time: this was a surprise. The chapter contains some punchy material.

The chapter on influencing the future uses of KBSs is good. There is a call to think about future regulation of the construction and use of KBSs, especially those available to the public at large. Whitby’s Code of Conduct for AI Practitioners is also aired.

In the conclusions and recommendations they state that they were “pleasantly surprised to find . . . few dangerous or undesirable applications of KBS”. This does seem justified with our current, rather limited knowledge, but may be only time will tell just as with other technologies such as asbestos or high-rise flats. The report would have been so much more authoritative had it been possible specifically to exclude safety critical applications as suitable for KBSs. The recommendations are sensible, although often rather short-term in nature.

Is the report worthwhile? Yes, definitely, for practitioners and students and/or teachers. It may be

of some value to researchers, especially as background, but it lacks the polish or single-mindedness to make it a seminal work. Overall, it probably meets the worthwhile objectives of the Council for Science and Society.

Reference

International Electrotechnical Commission, 1989. "Draft—Software for computers in the application of industrial safety-related systems", *Geneva: IEC Report 65A(Secretariat)94-1*.

Reviewed by Richard Thomas, AI Group, School of Computer Studies, University of Leeds, UK.

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The Council for Science and Society (CSS) is a charitable institution dedicated to the study of the social impact of science and technology. In particular, the CSS promotes the early discussion of topics of future significance not yet the subject of serious public debate. The stated aim of this report is to increase general awareness of knowledge-based systems (KBSs) and to alert the public at large to the potential benefits and possible dangers arising from the widespread introduction of this technology.

The report opens with a brief history of artificial intelligence and the development of knowledge-based system technology. Unfortunately, considering the lay audience at which this report is aimed, the explanations are couched in rather technical terms which may hinder understanding. A wide range of applications is discussed with illustrations drawn from the fields of finance, law, education, the military and health.

The authors don different "hats" to present the benefits and risks of KBSs. In the guise of "the believer", the benefits of the knowledge-based filtration and delivery of information are expounded, while the "social critic" warns of the hazards of uncritical acceptance of a KBSs advice, misplaced belief in a system's wisdom, the risks to civil liberties, the ethics of cultural imperialism and, most ominously, the terrifying dangers threatened by the military use of autonomous decision systems. Even the "disbeliever" has his say, but gets short shrift, as the authors clearly believe in the technical capability of KBSs.

The report observes that many of the risks arising from the use of KBSs are shared with computer systems in general: the threat to privacy and civil liberties, for example. The dangers of autonomous decision making systems (systems where an action of some consequence is taken by the system directly, without a human authority in the decision loop), particularly those in the military field, are heavily underlined, and rightly so, for not only are the consequences of error most serious, but military secrecy shrouds their development from public scrutiny. But here again, the risks are shared with "traditional" computing. As long ago as 1980, Professor C. A. R. Hoare implored American military programmers not to use Ada for safety-critical software as he believed it to be too complex a language ever to be properly verified. This report levels the same criticism at military KBSs.

Finally, the report makes thirteen recommendations of measures to enhance the benefits and minimise the risks of such systems, ranging from education and the initiation of socially desirable applications to the adoption of industry standards and codes of practice.

Does this report achieve its objectives? The answer must be a qualified yes. Yes, because the benefits to society of appropriate systems, together with the dangers inherent in the inappropriate application of the technology, are clearly spelled out. Qualified, because discussion is largely limited to what could be termed "public" systems: systems in domains such as health, education and law with which all members of society will come into contact. There is no discussion of the myriad "private" systems, each affecting only a small group of people, which can be expected to outnumber the "public" systems by orders of magnitude. Qualified, too, because there is no discussion of the risks of failure by business to adopt the technology in the face of its adoption by our competitors.