Adjective and Adjective Verb Conceptual Dictionaries in an Integrated Narrative Generation System

Jumpei Ono
Faculty of Software and Information Technology, Aomori University,
10-1 Seishincho, Edogawa, Tokyo, 134-0087, Japan

Takashi Ogata
Faculty of Software and Information Science, Iwate Prefectural University,
152-52 Sugo, Takizawa, Iwate, 020-0693, Japan
E-mail: j.ono@aomori-u.ac.jp, t-ogata@iwate-pu.ac.jp

Abstract

Although the main conceptual types in our previous narrative generation study using conceptual dictionaries were verb and noun concepts, other conceptual types are necessary for the implementation of more precise narrative generation functions. In this paper, we prepare frameworks for adjective and adjective verb concepts in our narrative generation system, an integrated narrative generation system (INGS). Furthermore, we provide antonyms for each adjective and adjective verb concept. This function will contribute to introducing contrasting rhetoric into narrative generation.

Keywords: Adjective Conceptual Dictionary, Adjective Verb Conceptual Dictionary, Antonym, Story Generation.

1. Introduction

We are developing a narrative generation system that organically integrates knowledge of narrative structures with artificial intelligence techniques. We call this an integrated narrative generation system (INGS)[1, 2]. Regarding knowledge of a narrative's structure, the INGS has a conceptual dictionary that is used to generate the narrative. Thus far, we have developed a noun conceptual dictionary and a verb conceptual dictionary for events that constitute a narrative [3]. However, in terms of word types, nouns and verbs are the minimum necessary components of a narrative. Therefore, we prepared a modifier conceptual dictionary containing adjectives, adjective verbs, and adverbial concepts as its components [4]. In this study, we focus on adjective and adjective verb concepts among the components of the modifier dictionary.

The purpose of this paper is to present the structure of the adjective and adjective verb conceptual dictionaries and study how to store and use antonym concepts.

2. Adjective and Adjective Verb Conceptual Dictionaries

This section describes the structure of the adjective and adjective verb conceptual dictionaries. Only a few tentative intermediate concepts are set up using intermediate concepts from the verb conceptual dictionary [4].

2.1. *Adjective conceptual dictionary*
There were 714 adjectives. Each adjective concept belongs to one of the following categories: attributes, possessions, relative relations, perceptual states, emotional states, thought states, physical states, and natural phenomena.

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Individual adjectives follow the structure of verb concepts 3. Each has a sentence pattern for single sentence generation, case structure, case constraints, and an intermediate concept to which the concept belongs. The case constraint expresses the concept that the adjective modifies, and one of the intermediate concepts in the noun conceptual dictionary is filled in. The example in Fig. 1 shows that "outdoor" is an adjective that indicates "bright."

```
(set '明るい 1[bright] '((name 明るい 1[bright])
  (sentence-pattern "N1 が 明るい[N1 is bright]")
  (case-cons-set
   ((case-frame ((agent nil) (counter-agent nil) (location nil)
(object N1) (instrument nil) (from nil) (to nil)))
    (constraint ((外[outdoor])))))
   (is-a (d 自然現象[natural phenomena]))))
```

Fig. 1. An example of an adjective concept.

2.1. *Adjective verb conceptual dictionary*

There were 1,191 adjectival concepts. Individual adjectival concepts belong to one of the following categories: existence, attributes, relative relations, perceptual states, emotional states, thought states, physical states, and natural phenomena.

Individual adjective concepts follow the structure of verb concepts [2] as well as that of adjective concepts. Each has a sentence pattern for single sentence generation, case structure, case constraints, and an intermediate concept to which the concept belongs. As with adjectives, the case constraint expresses the concept the adjective modifies, and one of the intermediate concepts in the noun conceptual dictionary is filled in. The example in Fig. 2 is an adjective that indicates that a "human," an "animal," or a "body part" is "robust."

```
(set '頑健だ 1[robust] '((name 頑健だ 1[robust])
    (sentence-pattern "N1 が 頑健[N1 is robust]")
    (case-cons-set
      ((case-frame ((agent nil) (counter-agent nil) (location
nil) (object nil) (instrument nil) (from nil) (to nil)))
      (constraint (( 人 [human] 動 物 [animal] 動 物 { 部
分}[animal{part}])))))
      (is-a (d 身体状態[physical states]))))
```

Fig. 2. An example of an adjective verb concept.

3. Toward Defining Antonym Concepts

We propose a method of surveying antonym concepts for a given concept and incorporating their structures into conceptual dictionaries. To do so, we first investigate antonyms and then check the correspondence between the investigated antonyms and the concept dictionary.

1. **Investigating antonyms:** We consulted the *Weblio Antonyms / Synonyms Dictionary* (https://thesaurus.weblio.jp/antonym/), *Dictionary of Antonyms / Synonyms Online* (https ://taigigo.jitenon.jp/), *Large Dictionary of Antonyms* (https://hantaigo.com/), etc., to research and record the antonyms of the adjectives and adjective verbs.

2. **Comparison of synonyms and concept dictionaries:** Check if there are any adjectives or adjective concepts that match the investigated antonyms. If yes, create a relationship between the two concepts in the conceptual dictionaries. If there are no matches, register the concept of the investigated antonyms in the conceptual dictionaries and create a relationship between the two concepts.

The antonym concepts prepared using the above procedure were recorded on the list of adjective and adjective verb concepts, as shown in Fig. 3.

```
(set <Concepts> '((name <Name>)
  (sentence-pattern <Pattern>)
  (case-cons-set
   ((case-frame <Cases>) (constraint <Constraints>)))
    (is-a (<Concepts>))
    (antonym <Antonym concepts>)
    ))
```

Fig. 3. Adding antonym concepts to each adjective and adjective verb concept.

Next, we will provide an example of the utilization of the antonym concepts we have prepared here. We proposed a technique called coloring as a way to give a story a specific atmosphere [5]. This is a technique to change a story so that it has a specific atmosphere by adding words related to the desired atmosphere to the story.

One of the ways to realize coloring is to handle adjectives and adjective verbs. For example, to give the

impression of blue, the words "refreshing" and "cool" were utilized. However, owing to the limitations of the color image scale, this technique only deals with words that have positive impressions. However, by using the antonymy relationship, it is possible to derive negative words from positive ones.

4. Conclusion

In this paper, we provided a detailed description of the adjective conceptual dictionary in the INGS. In addition, we discussed how to define antonym concepts corresponding to the two types of concepts, with the aim of applying them to story generation techniques.

In the future, we will continue to work on the definition of antonym concepts and attempt to conduct generation experiments using the expanded conceptual dictionary.

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Authors' Introduction

Dr. Jumpei Ono

Jumepi Ono received his bachelor's degree from the Faculty School of Software and Information Science, Iwate Prefectural University in 2010. He received his MS and PhD from the Graduate School of Software and Information Science, Iwate Prefectural University in 2014 and 2018, respectively. He worked as an information and communication technology instructor at the Vocational School of Digital Arts Sendai from 2018 to 2020. He is currently an assistant professor at the Faculty of Software and Information Technology, Aomori University.

Dr. Takashi Ogata

Takashi Ogata received his BSS from Waseda University in 1983, his MS from Tsukuba University in 1992, and his PhD from the University of Tokyo in 1995. He has garnered industrial experience from working at software development companies since 1983. He has been an associate professor in the Faculty of Engineering at Yamanashi University since 1997 and is currently a professor in the Faculty of Software and Information Science at Iwate Prefectural University, where he has worked since 2005.