A Task Ontology Construction for Presentation Skills

Kiyota Hashimoto* and Kazuhiro Takeuchi**

Osaka Prefecture Univ.: 1-1, Gakuen-cho, Naka-ku, Sakai, 599-8531, Japan*
*Osaka Electro-Communication Univ**., 18-8, Hatsu-machi, Neyagawa, 572-8530, Japan*
(Tel : 81-72-252-1161; Fax : 81-72-254-9944)
(hash@lc.osakafu-u.ac.jp)

Abstract: Presentation is an integrated art of communication in which both linguistic and paralinguistic skills are employed, and deliberate preparation is necessary. We're developing a comprehensive learner support system for to help learn presentation skills. This paper reports our development of task ontology for presentation skills as one of the foundational components of our system. It consists of three sub-ontologies: presentation strategy ontology, rhetorical structure ontology, and lexical ontology. They are used for background inferences and evaluations of learners' presentations. With a prototypical application of them shows the employment of task ontologies is effective for intelligent learning support systems.

Keywords: Task ontology, Presentation strategy, Rhetorical Structure Theory, rhetorical structure ontology, learner's presentation

I. INTRODUCTION

It is more and more important for any one of us to make a good presentation, particularly that in English, in various situations. Oral presentation is one of the most sophisticated communicative activities; deliberately designed to be presented to specific audience with slides to deliver information and attempt to make a persuasion. Not only the linguistic organization but also the paralinguistic effects like body language and eye contact are utilized, and the presenter should have a deep understanding not only of what he or she delivers but of how the audience will react. Most of the people who have to make presentations have some difficulties preparing and making them, and computational learning support is desirable. From this viewpoint, we are developing a comprehensive online learning support system for presentation [1], and are constructing a multimedia learner corpus of learners' presentations [2]. The former contains Presentation Organizer which can be used to construct oral manuscripts and corresponding slides simultaneously, and the latter contains orally spoken texts and slides to be annotated. Both require a fine-grained way of describing and representing the text organization, or rhetorical structure of presentation.Thus, we have designed and constructed a couple of ontologies related to presentations. In this paper, we report two of them, Presentation Strategy Ontology and Rhetorical Structure Ontology.

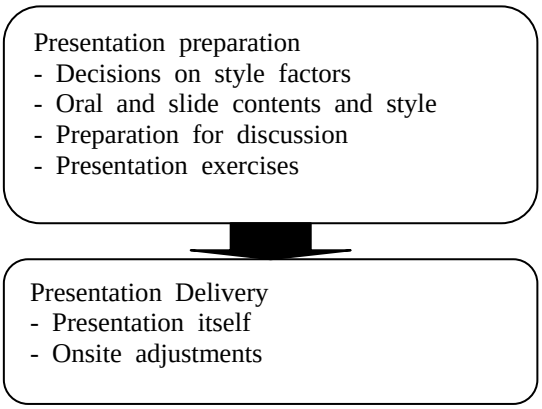

Fig.1 Presentation process

II. PRESENTATION STRATEGY ONTOLOGY

The process of preparing and delivering a presentation is roughly done in a way as shown in Fig. 1. As this simple process tells, the success or failure of a presentation is mostly decided by the preparation phase. Thus, any talk ontology for presentation has to focus on the preparation phase.

Presentation, whether it is oral or written, is delivered for a particular communicative purpose, which is to determine what and how to be delivered—content and style. A communicative purpose can be analyzed into different aspects. Let us call these aspects style factors. As each style factor affects what and how to be delivered, they have to be deliberately considered. Numerous books on presentation preparation emphasize the consideration of style factors, though each calls style factors differently, and we classify them as in Table 1.

Factors	Examples
Topical (Genre)	inorganic chemistry English literature ... (Note that the topical factor can be very much specific.)
Media	newspaper textbook oral presentation ...
Targeted reader/ audience	laypeople professionals ...
Purpose	persuasion explanation ...
Intention	formal informal or friendly ...
Time	the length of presentation

Table 1 Style Factors

With the decisions on style factors, oral and slide contents are to made not only on what to be delivered but also how to deliver it. Preparation for discussion is also affected. In other words, all the other aspects of presentation preparation and delivery are decided along the line of the choices of the appropriate style factors for the presentation. Particularly, all the linguistic style elements (See Fig.2) which manifest the choices are heavily affected. Note that the logical organization in Fig.2 is more concerned with the other ontology, Rhetorical Structure Ontology, which we will discuss in the next section.

With these consideration in mind, we have devised a prototype of Presentation Strategy Ontology as in Fig. 3

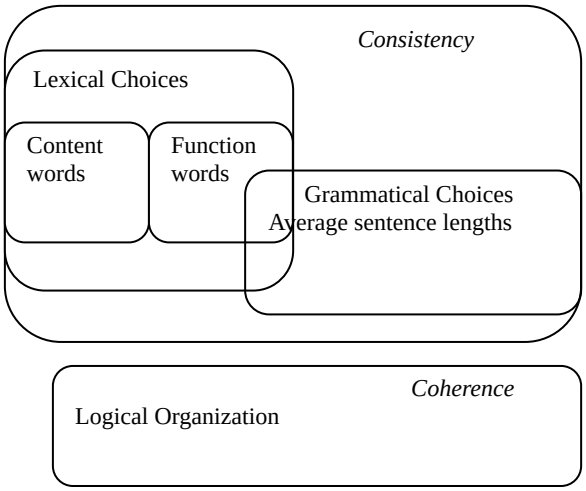

Fig.2 Linguistic Style Elements

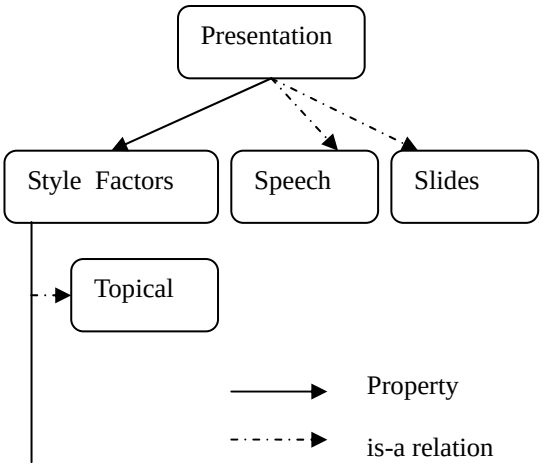

Fig.3 Brief Overview of Presentation Strategy Ontology

III. RHETORICAL STRUCTURE ONTOLOGY

1. Rhetorical Structure Theory and Ontology

Rhetorical structure has long been investigated in literature and linguistics, and computational linguists have pursued the possibility of applying it to natural language generation and automatic summarization in particular [3]. A number of theories and frameworks have been proposed [4], of which Rhetorical Structure Theory, originally proposed by Mann and Thompson [5],[6],[7], is the most popular.

In the RST framework, the discourse structure of a text is considered to be coherent and thus capable of being be basically represented as a single-rooted tree with a set of directed graphs. Each directed graph is labeled for its rhetorical relation. Originally 23 relations were proposed [8], but the exact number proposed varies among researchers.

Various types of domain ontology have been investigated in order to make structured knowledge machine-readable, and instances of rhetorical structure ontology have also been proposed [8]-[11]. In particular, Rahal et al.[11] share a similar perspective with us in that their system is intended for supporting collaborative writing. None of them, however, can deal with presentations successfully.

2. Reconsideration of RST

A. EDU

As shown in the previous section, RST is basically clause-based: its EDU is assumed to be clausal. A number of researchers have repeatedly reinvestigated the validity of this approach both from theoretical and

practical perspectives, but nearly all of them still assume clause as EDU [3],[4],[8]. However, Kibble pointed out, in investigating a small corpus of pharmaceutical leaflets, that at least a nominalized noun phrase, particularly a gerundive one, plays the same role as a clause[12], and a given relation between two conceptual units can be embodied in several different ways. So we define the EDU as a "semantically" clausal segment. "Semantically" clausal segment means a segment in which a subject-predicate relation is contained, whether explicitly or implicitly.

B. Surface or Deep?: Potential Textual Inconsistencies and Imperfections

Rhetorical structure deals with the detailed organization of the content to be written or told. In that sense, a given rhetorical structure is assumed to represent the deep structure of the content, on the naïve assumption that the deep structure is properly mapped onto the surface structure, the text. This cannot be assumed, however, in the case of learner's presentations. Thus, in order to reveal textual inconsistencies and imperfections, it is important to annotate a rhetorical structure mainly based on surface logical cues.

C. Supra-textual Cues

One of the biggest differences between written texts and oral presentations is the existence of interactions between the text itself and the outer world. A presenter frequently gives instructions to the audience to draw their attention to some part of the slide, such as "Look at the graph." This type of instruction is to be considered supra-textual in that it points out some element outside the orally spoken content, but it still has its nucleus adjacent to it, since such instructions are naturally give in elaborating an EDU. So supra-textual cues are to be incorporated into rhetorical relations.

D. Revised RST for representing the rhetorical structure of presentation

Based on the discussions in the previous sections, we defined our revised RST as shown in Table 2.

3 Rhetorical Structure Ontology for Presentation

Our revised RST discussed above has to be formalized for machine-readability, and one of the plausible implementations is to make a rhetorical ontology. We are now implementing a prototypical rhetorical ontology for presentations, PRESONTO, using OWL 2.0. A key feature is to annotate rhetorical structures of the oral part and the slide part of a presentation in the same way. The underlying assumption is that a span, maximally of a slide, necessarily corresponds to a span of oral speech, and this correspondence guarantees the correspondence between oral speech and slides. Furthermore, it is possible, with this correspondence, even non-verbal elements like graphs and pictures to be properly annotated in the same way. PRESONTO is still prototypical, but its overview is shown in Fig. 4.

EDU: Semantically clausal segments
A rhetorical relation is primarily based on the surface structure and is assigned 0 or 1 according to the logical validity.
The Set of Rhetorical Relations for our purpose

Name	Description (* in the Name indicates that the item is newly introduced here)	Order of N&S
Background	Satellite provides background information to the nucleus	S before N
Contrast	Applies to two nuclei that contrast each other	
Elaboration	Satellite elaborates the information in the nucleus	N before S
*Elaborative Example	Satellite exemplifies the information in the nucleus	N before S
Enablement	Information in the satellite enables the audience to perform the action in the nucleus	N before S N before S
Evidence	Satellite provides evidence to the statement in the nucleus	
Justify	Satellite justifies the nucleus	
Motivation	Satellite motivates the reader to perform the action in the nucleus	
List	Listed nuclei	S before N
Sequence	Multiple nuclei that follow each other in sequence	
Solutionhood	Satellite is the problem; Nucleus provides the solution.	N before S
Summary	Short summary or paraphrase of the previous span	
*Supra-textual Cue	Cue for an action on the part of the audience.	
*Orphaned	Any other orphaned nucleus, to be connected to the nearest dominating nucleus	

Table 2 Our Revised RST

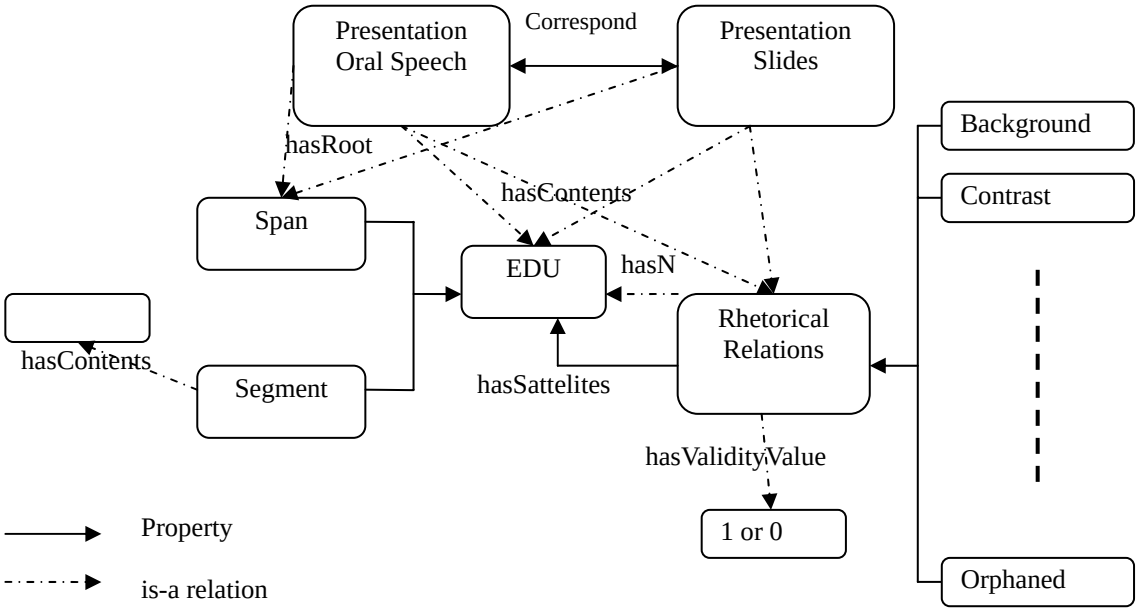

Fig.4 Overview of PRESONTO, a Rhetorical Ontology for Presentations

VI. CONCLUSION

In this paper, we reported our ontologies for presentation description. They are expected to serve both as a descriptive tool and as a hinting tool to support learners' preparation of presentations. We are currently refining our related modules of learner support system for presentation to utilize these ontologies.

ACKNOWLEDGMENT

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