

ABSTRACTS OF CURRENT LITERATURE

Correction: In Issue 14-2, the title of Kathleen Finn's thesis was incorrect. It should read "An Investigation of Visible Lip Information to be Used in Automated Speech Recognition."

Selected Dissertation Abstracts

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Logic-Based Knowledge Representation Languages Can Represent Complex Objects and Hierarchical Structure in a Natural Manner

Jeffrey Alan Jackson

The University of Wisconsin - Madison

Ph.D 1987, 391 pages

Computer Science

University Microfilms International

ADG87-20464

KORAL is a syntactic extension of traditional predicate calculus for knowledge representation (KR). It has expressive power comparable to higher-order logic, is more concise and perspicuous than traditional logic, and represents important aspects of the meaning of descriptive English statements.

KORAL features include numerical quantification, structured variables, new rules of variable scoping, pointers, and typing of predicate places. An algorithm for translating KORAL to traditional logic is given, thus demonstrating the reducibility of KORAL semantics to the semantics of the ordinary predicate calculus.

The KORAL interpreter evaluates detection and individuation "meaning postulates" against a finite relational data base to automatically identify and name complex objects. The new names are constants used during subsequent computation.

The overall effect of this automatic identification and naming of complex individuals is that, in addition to having the capacity of the ordinary predicate calculus to handle hierarchies of atomic and compound formulas and of primitive and defined predicates, KORAL and its interpreter also have the capability to handle the "structural" hierarchy of complex individuals composed of other individuals, possibly themselves complex. Thus the frequent criticism that logic is "too flat" for effective KR is shown to be groundless and, further, logic is seen to

provide a helpful explication of the semantics of KR schemes that focus on hierarchies of complex objects.

A second frequent criticism of logic-based KR is that its associated inference too often blows up combinatorially. We argue that this criticism applied to all KR formalisms, and that the solution lies not in how knowledge is represented but in what knowledge is represented. In particular, hierarchical planning is required to control deductive combinatorial explosion. KORAL promises to be suitable for representing the control knowledge on which such planning must be based.

A Knowledge System Using Hybrid Reasoning Schemes and Exploiting a Relational Data-Base as a Frame-Like Knowledge Base

Wei-Si Jiang

University of Cincinnati Ph.D 1987, 178 pages

Computer Science

University Microfilms International

ADG87-22093

This dissertation describes an expert system shell, PAIS-I, and several prototype systems developed using this shell. The PAIS-I system has a couple of special facilities to support hybrid reasoning schemes, and is capable of exploiting a relational data base as a framelike knowledge base.

First-generation expert systems reason from rules of thumb, or use heuristic reasoning. They have limited problem-solving ability and a fragile behavior at the boundary of the field domain. Model-based reasoning employs a different approach. In this approach, we first build a model of the system's structure, function and causality, and then reason about this model.

With a specific problem domain-electronic trouble shooting, three small prototype expert systems were developed using the PAIS-I shell. Each of them employs a different reasoning scheme: the first one uses heuristic reasoning only; the second one uses model-based reasoning only; and the third one combines the first two approaches and uses a hybrid reasoning scheme. The comparative study shows that the heuristic approach is of high efficiency, but the problem-solving ability is limited. The model-based approach has powerful problem-solving ability, but is inefficient. The combined approach supported by the PAIS-I shell can achieve high efficiency as well as powerful problem-solving ability. The special facilities of the PAIS-I shell enable the implementation of this hybrid reasoning scheme easier and more convenient than the existing shells.

The PAIS-I shell has a direct access to an external database management system (DBMS) for fetching the information from the data base. It also has a DBMS frame interpreter to transform the information into executable Prolog clauses representing a frame.

With the support of these facilities, the system is capable of exploiting passive data in the data base as active knowledge for making useful inferences. With the help of the PAIS-I system facilities, a hardware verification prototype was developed using a novel approach. An implementation of commonsense reasoning was also studied, which is able to solve well-known Whether Birds Can Fly and Temporal Projection problems.

A Formal Theory of Plan Recognition

Henry Alexander Kautz

The University of Rochester Ph.D 1987, 226 pages

Computer Science

University Microfilms International

ADG87-18947

Research in discourse analysis, story understanding, and user modeling for expert systems has shown great interest in plan recognition problems. In a plan recognition problem, one is given a fragmented description of actions performed by one or more agents, and expected to infer the overall plan or scenario that explains those actions. This thesis develops the first formal description of the plan recognition process.

Beginning with a reified logic of events, the thesis presents a scheme for hierarchically structuring a library of event types. A

semantic basis for non-deductive inference, called *minimum covering entailment*, justifies the conclusions that one may draw from a set of observed actions. Minimum covering entailment is defined by delineating the class of models in which the library is complete and the set of unrelated observations is minimized. An equivalent proof theory forms a preliminary basis for mechanizing the theory. Equivalence theorems between the proof and model theories are presented. Minimum covering entailment is related to a formalism for non-monotonic inference known as *circumscription*. Finally, the thesis describes a number of algorithms that correctly implement the theory, together with a discussion of their complexity.

The theory is applied to a number of examples of plan recognition, in domains ranging from an operating system advisor to the theory of speech acts. The thesis shows how problems of medical diagnosis, a similar kind of non-deductive reasoning, can be cast in the framework, and an example previously solved by a medical expert system is worked out in detail.

The analyses provides a firm theoretical foundation for much of what is loosely called "frame-based inference", and directly accounts for problems of ambiguity, abstraction, and complex temporal interactions, which were ignored by previous work. The framework can be extended to handle difficult phenomena such as errors, and can also be restricted in order to improve its computational properties in specialized domains.

A Unified Theory of Inference for Text Understanding

Peter Norvig

University of California, Berkeley Ph.D

1986, 290 pages

Computer Science

University Microfilms International

ADG87-18104

Natural languages, like English, are difficult to understand not only because of the variety of forms that can be expressed, but also because of what is not explicitly expressed. The problem of deciding what was implied by a text—of "reading between the lines"—is the problem of inference. For a reader to extract the proper set of inferences from a text (the set that was intended by the text's author) requires a great deal of general knowledge on the part of reader, as well as a capability to reason with this knowledge.

Past approaches to the problem of inference have often concentrated on a particular type of knowledge structure (such as a script) and postulated an algorithm tuned to process just that type of structure. The problem with this approach is that it is difficult to modify the algorithm when it comes time to add a new type of knowledge structure.

An alternative, unified approach is proposed. This approach is formalized in a computer program named FAUSTUS. The algorithm recognizes six very general classes of inference, classes that are not dependent on individual knowledge structures. Rather, the classes describe very general kinds of connections between concepts. New kinds of knowledge can be added without modifying the algorithm. Thus the complexity has been shifted from the algorithm to the knowledge base. To accommodate this, a powerful knowledge representation language named KODIAK is employed.

The resulting system is capable of drawing proper inferences (and avoiding improper ones) from a variety of texts, in some cases duplicating the efforts of other systems, and in other cases improving on them. In each case, the same unified algorithm is used, without tuning the program specifically for the text at hand.

Toward a Mathematical Theory of Plan Synthesis

Edwin Peter Dawson Pednault

Stanford University Ph.D 1987, 258 pages
Computer Science

University Microfilms International
ADG87-20423

Planning problems generally have the following form: given a set of goals, a set of allowable actions, and a descriptive of the current state of affairs, find a sequence of allowable actions that will bring about a state of affairs in which all of the desired goals are satisfied. This dissertation examines the question of how to solve planning problems efficiently. This question is addressed from a rigorous, mathematical standpoint, in contrast to the informal and highly experimental treatments found in most previous works. By introducing mathematical rigor, it has been possible to develop techniques that are capable of solving a much broader class of problems than has been considered in the past. For example, problems that involve time and context-dependent actions can be solved using the techniques that are presented. It has also been possible to unify and generalize many existing ideas in automatic planning, showing how they arise from first principles and how they may be applied to solve this broader class of problems. These ideas include means-ends analysis, opportunistic planning, goal protection, goal regression, constraint posting/propagation, and formal objects.

Derived Relations with Exceptions

Gonzalo Ramirez-Ruiz

Texas A&M University Ph.D 1987, 200 pages
Computer Science

University Microfilms International
ADG87-20937

Generalization rules are a powerful and versatile tool to represent knowledge at a high level of abstraction—as opposed to conventional database systems, which use data to represent specific facts. A generalization rule used in conjunction with a relational database system serves two purposes: first, it represents knowledge of a general nature; and second, it defines the subset of a population of tuples that satisfy the conditions defined in the rule. As a generalization, the knowledge being represented does not depend on any specific facts, but rather it describes information of a general nature about an organization or a phenomenon; as a subset of a population, it describes all those individuals that fall into the generalization given by the rule. A major issue that had not been fully addressed in the literature is the problem of exceptions to generalizations. Exceptions arise naturally in the real world because, by definition, a generalization implies a loss of detail, and because even if it were feasible, it is probably not desirable nor convenient to define every possible case in a generalization rule.

This dissertation has identified the problems in dealing with exceptions, characterized the types of exceptions, analyzed the issues in storing generalization rules and exceptions, studied the possible conflicts in stored data, and proposed definite solutions. These solutions are given in a mathematical, axiomatic form. A mathematical entity called DRE-algebra has been defined that allows the formal specification of generalization rules, exceptions, and database operations on exceptions. In addition, an implementation has been given as an extension to the SQL database language.

**Concept Acquisition Through
Representational Adjustment**

Jeffrey Curtis Schlimmer

University of California, Irvine Ph.D

1987, 354 pages

Computer Science

University Microfilms International

ADG87-24747

Though the experiences of life exhibit unceasing variety, people are able to find constancy and deal with their world in a regular and predictable manner. This thesis promotes the hypothesis that the necessary abstractions can be learned. The specific task studied is inducing a concept description from examples. A model is presented that relies on a weighted, symbolic description of concepts. Though the description is distributed, novel examples are classified holistically by combining each portion's contribution. Each new example also refines the concept description: internal weights are updated and new symbolic structures are introduced. These actions improve description quality as measured by classification accuracy over novel examples.

Initially the concept description is highly distributed, being composed of many simple components. As learning progresses, sophisticated descriptive structures are added, and eventually the description is coalesced into a few highly predictive components. This qualitative change in the representation of the concept is a unique feature of the model.

The model extends previous work by allowing for noisy examples, unknown values, and concept change over time. To bolster claims of robustness, several experiments illustrating the model's behavior are reported. Key results illustrate that the model should scale-up to larger tasks than those studied and have a number of potential applications.

**A Theory of Stratified Meaning
Representation for Natural Language**

Tomasz Strzalkowski

Simon Fraser University (Canada) Ph.D

1986

Computer Science

(This item is not available from

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ADG05-61235

We introduce a computationally oriented theory of natural language understanding that integrates various levels of language processing with methods of modeling the language denotational base. This theory attempts to bridge the gap between the formal theories of language and meaning, such as possible worlds theory and the theory of situations, and artificial intelligence practice. We develop the concept of the Stratified Model as a major processing medium that provides an interface between linguistic input, the "real" universe, and the knowledge base of some hypothetical, intelligent individual.

The major work reported in this dissertation focuses on selected aspects of the Stratified Model which have been identified with the domains of three language transformations and the meaning representation levels they produce. The first of these transformations represents the syntactic analysis of morphologically disambiguated utterances with the categorial grammar CAT. As a result, a set of possible discourses is generated in which each sentence is considered independently of the rest of discourse. Possible discourses are subject to another transformation which integrates them into partially connected and locally coherent discourse prototypes. At this stage, various intersentential dependencies are evaluated, including anaphoric in-text relations. A small number of possible discourse representations that display global coherence are selected from among discourse prototypes and delivered onto the ultimate meaning representation level by the final transformation. From this level a mapping is attempted onto a corresponding universe model. A sequence of further transformations would then extend this mapping to a real-world interpretation of discourse.

The problems of modeling the language denotational base are addressed within the Theory of Names and Descriptions, which constitutes a part of our framework. A layered model of the

universe is proposed to capture non-singular interpretations of certain linguistic entities often referred to as functional, generic, mass, or intensional. The uniformity and elegance of our approach is contrasted with the partial and incomplete explanation of this phenomenon given in other relevant research.

Language and Definiteness

Nirmalangshu Mukherji

University of Waterloo (Canada) Ph.D
1987

Education, Philosophy of

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ADG05-60643

This study is an attempt to confront a received view of language with a single linguistic phenomenon. At issue is the computational view of language according to which a sequence of sounds is processed through computational components, each of which is distinguished by its own set of rules. The linguistic phenomenon at issue is the definite article *the*. Hence the title.

I show first that, given the nature of the linguistic phenomenon at issue, just two components of the computational view are relevant here. The components are: grammar (Chomsky) and logic (Montague).

Next, I argue that there is some reason to believe that *the*, unlike other "logical particles" of English, seems to escape computational processing. This problem has never quite surfaced in the recent literature in philosophy, linguistics, and logic because most authors still believe that Russell's Theory of Descriptions—despite Strawson's objections—at least partially accounts for *the*. I show that Russell's theory has been simply assumed, rather than examined, in much current discussion of de re modalities, rigid designators, etc. I examine Russell's theory from various angles to conclude that it fails even as a partial account of *the*-phrases. Thus the problem raised above remains open.

Finally, an evaluation of a variety of data leads to the conclusion that *the* is best viewed as a blind device for an expected convergence, from the speaker's point of view, of speaker-hearer—GROUP—reference. This leads to three consequences. First, the only rule that plausibly could be applied to *the* turns out not to be syntactic, in the Chomskyan sense, despite *the* being a blind device. Second, *the* cannot be cast in any logic since it does not simulate any logical operation. Third, given that definite descriptions supply the clearest model for singular reference, some problems in this area (e.g., Frege's Puzzles) seem to escape a computational solution.

The following dissertation is available from
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Doheny Library
University of Southern California
Los Angeles, CA 90089-0182

Parallel Processing Techniques for Production Systems

Manuel Fernando Da Mota Tenorio

University of Southern California Ph.D
1987

Engineering, Electronics and Electrical

(This item is not available from

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ADG05-61010

Production systems' static and dynamic characteristics are modeled with the use of graph grammar in order to create means to increase the processing efficiency and the use of parallel computation through compile time analysis. The model is used to explicate rule interaction, so that proofs of equivalence between knowledge bases can be attempted. Solely relying on program static characteristics shown by the model, a series of observations are made to determine the system dynamic characteristics, and modifications to the original

knowledge base are suggested as a means of increasing efficiency and decreasing overall search and computational effort. Dependences between the rules are analyzed and different approaches for automatic detection are presented. From rule dependences, tools for programming environments, logical evaluation of search spaces, and Petri net models of production systems are shown. An algorithm for the allocation and partitioning of a production system into a multiprocessor system is also shown, and addresses the problems of communication and execution of these systems in parallel. Finally, the results of a simulator constructed to test several strategies, networks, and algorithms are presented.

Quantitative and Qualitative Assessments of the Impact of Linguistic Theory on Information Science

Amy Warner

University of Illinois at
Urbana-Champaign Ph.D 1987, 240 pages
Information Science
University Microfilms International
ADG87-21782

A citation analysis was performed on a subset of the information science literature to determine the impact of linguistic theory on information science. Both quantitative and qualitative measures were employed to show the relationship between the two fields. The overall findings indicate that this portion of the information science literature has made almost no use of linguistic theory. The small number of citations on linguistic theory did show some patterns, indicating that small numbers of citing and cited authors account for most of the activity; that syntax and semantics have occupied more attention from information scientists than other branches of linguistic theory; that information scientists have cited older works over time; and that most of the citations to linguistic theory belong to qualitative "non-use" categories.

What's a Bunch? Integrating and Applying Syntactic, Semantic, and Sociolinguistic Analyses to Explain the Partitive Construction in English

Thomas Anthony Angelo

Harvard University Ed.D 1987, 360 pages
Language, Linguistics
University Microfilms International
ADG87-22667

This dissertation explains the structure, meanings, and uses of the partitive construction in English. Partitive constructions are phrases such as "bunch of", "herd of", "gallon of", or "boatload of". Partitives premodify and specify nouns and noun phrases. Partitives are shown to be of two syntactic classes: nominal and quantifier. The syntactic structure of each class of partitives is analyzed and illustrated in some detail. Next, the lexical semantic meanings of partitives are discussed. Partitive meanings are shown to be systematically interrelated and categorizable according to a limited number of dimensions. Third, a subset of the English nominal partitives is shown to be a nominal classifier system—a language-specific instance of a language universal feature. Fourth, results are presented from a study of partitive acquisition in five English-speaking children. The data base used in the present study consists of transcripts of extensive audiotaping of these five preschool children and their caregivers. These transcripts were accessed and analyzed through the Child Language Data Exchange System (CHILDES). The development of partitive use in children is then considered in light of overall development of classification and categorization during childhood. Results from surveys on adult use and understanding of partitives are presented and analyzed in terms of the pragmatic functions of partitives in English. Finally, the relevance of this dissertation to applied linguistics, English lexicography, and English language teaching and related research is commented on, and suggestions are made for more focused future research on partitives.

Morphological Structure and Parsing in the Lexicon

Karen Denise Emmorey

University of California, Los Angeles

Ph.D 1987, 183 pages

Language, Linguistics

University Microfilms International

ADG87-25038

This study explores the relation between formal grammars and psychological parsing models and is concerned with how morphological structure is represented and accessed in the lexicon. A series of auditory lexical decision experiments were conducted with English. The results indicate that morphological structure is analyzed on-line during lexical access. I propose that English prefixed words are stored in the lexicon with their morphological structure marked and that only the roots of suffixed words are contained in the cohort set used for recognition. There was no evidence that parsing is misled by pseudoaffixation. Some evidence suggests that derived suffixed words take longer to recognize than inflected and monomorphemic words. I propose that this delay is due to the category-changing nature of the derivational suffixes.

Morphologically complex words and nonwords were also presented visually. The results indicate that auditory and visual lexical access procedures are subject to different constraints that affect morphological analysis. For auditory processing recognition of a suffix is tied to the identification of a root. For visual processing, however, recognition of the root and suffix can occur in parallel. Auditory word recognition is constrained by temporal order, whereas visual word recognition can operate more holistically.

Three auditory priming experiments were also conducted. One experiment showed that morphological relationships are represented independently of semantic relatedness. A large priming effect was found for morphologically related words that were not semantically related (e.g., submit, permit). Significant priming was not found for words that were simply phonologically related (e.g., balloon, saloon). The second and third priming experiments indicated that suffixes do not have lexical representations that can be primed during lexical access; morphological priming was not found between words that share a suffix (e.g., blackness, shortness). Formal models that propose separate lexical entries for affixes are not supported. Lastly, phonological priming was observed when the words shared a final syllable but not when they shared final segments. Word-final phonological priming presents problems for the cohort model, which predicts that only word-initial priming can occur.

Topic, Focus, and the Grammar of Spoken French

Knud P. Lambrecht

University of California, Berkeley Ph.D

1986, 365 pages

Language, Linguistics

University Microfilms International

ADG87-18051

This study is an attempt to explain a number of recurring structural patterns in the spoken French sentence in terms of the communicative functions these patterns serve in spontaneous speech. It is based on the assumption that the relationship between the form of sentences and the linguistic and extralinguistic contexts in which sentences are used as units of propositional information is governed by rules of grammar at a grammatical level called information structure. The fundamental argument is that the structure of the French sentence reflects the semantic-pragmatic relations topic and focus. These correlate in turn indirectly with the representations of referents of syntactic constituents in the mind of the speaker/hearer at the time of an utterance. Thus a link is established between the pragmatics of the speech situation and the formal structure of the sentence.

Part I discusses the grammatical domain of information structure and defines three sets of discourse-pragmatic notions: 1. the propositional notion of information, subdivided into

assertion and pragmatic presupposition; 2. the cognitive notions of activation and identifiability, which reflect the status of mental representations of referents in a discourse; 3. the relational notions of topic and focus, which determine the respective scope of the assertion and the presupposition.

Part 2 is an analysis of the structure of the spoken French clause based on the framework elaborated in Part 1. The analysis builds on two fundamental observations concerning the relationship between syntax and discourse in spoken French. The first is that the canonical SV(O) sentence type, with lexical arguments in subject (and object) position, is pragmatically severely constrained and is superseded by a preferred clause type of the form V(X). The second observation concerns the existence of a number of ready-made grammatical constructions that allow speakers to preserve the preferred V(X) clause type in discourse. These grammatical constructions are of two major structural types: clefts and detachments. In both types, lexical NP constituents appear in positions other than within the clause in which they are semantic arguments, resulting in a separation of the lexical naming function of the NP from the relational role it plays as an argument in a proposition.

**Computer Synthesis of English
Causative Verbs**

Roberta H. Merchant

Georgetown University Ph.D 1986, 248
pages

Language, Linguistics

*University Microfilms International
ADG87-20561*

Machine translation systems require word level analysis in order to identify lexical items used in the processing. The question of whether to go beyond word level analysis to morphological analysis depends on whether coherent and productive morphological rules, either inflectional or derivational, exist in the language studied. English inflectional morphology is productive and is used in most machine translation systems, but derivational morphological analysis is required for synthesis of English causative verbs from translation of other languages.

To evaluate the effectiveness of derivational morphological analysis in English, word formation rules based on principles of X-bar morphology were developed. After the rules were formulated, a computer program was written to carry out these morphological operations. A large data base representing the possible categories of morphological variation between non-causative and causative pairs in English was selected and tested to verify the rules used in the program.

The program and data base show that there is a large number of non-causative/causative pairs in English showing coherent and productive morphological relationships which can be stated in word formation rules designed for computational analysis. Application of morphological rules to computer synthesis of English causative verbs is a practical and efficient method of building the lexical synthesis component of a computational system.

Control Verbs in English

Elizabeth Minassian Pellegrino

Georgetown University Ph.D 1986, 170
pages

Language, Linguistics

*University Microfilms International
ADG87-20562*

This thesis deals with control verbs in English within an interpretive framework, proposing lexical features for these verbs and rules in LF which account for their behavior. It is argued that control features, applicable to LF, should be based on thematic relations instead of grammatical relations. The proposed thematic control features, (+AG) and (AG), are shown to best account for the data. The projection of these features into the syntax including any structures, such as a nonnull COMP, which may affect the choice of controller, is addressed.

In the course of this examination of control verbs, an explanation is provided for an apparent enigmatic pair: the ungrammatical, **John was promised to leave*, where the obligatory controller is unavailable, and the grammatical, *John was promised to be allowed to leave*, where the obligatory controller appears to be unavailable. It is shown that a passivized complement triggers a reversal of lexical control properties. Consequently, the control properties of promise in the above pair reverse with an embedded passive, allowing subsequent matrix passivization in the latter of the two. Furthermore, this study reveals a dichotomy among control verbs with two matrix NPs, hence two possible controllers: those that take a passivized complement and exhibit a reversal of control properties and those that neither take a passivized complement nor exhibit a reversal of control properties. This same dichotomy emerges in the study of the influence of pragmatic factors; the former group is subject to their influence, whereas the latter group is not.

The basic theme of this study is that control properties correlate with the meaning of the verb. The features (+/-AG) represent a component of the meaning of the verb. It is illustrated that various senses of a control verb correspond to various control features. It is further suggested that subcategorization properties correlate with the sense of the lexical item rather than with the lexical item alone.

Aspects of Coherence in English and Japanese Expository Prose

Thomas Kenneth Ricento

University of California, Los Angeles

Ph.D 1987, 218 pages

Language, Linguistics

University Microfilms International

ADG87-23190

The primary goals of this dissertation are to compare certain structural aspects of comparable English and Japanese expository texts which are thought to be coherence markers, and to ascertain the degree to which native speakers of both languages are able to access appropriate formal schemata in reordering scrambled paragraphs of these texts.

The data consist of 10 Japanese texts and the English translations of these same texts, and five English texts. The coherence features measured or described are: thematic continuity, paragraph linking, rhetorical patterns, literary conventions, reader/writer responsibility, and cultural values/attitudes. In the experimental portion of the study, 30 bilingual native Japanese speakers and 23 monolingual native English speakers ordered the scrambled paragraphs of the texts and also provided titles and summaries. Rank order correlations (ρ) and interrater reliability scores (r) were calculated, and between-group comparisons of means were made.

Analysis of the texts revealed cross-linguistic similarities in the relative frequency of cohesion (lexical, referential, conjunctive) markers, and differences in the relative use of paragraph linking devices, transition statements, and topical focus markers. Differences were noted in the relative use of various rhetorical types (Meyer 1985); certain rhetorical patterns were identified which are particular to Japanese, and other patterns were identified which occur in both languages.

Results from the paragraph reordering experiment provide evidence that certain rhetorical patterns are familiar to both native English speakers and native Japanese speakers, while other patterns are familiar only to native Japanese speakers. It was also found that bilingual native Japanese speakers apparently access formal schemata appropriate for English

expository prose when reading English translations of Japanese texts.

Analysis of titles and summaries provided by consultants revealed no correlation between consultants' ability to correctly reorder the scrambled paragraphs and their understanding of the main point of the text.

Indeterminacy of Translation: Theory and Practice

Dorit Bar-On

University of California, Los Angeles

Ph.D 1987, 439 pages

Philosophy

University Microfilms International

ADG87-23145

To an ordinary translator, the idea that there are too many perfect translation schemes between any two languages would come as a surprise. Quine's thesis of the indeterminacy of translation expresses just this idea. It implies that most of the implicit canons actual translators use in their assessment of translations lack objective status. My dissertation is an attempt to present a systematic challenge to Quine's view of language (and mind) and to support the idea that one could develop an objective theory of translation that is also faithful to actual translation practices.

I expose a non-superficial similarity between external-world skepticism and Quine's meaning-scepticism, and deploy against Quine an objection that closely resembles his own objection to external-world skepticism. I then develop a new interpretation of Quine's reasoning, according to which denying objective status to intuitive meanings is Quine's way of avoiding a sceptical problem about what other people "really" mean.

I argue that the intelligibility of Quine's meaning-scepticism turns on an implicit contrast between the perspective of the theorist of language and the perspective of the user of language. Quine's defense of his skepticism features a theorist-language trying to probe an alien language—a "radical translator"—who reasons that her own judgments as a language user lack objective status.

I take issue with the use Quine makes of the above contrast. I first argue that understanding the goal of radical translators requires knowing what is to be expected of an adequate translation scheme. Since this is something we learn from experience with existing translation schemes, I offer a pretheoretic description of the practice of translation between known languages. I show how ordinary translators' assessments of the quality of given translations derive from systematic judgments they make as language users. It is these sorts of judgments that guide actual radical translators in ruling out bizarre alternative translations of the kind Quine entertains in defending his scepticism. A proper theoretical account of radical translation, I conclude, must begin with—and include—the perspective of the radical translator as a language user.

The Elicitation of Units of Knowledge and Relations: Enhancing Empirically Derived Semantic Networks

Nancy Marie Cooke

Psychology, Experimental

University Microfilms International

ADG87-20055

The notion that associations of units of knowledge underlie memory has been pervasive throughout many psychological paradigms and is especially prevalent in current semantic network theories. Units of knowledge have been represented in semantic networks as nodes and associations between units have been represented as links between nodes. Unlike previous associational theories, semantic network theories have attributed meaning to associations through the use of links labeled with particular relations. Unfortunately, there have been as many different types of units and relations proposed as semantic network models. Attempts to address these variations have been made through the development of semantic network formalisms.

An alternate approach is through the empirical generation of networks using algorithms such as Pathfinder. Semantic networks derived from human judgments can be used to verify the psychological meaningfulness of intuitively derived networks. In addition, the networks have some useful applications as knowledge elicitation tools. However, there are limitations inherent in the Pathfinder methodology that must be overcome before it can be successfully applied. The research discussed in this paper addressed two limitations that are also particularly relevant to the historical issues of units of knowledge and associations. More specifically, the problems of identifying the critical units of domain knowledge to be represented by nodes and of interpreting or labeling links in the resulting networks were investigated.

In the first two studies units of knowledge were elicited from experts in the domains of driving and flight maneuvers. The elicitation tasks that were used included the listing of concepts, steps, or chapter headings, and the extraction of main ideas from an interview. The elicitation techniques differed in terms of the quantity of ideas elicited, as well as the type of knowledge that was elicited. A second series of studies addressed the link interpretation issue using relations in a set of common concepts and a set of programming concepts. Subjects either sorted linked pairs into groups having the same meaning or labeled links with the appropriate relation. Links were ultimately classified using cluster analysis techniques. Results indicated that the clusters were meaningful and that the link types represented by each cluster corresponded to an independently derived taxonomy of link types. In general, the techniques investigated in this paper represent steps toward the formalization of aspects of the Pathfinder methodology that are critical to its application as a knowledge elicitation tool and as a tool for validating intuitively derived semantic networks.