Argument Realization

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Argument Realization presents a thorough survey of current theories that deal with the relationship between verbs and their arguments. It addresses the problem of argument realization in its many aspects such as semantic roles, lexical semantic representation, conceptualizations of events, thematic hierarchies, and verb alternations. This is a linguistics book and therefore geared toward researchers in syntax and semantics. Nevertheless, this extensive and clearly presented body of work by Levin and Rappaport Hovav deserves a prominent place in computational linguistics libraries.

The book is organized into three broad parts. The first part reviews current theories of semantic roles, lexical semantic representation, and event structures. The second part focuses on the mapping from lexical semantics to syntax and on thematic hierarchies. The last part examines perspectives on multiple argument realization.

Chapter 1 presents a good survey of linguistic theories and their different ways of explaining syntactic similarities in language. It discusses proposed strategies of isolating semantic components of verbs and the fact that these meaning components cannot be taken in isolation to explain syntactic behavior. The chapter concentrates on the problems that must be taken into account when developing a theory of argument realization and a related theory of lexical semantic representation. It discusses the importance of viewing verb meanings as *construals* of happenings and explores the variety and uniformity in argument realization through cross-linguistic examples showing that argument realization involves more than just the agent and patient roles.

Chapter 2 introduces work on semantic role lists and examines in detail their properties. This chapter includes a discussion on the limitations of semantic role list representations, in particular: (1) the difficulty of determining the right granularity for defining semantic roles; (2) the lack of internal structure of the typical semantic role inventory and the fact that cross-linguistic examples attest similarities between certain roles (e.g., patient and recipients, goals and benefactives); and (3) the problem of assigning a single instance of each role per clause and, if this constraint is relaxed, why only some pairings of roles are possible. Even with these limitations, Levin and Rappaport Hovav still maintain the notion that semantic roles are an appropriate basis for a lexical semantic representation. This chapter also reviews proposed efforts to solve these limitations through decomposition of semantic roles into binary features, and by allowing arguments to be assigned more than one semantic role.

Chapter 3 reviews other current notions of semantic role representation. It presents in detail Dowty's (1991) approach on proto-roles, pointing out some of the limitations of this work. It compares this work to Schlesinger (1995) emphasizing potential benefits of the prototypical approach and presents an extensive survey of approaches that extended Dowty's. This chapter also introduces the approach taken by Van Valin (1990)

of "generalized semantic roles," more coarse-grained roles called macroroles within that framework. The two macroroles proposed, Actor and Undergoer, tend to show up mainly in subject and object positions and can be considered generalizations of commonly used semantic roles such as agent, experiencer, patient, and location. The second part of this chapter introduces the idea of adding more structure to the lexical semantic representation by means of predicate decomposition. The authors argue that this is a preferable representation for semantic roles — first, because predicate decomposition allows for distinctions between the root and the event structure part of the verb, which lexical entailments do not; second, because it provides relations between arguments that help explain why only certain arguments can occur together; and third, because it allows a representation of sub-events.

Chapter 4 presents three approaches to event conceptualization and discusses their merits in argument realization. The first is the localist approach as described by Gruber (1965) and further developed by Jackendoff (1990). This approach supports the idea that events of motion and location are central to understanding all events and that their components can be extrapolated for events that are not of motion or location. However, this approach does not seem to have criteria for assigning particular roles to arguments. The second approach described is the aspectual approach, in which argument realization is based on temporal and mereological properties of the predicates that describe events. Aspectual properties such as telicity, measure, and incremental theme appear to help in the selection of components of transitivity and argument realization, especially in the choice and expression of direct objects. The third approach is the causal approach in which events are modeled as **causal chains**, a series of segments that relate participants in an event. Most of the causal approaches described are inspired by Talmy's work on causation (Talmy 1976, 1988). This work seems to be directly related to semantic role lists that provide a representation of an event in terms of its participants and the relationships among them.

In Chapter 5, the authors present existing hypotheses about the nature of the mapping from lexical semantics to syntax. These hypotheses make the assumption that certain aspects of the lexical representation, such as the equivalence classes that the representation defines and prominence relations among arguments, must be preserved in syntax. The last part of this chapter is devoted to a discussion of two broad classes of algorithms for mapping the lexical semantic representation to the syntax: **hierarchy-aligning** and **bidirectional** algorithms. These two classes of mapping algorithms and the ranking of semantic roles in a thematic hierarchy are mutually interdependent and the formulation of the mapping algorithm greatly depends on the syntactic theory.

Chapter 6 analyzes in depth the notion of thematic hierarchies and shows several such proposed hierarchies. The discussion is based on the premise that different organizations for the thematic hierarchy can be compared only if the ranking among the roles is given the same interpretation and the ranking is intended to explain the same range of phenomena. Several formulations of thematic hierarchies inspired by Baker (1996) and Macfarland (1991) are presented, and the focus is on their disagreement on where to place the patient/theme role with respect to other roles, especially the spatial roles such as goal and location. This chapter ends with the conclusion that although all hierarchies establish rankings of arguments, it is not possible to formulate a thematic hierarchy that captures all possible generalizations involving the realization of arguments in terms of their semantic roles.

Chapter 7 is devoted to multiple argument realization and its manifestation as **argument alternations**. This is perhaps the most interesting chapter from a computational linguistics perspective, given that the relationship between argument alternations

and verb classes has drawn much interest in the development of computational lexical resources. This chapter reviews the projectionist and constructional perspectives of multiple argument realization as introduced by Goldberg (1995) and Borer (2003), respectively. In both approaches the verb's root has a core meaning that is then combined with event-based meanings represented or associated with syntactic constructions or with the meaning encoded in the syntactic structure. The authors present analyses of multiple argument realization involving event composition exemplified by verbs taking resultative constructions. In the last section, the challenges of predicting the distribution of verbs in particular instances of multiple argument realization and a theoretical explanation of the limited productivity of these alternations are addressed.

Levin and Rappaport Hovav establish a very clear and easy-to-follow line of argumentation that starts with the problems of semantic roles and their realization in morphosyntax and ends with the conclusion that it is not possible to establish a single hierarchy of thematic roles that would account for all phenomena in argument realization. This is a very comprehensive survey with an enormous amount of background work and useful notes and citations.

I would recommend this book to students and researchers of linguistics and computational linguistics, especially those interested in the several facets of lexical semantics and their morphosyntactic realizations. Some chapters of this book are likely to be used in computational linguistics courses and can provide interesting discussion topics for study groups.

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