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Artificial Intelligence: Tools, Techniques, And Applications by Tim O'Shea and Marc Eisenstadt (eds.), Harper and Row, New York, 1984, x+497 pp. (£12.95).

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Abstract

Robotica (1984) volume 2, pp 177–181

Book Reviews

ARTIFICIAL INTELLIGENCE: TOOLS, TECHNIQUES, AND APPLICATIONS by *Tim O'Shea and Marc Eisenstadt (eds.)*,

Robot Control Systems, discusses geometrical and mechanical aspects, referring to the need for suitable combinations of force control and position control. The discussion here does not go

Harper and Row, New York, 1984, x + 497 pp. (£12.95). The publisher's announcement says this is an introductory text designed for advanced undergraduate and graduate students in Artificial Intelligence, Cognitive Psychology and Computational Linguistics, as well as for professionals needing knowledge of industrial applications in Artificial Intelligence. It is intended to provide these various readers with clear tutorial accounts of a representative sample of mainstream AI topics. The editors are both from the Open University, and the book formed the basis of a study school under the auspices of the AISB (Society for the Study of Artificial Intelligence and Simulation of Behaviour).

The range of contents is rather different from that of most books on Artificial Intelligence, and reflects the current emphasis on studies having fairly direct utility. The main emphasis is on Robotics techniques, and on Natural Language processing, the latter being important in its application to Expert Systems and also having potential applications in advanced Robotics work.

The three Parts are headed, as indicated in the sub-title, Tools, Techniques, and Applications. The first, on Tools, consists of four Chapters, all dealing with programming languages. The first is on *PROLOG*, and is written by Clocksin, co-author of one of the best-known texts on that language. The coverage is pretty thorough, and even goes some way towards answering the question which bothers most people who read introductory works on *PROLOG*, namely how it is that a language allowing only (or mainly) declarations can be used to produce something (such as a compiler) which actually does something other than answer questions put by the user.

The next two Chapters give an introduction to *LISP* followed by an advanced treatment of it, leading up to the writing of a *LISP* interpreter in *LISP*. The fourth Chapter introduces a further alternative language for use in A.I., namely *POPLOG*. This has been developed mainly in Sussex University, but stems from earlier work in Edinburgh. It is useful to have this rundown on logic languages, which are interesting as logical structures even apart from their use in electronic computing. However, most workers will make a detailed study only of the languages they have the opportunity to use on actual systems; it is difficult to study either natural or computer languages without trying them out.

Part 2 begins with a chapter on "How to get a Ph.D. in AI". My first reaction to the title was one of horror at the apparent assumption of intellectual conformity, akin to the reaction of a visitor to the U.S.A. who found a class of seven-year-olds being given a talk on "How to give a party". In fact, the advice is pretty general and innocuous and applicable to anyone taking a Ph.D. in any subject, or for that matter undertaking a large and complex project of any kind.

The next Chapter in Part 2 is an essay on Cognitive Science Research in which there is discussion of findings in Psychology as well as of practical applications. (The treatment of Computer Vision in Part 3 also refers to biological studies, particularly the work of Marr and others on perception.) The next Chapter, on

very deep, but the next Chapter, on Kinematic and Geometric Structure in Robot Systems, is a very thorough survey of applicable mathematical techniques. Part 2 ends with a Chapter on Implementing Natural Language Parsers, in which the authors face up to the need to combine semantic and syntactic information.

Part 3 begins with a long and valuable review of work on Computer Vision, followed by another Chapter on Natural Language Processing. Like the discussion of parsers in Part 2, this acknowledges the need to combine semantic and syntactic information, and reviews the methods used in well-known projects including Winograd's SHRDLU and the use of "scripts" inspired by Minsky's use of "frames". Then there are Chapters on Industrial Robotics, Text Processing, Planning and Operations Research, and *MYCIN* as an example of an Expert System. The *MYCIN* System is generally acknowledged as a valuable aid to medical diagnosis in a number of areas. The treatment of Planning refers very much to work which was first carried out and described under the heading of Robotics, in planning robot movements. It is presented here in a more general context.

A curious feature of the book is the wide range of levels at which the various topics are treated. Some disparity is inevitable in a multi-author work, and no doubt much of it can be defended since the stated aim is to give tutorial accounts of a sample of mainstream topics. It is reasonable to combine these with lower-level discussions giving orientation in other areas. The Chapter on Text Processing, for example, does little more than indicate the existence of a problem, namely that of assisting the manipulation of text with reference to inherent structures other than the obvious character-sequence one accessible to word processors.

The book certainly contains much useful review and discussion material, particularly in the treatment of Kinematic and Geometric Structure in Robot Systems (Chapter 8), in reviewing material relevant to Computer Vision (Chapter 10), in discussing Natural Language Processing (Chapters 9 and 11), and in the overview of the development of the *MYCIN* system (Chapter 15).

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UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL, PRODUCTION AND USE OF INDUSTRIAL ROBOTS, PART 1 (Trends on the manufacture and use of industrial robots), 1983, 87 pp.

The second session of the Working Party on Engineering Industries and Automation of the UN Economic and Social Council held in February, 1982, suggested that a study should be undertaken on robotics in the context of manufacturing procedures. The implementation of this project that is concerned with new production methods in engineering as related to the man-machine management systems, will take the form of a series of studies on well-defined aspects of automation. Part 1

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