Ph.D Thesis

The semantics of Chinese aspects — theoretical descriptions and computational implementation

Guowen Yang
The University of Bremen

Summary

The present research has four primary goals: (1) Proposing a definition of aspect based on the depiction of the states of situations along both spatial and temporal dimensions. (2) Constructing a generalized aspect selection function (ASF) to represent the semantic applicability conditions of individual aspects; the ASFs are used mainly for theoretical descriptions of the aspects, although at the same time they are the basis for formulating the semantics in the computational implementation. (3) Organizing all Chinese aspect expressions, including both simple and complex aspect forms, into a hierarchical system network which is built based on the theory of systemic functional linguistics. (4) Computationally implementing the Chinese aspect system with the multilingual generator KPML.

Based on an analysis of the deficiency of defining aspect in just one dimension, i.e. the dimension of time, an aspect definition involving both temporal and spatial dimensions is proposed in the present research. By developing further the aspect definitions given by Comrie, Gong, and Dai, aspects in the present research are considered as different ways of viewing the states of a situation with respect to that situation's internal temporal constituency. Then, following Olsen, the temporal relations between the event time and the reference time are also taken to fall under the category of aspect. Therefore, in real contexts, the role of the viewing point of aspect is played by the reference time.

The present research gives definitions of different viewpoints within strictly defined temporal structures: for example, the reference time of perfective aspects ranges from the terminating time of the situation, including the terminating time, to infinity, i.e. $t_t \leq t_r$; the reference time of imperfective aspects ranges from the initial time, including the initial time, to the terminating time of the situation, i.e. $t_i \leq t_r < t_t$; and the reference time of imminent aspects ranges shortly before the initial time, i.e. t_r shortly-precedes t_i. Each individual aspect has its own semantic applicability conditions, captured formally with the generalized ASF, and expressed with features concerning temporal relations and features concerning conceptual distinctions. In the present research, nine conceptual features have been identified for characterizing the aspectual properties of different aspects. The aspects themselves are realized with both temporal adverbs and functionally derived aspect morphemes.

The grammar of the Chinese aspect system is written within the theoretical framework of systemic-functional grammar. All the aspect forms are organized into a hierarchical network. Systemic grammar networks are a kind of functionally oriented organization, in

which different of grammatical expressions are hierarchically arranged according to their semantic functions. The semantic functions of the grammatical expressions are expressed as semantic features that motivate particular paths through the hierarchy rather than others. Each specific path serves to constrain grammatical expressions so as to generate a specific grammatical expression, or surface realization, appropriate for its semantics. Three main components of the grammatical network are then *perfective*, *imperfective*, and *imminent*. The whole aspect system is built based on fourteen primary aspects, from which nineteen secondary aspects and five further tertiary aspects are derived.

The computational implementation of the Chinese aspect system includes testing the specified grammatical network and implementing the theoretically motivated semantics determined for the aspects. The former is mainly carried out via a mode of automatic generation that focuses on demonstrating the grammatical validity of language expressions generated via each path of the grammatical network. The latter is carried out via generation in a mode that focuses on evaluating the implemented individual points of semantic choice (inquiries) according to the semantic inputs given in a range of example specifications.

The thesis is organized into eleven chapters.

Chapter 1, composed of four sections, describes the state of the art in theoretical studies of aspect.

Chapter 2 concerns the logical tools with which it is possible to process temporal information computationally. Several previous computational systems for processing temporal information are also described.

Chapter 3 introduces the theories and methods adopted in the present research. Theoretical issues include the definition of aspect, forms of aspect realization considered, the range of aspectual features, and the connections between aspect and tense through the time of reference. The methods for formally representing the semantic applicability conditions of the aspects are also elaborated here

An overall description of the Chinese aspect system is then given in Chapter 4. The approach for organizing all kinds of aspects within a grammatical network is also presented, followed by a first overview and introduction to the complete grammatical networks of the Chinese aspect system.

Starting with Chapter 5, detailed descriptions of the different aspects making up the Chinese aspect system can then be given. The contents of these descriptions are focused on the semantic functions of the aspects, the temporal structures of the aspects, and the semantic applicability conditions of the aspects. In Chapter 5 itself the simple aspects of perfective are described, followed by, in Chapter 6, six imperfective and two imminent simple aspects.

The complex aspect descriptions begin from Chapter 7. Chapter 7 describes secondary aspects composed of two imperfective aspects. We begin in this chapter establishing a set of rules for constructing temporal structures of complex. The semantic applicability conditions of each complex aspect are also represented in the corresponding aspect selection function. Chapter 8 describes the secondary aspects composed of one perfective aspect and one imperfective aspect. Chapter 9 then describes four other kinds of secondary aspects that are in addition to the secondary aspects described in Chapter 7 and Chapter 8. Finally, Chapter 10 describes five tertiary aspects, i.e., the aspects composed of three simple aspects.

Chapter 11 describes the computational implementation of the Chinese aspect system and demonstrates the generation process with examples.

In conclusion, the four main goals of the research have been fulfilled. According to our aspect definition, we have divided the Chinese aspects into the three types of perfective, imperfective and imminent aspects, and organized fourteen simple aspects and twenty-four complex aspects into a single system network. The semantic applicability conditions of individual aspects composed of both temporal and conceptual features are represented by corresponding aspect selection functions. And all the aspect expressions are correctly generated with the KPML multilingual generator when presented with appropriate semantic expressions.