

non-logical, statistically based inference methods are presented.

Readings in Knowledge Representation is a most worthwhile reference for anyone in any aspect of artificial intelligence, from beginner to expert.

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DISCOURSE SEMANTICS

Pieter A. M. Seuren

Oxford: Basil Blackwell, 1985, x+544 pp.
ISBN 0-631-13594-4; \$39.95

Seuren's book can be useful and interesting for two different kinds of readers: firstly, for those specialists who are interested simply in problems suggested by the title itself, and secondly, for students and other people who are novices in the field of theoretical linguistics and want to reach its central points going a very difficult but also very fascinating way. This second "usefulness" seems to be not so obvious as the first one; probably it has not even been intended by the author. However, we should start this review by emphasizing *and lauding* this feature of the book in question.

Pieter Seuren does not try to build his theory without having laid the foundations of it. He places his ideas in a long tradition of linguistic thought and proposes his answers to some essential questions relating to language and linguistics. He considers the main goal of the study of language to be "an insight into the cognitive machinery which enables humans to use it the way they do" and describes and criticizes the current situation in the theory of meaning and grammar with its principal fault being the insufficiency of linguistic facts to support abstract, formal systems. Seuren resumes the ancient controversy between the anomalists and the analogists and places his book in the former tradition.

These, and many other basic theoretical statements make this book partially open *but not easy!* for non-specialists who wish to familiarize themselves with some topics of modern linguistic thought.

However, the main purpose of this book is to represent Seuren's ideas concerning semantics, especially describing the meaning of sentences from the point of view of their role in a discourse. Seuren is of the opinion that the meaning of a sentence cannot be described in isolation. The central notion of the book is thus "discourse domain", which is defined as a finite number of distinct addresses, superaddresses, and instructions. An address is a store to which every new asserted sentence in the discourse contributes new information about the individual referred to by the discourse. A

superaddress differs from the address in that it refers not to individuals but to sets of individuals.

In Seuren's estimation, the meaning of a sentence consists in "the systematic modification, or increment, which it brings about whenever it is added to an appropriate given discourse domain".

These basic definitions are contained in the first chapter which is entitled "Discourse and interpretation". They are implemented in other parts of the book, especially in chapters 4 and 5.

In chapter 2, "Grammar and lexicon", Seuren arraigns the idea of surface semantics and represents his version of traditional SA-semantics, which is based on the assumption that surface structures are not directly interpretable and, therefore, a separate level of semantic analysis is needed.

Chapter 3, "The logic and semantics of presupposition", gives us, among other things, the idea of presuppositional three-valued logic which is also developed in the appendix by A. Weijters.

The book in question contains many fragments which are really exciting. It gives a large and original picture of one of the most important topics in modern linguistics.

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PLANNING AND UNDERSTANDING: A COMPUTATIONAL APPROACH TO HUMAN REASONING

Robert Wilensky

Reading, MA: Addison-Wesley, 1983, xiv+168 pp.
ISBN 0-201-09590-4; \$25.00

IN-DEPTH UNDERSTANDING: A COMPUTER MODEL OF INTEGRATED PROCESSING FOR NARRATIVE COMPREHENSION

Michael George Dyer

Cambridge, MA: The MIT Press, 1983, xvii+458 pp.
ISBN 0-262-04073-5; \$35.00

The two books under review here have much in common: not only do they both deal with the question of comprehension of narratives in general, but they also share the view that this can be achieved via understanding of the goals of the participants involved. This coincidence perhaps stems from the shared background of the two authors, namely the Yale-based work of Schank, Abelson, and others, to which both authors make reference, in some instances extensively. In case this revelation should lead some readers to prejudge the works immediately, it must be said that the Schankian influence is less evident in Wilensky's book than in Dyer's.

The similarities between the two books do not go much further. In particular, Wilensky's coverage is narrower, and nearer cognitive science than computational linguistics. Dyer's broader coverage stems partly from the fact that his book is much more obviously based on his Ph.D. thesis, and this is an important weakness: authors and publishers should be aware that there is a big difference between a thesis and a book, and theses must be carefully revised and edited before they are published. Dyer's work is a long and difficult read, even though he has interesting things to say; Wilensky's, despite its narrowness, is a more rewarding book.

Wilensky's first two chapters are introductory. Claiming psychological relevance for his approach, he presents understanding as being inversely related to planning: while the latter "starts from a goal and proceeds towards a plan of action", the former "starts from perceived actions and proceeds towards hypothesised plans and goals" (pp. 17-18). In Wilensky's view, then, a computational model of narrative understanding involves modelling the goals and plans of the actors involved in the narrative. Although narratives to be considered typically are restricted to "mundane activities", Wilensky notes that these have more complex plan structures than apparently more difficult problems (p. 11). Although individual goals may be quite simple, they often interact with each other or – in the case of "meta-plans" and "meta-goals" – pertain directly to each other.

Chapter 3 gives an overview of the planning model: plans are associated with and triggered by goals, but they also have consequences that must be taken into account, and these consequences often affect other plans. So the understander has four components: a goal detector, a plan proposer, a projector (which theorises about the consequence of carrying out plans), and an executor.

Chapter 4 notes that plans sometimes need to take account of multiple goals that may be in conflict, and so the concept of a "meta-planner" is introduced, which aims to achieve "meta-goals" such as resolving such conflicts. This need for meta-planning is further developed in Chapter 5, where it is suggested that a story-understander must be able to recognise the reasons behind actions which do not apparently relate to the fulfilling of any explicit goals.

The next five chapters consider in detail various types of goal-interactions and relationships. These can be broadly classified as internal or external, the former involving conflict or overlap, the latter competition or concord. Chapter 7 deals with goal conflict and competition, and suggests that this can be dealt with either by abandoning one of the goals, altering the plan to eliminate the cause of conflict, or inception of a new plan to deal with the conflict. Knowledge about goal conflict is very important in story understanding because it leads to expectations in the reader about the behaviour of the characters, or the likelihood of the goal being fulfilled. Wilensky goes into considerable details in these chapters,

with ample exemplification. One aspect which however is not emphasised is the extent to which stories are interesting only when readers' expectations are violated. Many of Wilensky's example narratives would in fact make rather dull stories, because nothing unusual happens, and one wonders how his theory would cope with that aspect of narrative understanding. In this respect, Dyer's approach, which is more frame-like, more explicitly attempts to account for this aspect of narratives. Wilensky categorises various types of conflict and competition, noting that they sometimes arise from the particular plan chosen rather than the goal itself. Chapter 8 continues the theme of goal conflict, discussing various ways in which it can be overcome, and especially the related questions of planning to maximise the goal achievement in a conflict situation, e.g., by partially fulfilling all goals, or picking one as being the most important to fulfill, or finding an alternative plan that meets the goals but without conflicts. Conflict resolution becomes a meta-goal with associated meta-plans, and so on. In Chapter 9, the author talks briefly about external conflicts, where the goals of different actors are in competition, and compares various approaches in the literature. Chapter 10 deals with positive goal relations, such as overlapping goals, subsumptions and goal concords.

The final two chapters deal with some implementations of the model, and here we get the first real indication of how what we have been reading about relates to understanding. Making reference to earlier implementations (especially PAM) and their weaknesses, he introduces the special-purpose programming language PEARL – a frame-like formalism also resembling Prolog, and implemented in Lisp. The representations, which are likened to an extended version of Conceptual Dependency (but which do not actually look quite so abstract or deep), are illustrated, and in Chapter 12 a particular implementation, FAUSTUS, is discussed. These final two chapters are very useful in reassuring the reader that the preceding chapters were not purely theoretical and certainly serve the purpose such exemplification can best hope to fulfill, namely of assuring the plausibility and giving some of the flavour of the implementation.

Turning now to Dyer's rather longer work, the first general point is to mention once again the excessively broad "thesis-style" coverage. In Dyer's defense, it should be said that he includes in his first chapter a "Guide to the Reader", enabling him/her to read selectively. The book is broadly divided into four parts, the first dealing with "Thematic Abstraction Units" (TAUs), the second with the relationship between understanding and memory, the third with some specific knowledge structures, and the fourth principally a detailed traced example.

In Part I then we have the TAU, which "serves as a basis for story characterization by means of cross-con-

textual reminders and the recall of adages" (p. 27). These "adages" capture in a neat saying the point of the story. They are in effect macros representing a particular goals-events interaction. But it is unclear whether recognition of the appropriate adage (e.g., "Too many cooks spoil the broth") triggers the setting up of a pattern of abstract goals and events against which to match the events of the story, or vice-versa. If the former, one wonders how the appropriate adage is picked out in the first place. If the latter, then the use of adages would seem to be no more than a gimmick, or more charitably an initially interesting but quickly tiresome, expository device. The question of just how the more intricate details of the stories are to be understood is more pressing. On the other hand, as part of a cognitive theory of story understanding, the idea of relating stories with similar structures is probably right, though there is also the important point that stories are only interesting insofar as they take an unexpected turn, as Dyer correctly notes: "It is the unusual and unexpected events, including the mistakes and failures of the characters which often make a story memorable. By their very nature, such events cannot be predicted in a top-down manner" (p. 17).

As well as TAUs, the discussion of which continues for an excessive 75 pages, Dyer introduces the notion of AFFECTs, which are knowledge structures relating the emotional reactions of participants. These are important in indicating which TAU is present, and in answering questions about the narrative.

The second part of this book concerns the control, coordination, and interaction of various processes, viz., parsing for comprehension, retrieval for question answering, and memory modification in both. Dyer's claim is that these interactions are a key element of the integrated narrative comprehension system, one of whose features is the ability to understand and answer questions without parsing them fully or even completely understanding them. The system, called BORIS, uses "demons", a type of production system similar to, but more general than, Riesbeck and Schank's "requests", which undertake a wide variety of tasks involving various types of knowledge structure. The knowledge structures used by BORIS are firmly founded in the Yale tradition, a feature that extends in Part III to the use of "I-links" (goal-plan-event dependencies not unlike those discussed in Wilensky's book), MOPs (interconnectable script-like structures which will be familiar to followers of the Yale School), and so on.

The final part of the book, not including a number of appendices, contains a highly detailed worked example which will be of great interest to anyone thinking of simulating the model, and which is of value in that it brings together and focuses the preceding discussion, as well as clarifying some peripheral questions, especially

concerning the basic parsing strategies used. The book ends with a retro- and prospective view of the general approach, highlighting some of the theoretical discoveries that arose from the computer implementation, and looking forward to future work in the field.

As mentioned above, Dyer's book is long and thorough: while this is an advantage for readers who wish to immerse themselves in the model and get an exhaustive view of it, for the more casual reader it is a difficult book to get a lot out of despite the author's guide to "skimming". In some respects it is more overtly relevant to Computational Linguistics than Wilensky's book, especially in being more explicit about formalisms and fine detail, and in dealing with run-time questions: Wilensky only really underlines the relationship between planning and understanding in his final chapter, whereas the Dyer book makes this more explicit throughout.

Finally, one thing that both books are able to make quite clear even to the most optimistic reader is that the whole question of understanding and modelling actors' motives even in relatively banal stories is extremely complex, and worthy of all the attention it is given.

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BOOKS RECEIVED

Authors and publishers who wish their books to be considered for review in **Computational Linguistics** should send a copy to the book review editor,

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All books received will be listed, but not all can be reviewed.

Readers who wish to review books for the journal should write to the book review editor outlining their qualifications. Obviously, we cannot promise the availability of books in anyone's exact area of interest.

Erratum: The following book was incorrectly listed in issue 12(4); the author's name was inadvertently given as Dobbs.

Hobbs, James B.

[Lehigh University]

Homophones and Homographs: An American Dictionary
Jefferson, NC: McFarland, 1986, viii+264 pp
Hardbound, ISBN 0-89950-182-6, \$27
