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Research Article

Implementing the Story Units of Japanese Folktales by Using a Verb Conceptual Dictionary

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ABSTRACT

This paper deals with the theme of the development of story units based on Japanese folktales. Each story unit functions in an Integrated Narrative Generation System (INGS), which is the core of our systematic narrative generation study. In this research framework, story units can be positioned as a story technique that generates and expands a story structure in the narrative generation process. This paper focuses on the combination of story units implemented by Common Lisp using a verb conceptual dictionary, which is important for a noun conceptual dictionary in conceptual dictionaries functioning in the INGS. The mechanism enables organically combined processing with other narrative techniques and the use of semantic functions using conceptual dictionaries functioning in the INGS.

1. INTRODUCTION

A characteristic of our narrative generation study is to introduce "narratology" as the basis of the theory and implementation. As Ogata [1,2] proposed, narratology is a literary research area that deals with the structure, generation, distribution, etc. of narrative phenomena in a broad sense. Although narratology includes a number of topics and themes, the folktale study discussed in this paper also forms an important part of narratology. In addition, Ogata [2] calls the narratology that was renewed through the introduction of artificial intelligence and cognitive science "post-narratology."

For example, in the morphology of folktales [3], Propp collected Russian folktales called magical folktales to structurally analyze the tales in terms of commonalities found among the collected stories, and he called common and abstract event elements seen in the "functions" of collected folktales, which are related to the main actions of the main characters in a narrative genre including a number of Russian folktales. In our narrative generation systems, we used Propp's narratological theory as a story generation function [4]. Further, our narrative generation systems are integrated into an Integrated Narrative Generation System (INGS) [5].

Before we enter into a concrete discussion of the topic in this paper, we refer to the research context of the study. First, concerning the narrative generation studies regarding recent narratology, Dawson and Mäkelä [6] have presented narratology's newest situation. Their book contains various themes beyond traditional narratology, including topics related to information technologies such as SNS and computer games. The section on complex systems contains a paper regarding narrative generation and post-narratology by Ogata [7]. Books that focus more directly on post-narratology [8, 9]

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include papers pertaining to the generative models of language and narrative in broad platforms such as metaphors [10], poems [11,12], *dajare* (puns) [13], video games [14], mental representations [15,16], advertisements [17,18], movie films [19,20], *haiku* [21], and business plans [22].

Concerning the computational approach to narrative as a part of the current narratology, *Routledge Encyclopedia of Narrative Theory* [23] contains the section of "Artificial Intelligence and Narrative" (Nich Montfort). *Living Handbook of Narratology* [24] treats "computational narratology" [25], "story generator algorithms" [26], "narrativity of computer games" [27], etc. Propp not only deals with the aspects of the story, but also with a variety of aspects in the narrative. Approaches have already been proposed to introduce his theories in the form of narrative generation [28,29,30,31,32,33].

There are studies of narrative generation using conceptual dictionaries and ontologies. For example, although the story generation system by Okada and Endo [34] is organized as the application of a relatively large-scale conceptual dictionary, the range of themes treated by it is small. While Mizoguchi [35] has explored the method of the ontology of *Genji Monogatari* (*The Tale of Genji*), it has not been implemented. Takeuchi [36] has proposed a conceptual dictionary framework that can be applied to narratives. Synthetic narrative generation mechanisms have been proposed and discussed in relation to knowledge representation [37,38,39]. A direction for future narrative generation research will be formed by strengthening the basic structure of narrative generation via the use of richer narratological knowledge, methods, and techniques, and unifying new methods of linguistic processing and neural processing, among others.

The above Propp theory is aimed toward the abstract and general modeling of the narrative structure of folktales. In contrast, in the same folktale study, there are studies that treat many folktale examples at a more concrete level or level of lower abstraction than the Propp theory. For instance, Aarne and Thompson collected folktales mainly from various parts of Europe and produced the International Folk Tale Abstracts [40,41] (compiled by Aarne and expanded and revised by Thompson, thus, it is called the Aarne-Thompson type index [AT index]). It is a classification of themes of European folktales, and each theme called "motif" has a simple description that represents its summarized event. According to Ozawa [42], a motif is a unit that contains one major action of a major character in the composition of a story, as well as actions that directly correspond to that action. To analyze Aarne-Thompson's International Folktale Abstracts, it was noted that there were differences in the characters and actions of the different categories of folktales in the International Folktale Abstracts.

Keigo Seki, a Japanese folklorist, and his group conducted a survey and analysis of Japanese folktales to draw a comparison with the above research to present a systematic categorization of the "types" of Japanese folktales [43]. Although the types are similar to the motives in the above research, in that they show a summarized description of each categorization of folktales, many types provide a longer and more complex description of events for each categorized group of folktales.

We have presented an idea in which we formalize the folktale types provided by Seki and his group as the Common Lisp programs called "story units," in order to incorporate them into the INGS [44]. However, this study was incomplete in terms of problems such as the discordance of the numbers between the original types of folktales and described story units, and development via the use of an arbitrary method. The main objectives of the above study are: to complete each formal description of the story units based on the original texts of Japanese folktales' types and combine conceptual elements in the defined story units with the verb and noun conceptual dictionaries of the INGS. Through the latter mechanisms, the story units acquire the ability that is organizationally combined with the various narrative techniques in the INGS and enable automated semantic processing such as semantic linkages among the concepts. In the narrative generation mechanism found in the INGS, the narrative techniques, which are central program types, generate narrative structures in a narrative generation cycle using a kind of knowledge base, including fragmental narrative parts. All the narrative techniques and knowledge are organically and mutually combined with several types of conceptual dictionaries.

Based on the previous considerations and experiments [44], this paper defines story units based on the original texts of all the Japanese folktale types and combines the verb concepts in story units with the verb

conceptual dictionary of the INGS in order for one to be able to use story units as a group of story techniques in the INGS. In particular, we conducted a survey and analyzed the description of the types of folktales and automatically transformed all types of story units into Common Lisp codes based on our previous attempt. Next, although we attempt to combine all the verb concepts in the story units with the verb conceptual dictionary based on the defined program codes of story units, we categorize the types of combinations into a simple combination and more difficult combinations, for which various special techniques are necessary. Finally, we present several incomplete points for the future work toward more comprehensive research, including the revision of the definition of story units and the combinations of the story units with the verb conceptual dictionary and other conceptual dictionaries such as noun and adjective conceptual dictionaries.

2. TYPES OF JAPANESE FOLKTALES

Seki and his research group structurally analyzed approximately 35,000 folktales collected from various areas of Japan. The results were collected in *Nihon Mukashibanashi Taisei* (*The Complete Collection of Japanese Folktales*) [43,45,46,47,48,49,50,51,52,53,54, 55]. This complete collection has a total of 12 volumes. OF these, volumes 1 to 10 contain the collected folktales, volume 11 contains materials on the types of folktales, an index, and a bibliography, and volume 12 contains the contributed articles on folktales. The study presented in this paper is related to the types of folktales in volume 11. In volume 11, Seki and other researchers distributed 825 types of folktales under 39 categories as a classification of Japanese folktales.

Each type of folktale in the description of the book contains a summary of the contents of folktales corresponding to the type. These types of folktales are systematized, with the largest categories being 「動物昔話 [*Dōbutsu Mukashibanashi*]」 ("Animal Folktales"), 「本格昔話 [*Honkaku Mukashibanashi*]」 ("Ordinary Folktales"), and 「笑話 [*Shōwa*]」 ("Joke and Anecdotes"), which are based on the AT index. The animal folktales are tales in which one or more animals are main characters. The ordinary folktales mean a category of folktales that narrate the lives of ordinary humans. The joke and anecdotes are simple tales to make people laugh.

In addition, these three large categories have "divisions" that group folktales in accordance with their motifs, with 11 divisions for "Animal Folktales," 16 for "Ordinary Folktales," and 12 for "Joke and Anecdotes" (a total of 39 divisions). In each category, 825 types of folktales were assigned. A total of 825 types of folktales belong to one of the divisions, each of which contains a minimum of two and a maximum of 66 types of folktales.

Figure 1 is an example of the original text and a description of a type of folktale. The description and our presented program codes, namely story units, are written only in Japanese, with the related texts also using Japanese as the basic language. We present an English translation in this paper for the convenience of the readers.

四七四 鬼の面 [*Oni no Men*] (cf. AT 八三一)
ある女（男）が山（化け物屋敷）で鬼の面をかぶっている。[*Aru on'na (otoko) ga yama (bakemono-yashiki) de oni no men wo kabutte iru.*] 化け物がそれを見て逃げる。[*Bakemono ga sore wo mite nigeru.*] 女は (a) 宝物をとって帰る、または (b) 化け物屋敷の主人になる。[*On'na ha (a) takaramono wo totte kaeru, mata ha (b) bakemono-yashiki no shujin ni naru.*]
(474 Demon's Mask (cf. AT 831)
A woman (man) puts on a demon's mask in a mountain (a monster house). A monster looks at the mask and runs away from the woman. The woman (a) takes the treasure and goes home, or (b) becomes a host of the monster house.)

Figure 1. Example of the original description of a type of folktale.

3. FORMALIZING THE TYPES OF JAPANESE FOLKTALES AS STORY UNITS

In this section, we systematically describe the above-mentioned survey and analysis of the types of Japanese folktales to transform them into Common Lisp codes, as story units. Although our previous study [44] was conducted based on the Lisp code description, we attempted it based on the precise and detailed reconsideration of the original texts of the types of folktales and formalization.

3.1 The Structure of a Folktale Type

Table 1 presents the structural description of Figure 1 based on the format we developed in this study, which includes the following seven items:

- **No.**: The serial number for each type of folktales, based on Seki, Nomura, and Ōshima [43]. For

Table 1. Example of the event structure of a folktale type.

No.	Type Name	Selective Structure	Original Text	Sentence		Event
474	鬼の面 [*Oni no Men* (Demon's Mask)]	-	ある女(男)が山(化け物屋敷)で鬼の面をかぶっている。化け物がそれを見て逃げる。女は (a) 宝物をとって帰る、または (b) 化け物屋敷の主人になる。(A woman (man) puts on a demon's mask in a mountain (a monster house). A monster looks at the mask and runs away from the woman. The woman (a) takes the treasure and goes home, or (b) becomes a host of the monster house.)	ある女(男)が山(化け物屋敷)で鬼の面をかぶっている。(A woman (man) puts on a demon's mask in a mountain (a monster house.)		ある女(男)が山(化け物屋敷)で鬼の面をかぶっている (A woman (man) puts on a demon's mask in a mountain (a monster house)
				化け物がそれを見て逃げる。(A monster looks at the mask and runs away from the woman.)		化け物がそれを見て (A monster looks at the mask)
						(化け物が)逃げる (A monster) runs away from the woman)
				Or	女は (a) 宝物をとって帰る、(The woman (a) takes the treasure and goes home,)	女は宝物をとって (The woman takes the treasure)
						(女は)帰る (The woman) goes home)
					または (b) 化け物屋敷の主人になる。(or (b) becomes a host of the monster house.)	(女は)化け物屋敷の主人になる (The woman becomes a host of the monster house)

instance, in the example of Figure 1, 「四七四 [*yonhyaku shichijū shi*]」 means 474.

- **Type Name**: The original name representing the characteristics of folktales is described. 「鬼の面 [*Oni no Men*]」 in Figure 1 means "Demon's Mask."
- **AT Index**: The number corresponding to a motif in the AT index. Some folktales do not have corresponding numbers. In Figure 1, 「cf. AT 八三一 [*happyaku sanjū ichi*]」 means "cf. AT 831."
- **Selective Structure**: This presents the structure of the entire type of folktale. In particular, an entire folktale type can be divided into several exclusive "or" parts in accordance with this selective structure. For example, 「百足と蛞蝓の旅行 [*Mukade to Namekuji no Ryokō*]」 ("Travel of a Centipede and Slug") (No. 41) is divided into two parts, namely A and B. They are shown in the following actual description: 「A 1. 百足と蛞蝓とが旅行し、百足が先に着く [*Mukade to namekuji to ga ryokōshi, mukade ga saki ni tsuku*]。 2. 蛞蝓は遅れていく [*Namekuji ha okurete iku*]。 百足はまだ十八足草鞋を脱ぎ残している [*Mukade ha mada jūhassoku waraji wo nuginokoshite iru*]。 B 1. 百足と蛞蝓が旅行を約束し、迎えに行くと百足は草鞋を作っているので蛞蝓は先に行く [*Mukade to namekuji ga ryokō wo yakusokushi, mukae ni yuku to mukade ha waraji wo tsukutte iru node namekuji ha saki ni yuku*]。 2. 蛞蝓は旅から帰ってくるが、百足はまだ作り終わっていない [*Namekuji ha tabi kara kaette kuru ga, mukade ha mada tsukuri oete inai*]。」 ("A 1. A centipede and a slug travel and the centipede arrives first. 2. The slug is late. The centipede takes off eighteen pairs of sandals. B 1. The slug and centipede promise to go on a trip, and when the slug comes to pick the centipede up, since the centipede is making sandals, the slug goes ahead. 2. While the slug returns from his trip, the centipede has not yet finished making sandals.")
- **Original Text**: The original sentences are described in this section. The above **No.**, **Type Name**, **AT Index**, and **Original Text** are items that are included in the original description [43].
- **Sentence**: The description of each original text is divided into a unit of sentences. "Or" refers to the branching structure that has exclusive possibilities. Different from the above **Selective Structure** in the entire level of a story, this "or" structure functions inside a sentence.

- **Event**: Each sentence is divided into one or more events. An event is a small narrative unit that is organically structured based on the verb concept. In many cases, sentences contain several events. When there is no subject, it is supplemented based on a speculation in accordance with the context. In the INGS architecture, events function as one of the most basic units of story generation and other mechanisms.

3.2 Creation of Story Units

We created the story units as Common Lisp programs based on the "event" descriptions provided in Table 1. We created 825 story units from 825 folktales. Technically, all the 825 types are listed in an Excel file in accordance with the form of Table 1, and the frameworks for story units by Common Lisp are automatically generated. Figure 2 is an example of this. Subsequently, the case structures in the frameworks were described by hand. The completed story units are shown in Figure 3.

```
(motif0669 (鬼の面[demon's-mask])
  ((ある女(男)が山(化け物屋敷)で鬼の面をかぶっている。)
       (化け物がそれを見て)
       (「化け物が」逃げる)
       (or
        (女は宝物をとって
         「女は」帰る)
        (「女は」化け物屋敷の主人になる。))
      )
     )
```

Figure 2. Automatically generated framework of a story unit.

Figure 3 is an example of the story unit that was created based on the folktale type presented in Table 1. The branching structure of the type of folktale is represented through a description starting with "or," as shown in Figure 3. In this example, there were five events in the story unit. Each event is composed of a verb and its case information based on the way events are described in the INGS. The descriptions of verbs and the case elements in the story unit are based on the descriptions provided in the type of folktales. They do not correspond with the verb and noun concepts in the INGS. However, in the case of verbs, a temporary number 1 is written after the verb in order to correspond with the verb concept. In addition, in this figure (and the following several code descriptions), the description of **&sc** (such as **(&sc 女[woman])**) means that the noun concept following the **&sc** shows the range of noun concepts as an actual concrete value. In particular, the story generation mechanism in INGS selects a noun concept from the range using the noun conceptual dictionary. For example, **少女[girl]**, **妻[wife]**, **母[mother]**, etc. can be selected from **女[woman]**.

Although the narrative structure of this example is comparatively simple, the story units include various complicated structures. For instance, in the case structure of verbs involving a dialogue such as "say," the content of the dialogue is inserted directly into the object case. In this case, the elements of the object case cannot be changed or expanded without changing the content of the description. Therefore, we consider a more flexible use of the story unit by creating a nested structure of events. For example, in an event, 「門番は褒美を半分よこせという [*Monban ha hōbi wo hanbun yokose to iu*]。」 ("A gatekeeper tells anyone to give half of the reward."), x in the event corresponding to the frame, 「門番が x を言う [*Monban ga x wo iu*]。」 ("The gatekeeper tells anyone x."), is equal to the event, 「褒美を半分寄越せ [*Hōbi wo hanbun yokose*]。」 ("do give half of the reward to the gatekeeper."). This is because we can interpret 「寄越せ [*yokose*]」 ("do give") as a strong tone corresponding to 「命令する [*meireisuru*]」 ("order") and this "order" is in the framework of "say." Moreover, we can regard the object for 「命令する [*meireisuru*]」 ("order") as 「百姓 [*hyakushō*]」 ("farmer") from the context. Based on the above nested event,

```
(event 言う1[tell]
  (agent (&sc 門番[gatekeeper])
  (object
    (event 命令する1[order]
      (agent (&sc 門番[gatekeeper]))
      (counter-agent (&sc 百姓
[farmer]))
      (object
        (event 与える1[give]
```

```
(motif0669 (鬼の面[demon's-mask] (被る1[put-on] 見る1[look] 逃げる1[run-away] (or (取る
1[take] 帰る1[go-home]) なる1[become])))
          (
           (1 (event 被る1[put-on] (agent (&sc 女[woman])) (object (&sc 鬼の面[demon's-
mask])) (location (&sc 山[mountain]))))
           (2 (event 見る1[look] (agent (&sc 化け物[monster])) (counter-agent (&sc 女
[woman]))))
           (3 (event 逃げる1[run-away] (agent (&sc 化け物[monster]))))
           (or
            (4a
             (event 取る1[take] (agent (&sc 女[woman])) (object (&sc 宝物[treasure])))
             (event 帰る1[go-home] (agent (&sc 女[woman]))))
            (4b (event なる1[become] (agent (&sc 女[woman])) (to (&sc 化け物屋敷の主人
[host-of-monster-house])))))))
```

Figure 3. Example of a story unit.

```
        (agent (&sc 百姓[farmer]))
        (counter-agent (&sc 門番
[gatekeeper]))
        (object (&sc 褒美の半分[the
half of reward])))))))
```

is described.

Among the case elements of the story units, there are 766 cases that can be nested. Table 2 presents the classification of the nested structures based on our analysis. In this table, **Example** shows an example of a nested event, and the boldfaced type corresponds with the inside event. **Structure** presents a description of a nested event transformed from the sentence of the **Example**. A total of 433 nested events were identified. According to our categorization of the nested events and the analysis of the semantic structures, we defined the methods of making a nested event for the 9 classifications as indicated in Table 2.

Although the verb concept is directly used in "An action" and "Actions" to make the nested event, with regard to *Avoidance* to *Desire*, the following verb concepts are used instead of the original verb concepts: 「回避する [*kaihisuru*]」("avoid") (*Avoidance*), 「禁止する [*kinshisuru*]」("prohibit") (*Prohibition*), 「提案する [*teiansuru*]」("propose") (*Proposition*), 「話す [*hanasu*]」("speak") (*Speech*), 「命令する [*meireisuru*]」("order") (*Order*), and 「望む [*nozomu*]」("desire") (*Desire*). In the case of *Hearing*, 「聞く [*kiku*]」("hear") is used directly.

3.3 Implementation Result

As stated in the first part of Section 3, in this paper, we revised the previous implementation of story units [44]. In this study, we created 825 story units based on the 825 types of folktales and our detailed description through the automated generation function drawn from the Excel description newly coded by Common Lisp. The 558 story units generated do not have a branch structure, and the remaining 267 story units have a branch structure. 27 story units in the 267 units have a branch structure based on **Selective Structure**. In particular, the 19 story units of the respective 27 units only have a **Selective Structure**. These story units have 72 events at most, and one event in the smallest case. Approximately 90 % of the story units have 20 or fewer events. There was a total of 55 story units with more than 21 events. There were only 2 story units with more than 50 events.

4. COMBINING STORY UNITS WITH A VERB CONCEPTUAL DICTIONARY

We combined the story units with a verb conceptual dictionary in the INGS. This section first proposes a simple explanation of the verb conceptual dictionary, followed by the concrete combination method of story units and the verb conceptual dictionary. Refer to reference [56] concerning a conceptual dictionary including a verb conceptual dictionary and other conceptual dictionaries in the context of our narrative generation research.

Table 2. Nested event structures in story units.

Category	Total	Meaning	Example	Event Representation
Action	246	An event structure consisting of a single action.	嫁が、**猫が踊っている**のを発見する。[*Yome ga, neko ga odotte iru no wo hakkensuru.*] (A wife finds a cat dancing.) (No. 255, 猫の踊 [*Neko no Odori*] (Cat's Dance))	**(event 発見する 1[find] (agent (&sc 嫁[wife])) (object (event 踊る 1[dance] (agent (&sc 猫[cat])))))**
Actions	50	An event structure consisting of multiple actions.	親父は**飲んで賢くなった**と答える。[*Oyaji ha nonde kashikoku natta to kotaeru.*] (My dad replies that he drinks a drag and becomes a wise man.) (No. 521, 殿様と小僧 [*Tonosama to Kozō*] (A Load and Child))	**(event 答える 1[reply] (agent (&sc 親父[dad])) (counter-agent (&sc 侍[samurai])) (object ($継起 (event 飲む 1[drink] (agent (&sc 子供[child])) (object (&sc 薬[drag]))) (event なる 1[become] (agent (&sc 子供[child])) (object (&sc 賢い[wise])))))**
Avoidance	1	An event structure in which a certain action is avoided.	吉四六は**感染せぬように**して垣を作る[*Kicchomu ha kansen senu youni shite kaki wo tsukuru.*] (Kicchomu makes a hedge so that he does not get infected.) (No. 613, 隣の喧嘩 [*Tonari no Kenka*] (A Quarrel of Neighbors))	**(event 作る 1[make] (agent (&sc 吉四六[Kicchomu])) (object (&sc 垣[fence])) (purpose (event 回避する 1[avoid] (agent (&sc 吉四六[Kicchomu])) (object (event 感染する 1[infect] (agent (&sc 吉四六[Kicchomu])) (object (&sc 夫婦喧嘩[conjugal quarrel])))))))**
Prohibition	15	An event structure in which certain actions are prohibited.	男は**地蔵にこのことを他言するな**という。[*Otoko ha jizō ni kono koto wo tagon suruna to iu.*] (A man told a *jizō* not to tell anyone about this thing.) (No. 本格新 33 [*Honkaku-shin 33*] (Ordinary folktales, new, 33) こんな晩 [*Kon'na Ban*] (Such Night))	**(event 言う 1[tell] (agent (&sc 男[man])) (counter-agent (&sc 地蔵[Jizo])) (object (event 禁止する 1[prohibit] (agent (&sc 男[man])) (counter-agent (&sc 地蔵[Jizo])) (object (event 言う 1[tell] (agent (&sc 地蔵[Jizo])) (object (&sc このこと[this thing])))))))**
Proposition	10	An event structure in which an action is proposed.	**助け合おう**と約束する。[*Tasuke aou to yakusokusuru.*] (We promise to help each other.) (No. 動物新 20 [*Dōbutsu-shin 20*] (Animal Folktales, new 20), 獅子といるか [*Shishi to Iruka*] (A Lion and Dolphin))	**(event 約束する 1[promise] (agent (&sc ライオン[lion])) (counter-agent (&sc いるか[dolphin])) (object (event 提案する 1 (agent (&sc ライオン[lion])) (object (event 助け合う 1[help each other] (agent (&sc ライオン[lion])) (counter-agent (&sc いるか[dolphin])))))))**
Speech	5	An event structure in which a character speaks anything.	猿は**生肝を忘れた**という [*Saru ha ikigimo wo wasureta to iu.*] (A monkey tells that he forgot to bring his liver) (No. 35, 猿の生肝 [*Saru no Ikigimo*] (The Heart of a Monkey))	**(event 言う 1[tell] (agent (&sc 猿[monkey])) (object (event 忘れる 1[forgot to bring] (agent (&sc 猿[monkey])) (object (&sc 生肝[raw liver])))))**
Order	68	An event structure in which an action is ordered.	門番は**褒美を半分よこせ**という[*Monban ha hōbi wo hanbun yokose to iu.*] (The gatekeeper tells to anyone to do give the half of reward.) (No. 笑話新 11 [*Shōwa-shin 11*] (Joke and Anecdotes, new 11), 拳骨の褒美 [*Genkotsu no Hōbi*] (A Reward of Punches))	**(event 言う 1[tell] (agent (&sc 門番[gatekeeper]) (object (event 命令する 1[order] (agent (&sc 門番[gatekeeper])) (counter-agent (&sc 百姓[farmer])) (object (event 与える 1[give] (agent (&sc 百姓[farmer])) (counter-agent (&sc 門番[gatekeeper])) (object (&sc 褒美の半分[the half of reward])))))))**
Desire	33	An event structure in which an action is wanted.	漁夫(樵夫)が**妻を得たい**と神に祈願する[*Gyofu (shōfu) ga tsuma wo etai to kami ni kigansuru.*] (A fisherman (woodcutter) prays to the god to get a wife.) (No. 118, 天人女房 [*Ten'nin Nyōbō*] (Heavenly Bride))	**(event 祈願する 1[pray] (agent (&sc 漁夫[fisherman])) (counter-agent (&sc 神[god])) (object (event 望む 1 (agent (&sc 漁夫[fisherman])) (object (event 得る 1[get] (agent (&sc 漁夫[fisherman])) (object (&sc 妻[wife])))))))**
Hearing	5	An event structure in which a character hears anything.	神々が男の嫁を決めたのを聞く[*Kamigami ga otoko no yome wo kimeta no wo kiku*]。(Hearing that the gods have decided on a man's wife.) (No. 本格新 30 [Honkaku-shin 30] (Ordinary folktales, new 30), 夫婦の縁 [*Fūfu no En*] (Fate Between a Husband and Wife)	**(event 聞く 1[hear] (agent (&sc 男[man])) (object (event 決める 1[decide] (agent (&sc 神々[gods])) (object (&sc 男の嫁[man's wife])))))**

4.1 Overview of a Verb Conceptual Dictionary

A "concept" here is a datum that shows the meaning and classification of a word. A conceptual dictionary that stores many concepts is an ontology of words in the INGS. The entire conceptual dictionary is a collection of lower-level conceptual dictionaries. A verb conceptual dictionary and a noun conceptual dictionary are the most representative conceptual dictionaries, and there are other dictionaries, including adjective and adjective verb conceptual dictionaries. The verb conceptual dictionary systematically registers 11,951 verb concepts, and the noun conceptual dictionary is a systematic dictionary of noun concepts, including 115,765 general noun concepts. There is also the existence of a proper noun conceptual dictionary.

Figure 4 presents an example of a verb concept. As shown in this example, a verb concept has a "sentence pattern," a "case frame," and a "constraint." A sentence pattern describes the most basic and simple sentence form in the transformation, which ranges from an event representation to a surface language representation. A case frame is a descriptive form that defines the types of concepts required semantically by a verb concept. Constraint describes the constraints for selecting a case frame from the noun concept dictionary, and "is-a" piece of information for systematically classifying the verbs.

When each verb concept in the defined story units is combined with the corresponding part in the verb conceptual dictionary, the above functions are effectively used to organize and expand the possibility of narrative generation and representation.

4.2 Method for the Combination of Story Units with a Verb Conceptual Dictionary

We organized the types of verbs contained in the story units and implemented the methods in accordance to the classification.

The 825 story units that we created had 1,117 different verbs. These verbs can be divided into those that can be easily combined with the verb conceptual dictionary and those that require some work to be done in order to be combined with the verb conceptual dictionary. First, we classified the verbs in the story unit in terms of the challenges in binding. Table 3 presents the breakdown of the classification, the number of units corresponding to the category, and a concrete example of the category.

The verb concepts in A ("Direct Connection") directly exist in the verb conceptual dictionary. In contrast, the verb concepts from B to E ("New Registration," "Notation," "Passive Form," and "Negative Form") do not have the corresponding verb concepts in the verb conceptual dictionary. In the following section, we explain all of these categories.

A. Direct connection

The verb concepts of this group in the described story units are directly combined with the verb concepts in the verb conceptual dictionary.

Each verb concept in the dictionary is defined using the verb stem, and a typical notation form as a verb notation has various possibilities in Japanese. The verb concepts in A are equal to those in the dictionary. However, it is necessary to adjust the verb number for a specific verb concept in accordance with the difference in the meanings indicated by the verb concept. For instance, a Japanese verb concept, 「食べる [*taberu*]」 ("eat") has several different meanings, such as "earn" and "eat." Since our verb conceptual dictionary respectively

```
(set'通行する1[pass-through] '((name 通行する1[pass-through])
    (sentence-pattern "N1 が N2 を 通行する"["N1 pass through N2"])
    (case-cons-set
     ((case-frame ((agent N1) (location N2)))
      (constraint ((人[human] -死人[corpse] -人間〈人称〉[human<person>] -準人間[semi-human])
                   (場所[location] -世界[world] -景[view] -宇宙[space] 建造物[building] -屋根[roof] -柱・梁〔はしら・はり〕[pillar / jo4ist] -壁[wall] -家屋{部分〈要素{その他}〉}{アンテナ}[building{parts<element{etc.}>}{antenna}] -家屋{部分〈要素{その他}〉}{避雷針}[building{parts<element{etc.}>}{lightning-rod}] -建具[fixture] -塀[fence])))))
       (is-a (v 物理的移動 [physical-movement])))))
```

Figure 4. Example of a verb concept.

Table 3. Categories of combination methods between the verb concepts in story units and the verb conceptual dictionary.

Category	Total Number	Example
A. Direct Connection	615	食べる [*taberu*] (eat)
B. New Registration	363	あさる [*asaru*] (scavenge)
C. Notation	121	気づく [*kizuku*] (notice)
D. Passive Form	13	追われる [*owareru*] (be chased)
E. Negative Form	5	承知しない [*shōchishinai*] (not-agree)
Total	1,117	

describes them as 「食べる 1」 and 「食べる 2」, the story units are necessary to reflect this mechanism.

Here, we refer to the processing of sentence generation by natural language based on the story units. This is done using the natural language generation mechanism contained in an INGS. For verb concepts that have the same notation, once the description of the story unit is used as it is, the sentence generation mechanism of INGS is used to expand the sentence into a natural sentence, and if a natural sentence that matches the content of the story unit is expanded, it is used as it is. In a situation of no case, we select an appropriate verb concept number from the verb concept dictionary and change the number of story unit verbs to that number. Currently, all the created story units can be automatically transformed to natural language sentences.

B. New registration

Since the verb concepts in this group do not exist in the verb conceptual dictionary, we need to register them in the dictionary.

With respect to the verb concepts in B, we first check to see if there are any verb concepts that have the same meaning but different notations in the verb concept dictionary, and if so, we process them as the task in C. If there is no verb with a different notation, we register it as a new verb concept in the verb concept dictionary. For each new verb, we created a sentence pattern and a case frame based on the case structure of the target verb in the story unit. Case-frame refers to the case structure of the verb in the story unit, and the case frame refers to the case of the target verb in the story unit. The sentence pattern is created by specifying the particle corresponding to each case used in the case frame and combining the "case number" and the "particle corresponding to the case." In the tentative data, we did not provide any constraints on the cases to be used, and all "is-a" to classify the verb types were set for "physical action." In this example, the cases registered in the original story unit are the agent case, which represents the subject, and the object case, which represents the object.

C. Notation

The notation of the verb concepts included in this group can be changed in accordance with the corresponding verb concepts in the dictionary. For instance, the notation of 「気づく [*kizuku*]」("notice") in a story unit is changed to 「気付く [*kizuku*]」("notice"), which is the corresponded notation used in the verb conceptual dictionary.

D. Passive form

The verb concepts in this category are described in passive forms. With regard to group D, we changed each verb concept to the verb stem and assigned a concept number to the concept. Furthermore, the alteration from the passive to positive is conducted through the adjustment of the contents in the "agent" and "counter-agent" cases present in the story unit. For example,

```
(追われる１ [be chased]
  (agent A) (counter-agent B))
```

is altered to

```
(追う１ [chase]
  (agent B) (counter-agent A)).
```

E. Negative form

The verb concepts in this category are described in negative forms. The verb concepts belonging to category E is firstly altered for the verb stem and "not" is added to the verb concept for representing negative meaning. For example,

```
(event 承知しない１[not agree]
  (agent A) (object B))
```

is described as

```
(event (not 承知する1[agree])
    (agent A) (object B))."
```

F. Current situation of the combination

In this study, we combined all the verb concepts in the created story units with the verb concepts in the verb conceptual dictionary in accordance with the above methods. For example, in the example of a story unit shown in Figure 1, the used verb concepts are based on

```
(event なる1[become]
  (agent (&sc 女[woman]))
  (to (&sc 化け物屋敷の主人[host-of-monster-house])))
```

based on "B. New Registration."

Figures 5, 6, 7, 8 and 9 present the generated examples of story units and the original description [43] in accordance with the above A to E. However, this is a tentative accomplishment as the investigation of the results has not been conducted. In the next section, we discuss the

Story Unit	(motif0436 (物いう魚 [Talking fish] (or (捕らえる1[catch] 持ち帰る1[return] 聞こえる1[hear] (or 答える1[reply] する1[do]) 驚く1[surprise] 放す1[release]) (拾う1[pick] かける1[hang] 聞こえる1[hear] 返しに行く1[return] 会う1[meet] やる1[give] 食べる2[eat] 来る1[come] 流される1[sweep]))) (or ((S継起 (1 (event 捕らえる1[catch] (agent (&sc 男[man])) (object (&sc 魚[fish])))) (2 (event 持ち帰る1[return] (agent (&sc 男[man])) (object (&sc 魚[fish])))) (3 (event 聞こえる1[hear] (object (&sc 声[voice])) (from (&sc 淵[pond])))) (or (4a (event 答える1[reply] (agent (&sc 持っている魚 [had fish])))) (4b (event する1[do] (agent (&sc 捕まえた魚 [caught fish])) (object (&sc 話[talk]))))) (5 (event 驚く1[surprise] (agent (&sc 男[man])))) (6 (event 放す1[release] (agent (&sc 男[man])) (object (&sc 魚[fish]))))) ((S継起 (A (1 (event 拾う1[pick] (agent (&sc 男1[man])) (object (&sc 魚[fish])))) (2 (event かける1[hang] (agent (&sc 男1[man])) (object (&sc 魚[fish])) (to (&sc 軒[eaves]))))) (B (1 (event 聞こえる1[hear] (agent (&sc 男1[man])) (object (&sc 一波寄するか……[I will call a tsunami into the house...])))) (2 (event 返しに行く1[return] (agent (&sc 男1[man])))) (3 (event 会う1[meet] (agent (&sc 男1[man])) (counter-agent (&sc 男2[man])))) (4 (event やる1[give] (agent (&sc 男1[man])) (counter-agent (&sc 男2[man])) (object (&sc 魚[fish]))))) (C (1 (event 食べる2[eat] (agent (&sc 男2[man])) (object (&sc 魚[fish])))) (2 (event 来る1[come] (object (&sc 大津波 [big tsunami])))) (3 (event 流される1[sweep] (agent (&sc 男2[man]))))))))))
Original Text	A 1. 男が魚(やまめ・山椒魚・池淵の主・鰻)を捕える [*Otoko ga sakana (yamame, sanshōuo, ikenofuchi no nushi, unagi) wo toraeru*]。2. (a) 持ち帰ろうとすると淵から声がする [*Mochikaerou to suru to fuchi kara koe ga suru*]。持っている魚がそれに答える [*Motte iru sakana ga sore ni kotaeru*]。(b) 捕えた魚が話しをする [*Toraeta sakana ga hanashi wo suru*]。3. 男は驚いて放す(捨てて逃げる) [*Otoko ha odoroite hanasu (suttee nigeru)*]。B 1. 魚を拾って軒にかけておく [*Sakana wo hirotte noki ni kakete oku*]。2.「一波寄するか……」と声がするので返しに行くと途中で男に会い、魚をやる [*"Hitonami yosuruka ……" to koe ga suru node kaeshi ni yuku to tochū de otoko ni ai, sakana wo yaru*]。3. 男が食べると大津波が来て流される [*Otoko ga taberu to ōtunami ga kite nagasareru*]。(A 1. A man catches a fish (oncorhynchus, salamander, the lord of Ikenofuchi, eel). 2. (a) The man hears a voice from a pond when the man returns home with the fish. The fish the man has replies to the voice. (b) The fish that the man caught speaks. 3. The man is surprised and releases the fish (the man throws the fish and runs away). B 1. A person picks up a fish and hangs it on an eaves. 2. The person returns the fish because the person hears a voice that "I will call a tsunami into the house..." and the person meets a man at half-way and gives the fish to the man. 3. The man eats the fish, a big tsunami comes, and the man is swept by the big tsunami.)

Figure 5. Example of a story unit and an original description in "A. Direct Connection."

"A. Direct Connection," except for

Story Unit	(motif0650 (栃まなこ [Eyes of Japanese horse-chestnut] (落とす 1[drop] 入れる 1[fit] 見える 1[look] なる 1[become] (or 入れる 1[fit] 入れる 1[fit]) あさる 1[scavenge] 食べる 2[eat])) ((A (1 (event 落とす 1[drop] (agent (&sc 男[man])) (object (&sc 目玉[eye ball]))))) (2 (event 入れる 1[fit] (agent (&sc 男[man])) (object (&sc 目玉 [eye ball])))) (3 (event 見える 1[look] (agent (&sc 男[man])) (object (&sc 腹の中 [inside body])))) (4 (event なる 1[become] (agent (&sc 男[man])) (to (&sc 名医 [excellent doctor])))) (or (5a (event 入れる 1[fit] (agent (&sc 隣の男 [man next to him])) (object (&sc 栃の実 [conker]))) (5b (event 入れる 1[fit] (agent (&sc 隣の男 [man next to him])) (object (&sc 犬の目 [dog's eye])))) (6 (event あさる 1[scavenge] (agent (&sc 隣の男 [man next to him])) (object (&sc 他人のごみ[other people's garbage heap]))) (7 (event 食べる 2[eat] (agent (&sc 隣の男 [man next to him])) (object (&sc 他人のごみ [other people's garbage heap]))))))
Original Text	ある男が目玉を落として誤って逆に入れる [*Aru otoko ga medama wo otoshite ayamatte gyaku ni ireru*]。腹の中がよくみえるので名医になる [*Hara no naka ga yoku mieru no de meii ni naru*]。隣の男がまね て(a) 栃の実または (b) 犬の目を入れる [*Tonari no otoko ga manete (a) tochi no mi mata ha (b) inu no me wo ireru*]。他人のごみ溜めをあさって食うようになる [*Tanin no gomi wo asatte kuu you ni naru*]。(A man drops an eye ball and fits the eye into the eye socket in reverse direction by mistake. The man becomes an excellent doctor because he clearly looks inside the body. A man next to him mimicked him. The man (a) fits a conker into an eye socket, or (b) fits a dog's eye ball into an eye socket. He begins to scavenge and eat from the other people's garbage heaps.)

Figure 6. Example of a story unit and an original description in "B. New Registration."

Story Unit	(motif0378 (山伏と一軒家 [Yamabushi and solitary house] (おどす 1[scare] 驚く 1[surprise] 落ちる 1[fall] 暮れる 1[set] 泊まる 1[stay] (or 出る 1[come] うなる 1[groan] (つける 1[dye] 開ける 1[open] 見せる 1[show])) 驚く 1[surprise] 逃げる 1[run away] 落ちる 1[fall] 気づく 1[notice] 笑う 1[laugh])) ((S継起 (A (1 (event おどす 1[scare] (agent (&sc 山伏[yamabushi])) (counter-agent (&sc 寝ている狐[fox that slept])) (object (&sc 法螺貝[trumpet shell]))))) (2 (event 驚く 1[surprise] (agent (&sc 狐[fox])))) (3 (event 落ちる 1[fall] (agent (&sc 狐[fox])) (to (&sc 川[river])))))) (B (1 (event 暮れる 1[set] (object (&sc 日[sun])))) (2 (event 泊まる 1[stay] (agent (&sc 山伏[yamabushi])) (to (&sc 一軒家 [solitary house])))) (or (3a (event 出る 1[come out] (agent (&sc 死者[dead])))) (3b (event うなる 1[groan] (agent (&sc 病人 [sick person])))) (3c (event つける 1[dye] (agent (&sc 婆 [old woman])) (object (&sc おはぐろ[tooth blackening]))) (event 開ける 1[open] (agent (&sc 婆 [old woman])) (object (&sc 大きな口[big mouth]))) (event 見せる 1[show] (agent (&sc 婆 [old woman])) (counter-agent (&sc 三伏[yamabushi]))))))) (C (1 (event 驚く 1[surprise] (agent (&sc 山伏[yamabushi])))) (2 (event 逃げる 1[run away] (agent (&sc 山伏[yamabushi])))) (3 (event 落ちる 1[fall] (agent (&sc 山伏[yamabushi])) (to (&sc 川[river])))) (4 (event 気付く 1[notice] (agent (&sc 山伏[yamabushi])) (object (&sc 日は明るい [day is bright])))) (5 (event 笑う 1[laugh] (agent (&sc 人 [people])) (counter-agent (&sc 山伏[yamabushi]))))))))
Original Text	1. 山伏が法螺貝で狐をおどすと、狐は驚いて川に落ちる [*Yamabushi ga horagai de kitsune wo odosu to, kitsune ha odoroite kawa ni ochiru*]。2. 日が暮れて一軒家に泊まる [*Hi ga kurete ikkenya ni tomaru*]。(a) 死者が出てくる [*Shisha ga dete kuru*]。(b) 病人がうなっている [*Byōnin ga unatteiru*]。(c) 婆がおはぐろをつけて大きな口を開けて見せる [*Baba ga ohaguro wo tsukete ookina kuchi wo akete miseru*]。3. 山伏は驚いて逃げて川に落ちる [*Yamabushi ha odoroite nigete kawa ni ochiru*]。気づくと日は明るく、人に笑われる [*Kizuku to hi ha akaruku, hito ni warawareru*]。(1. A *yamabushi*, a fox with a trumpet shell, and the fox is surprised and falls into the river. 2. The sun sets and the priest stays at a house. 2. The sun sets and the *yamabushi* stays at a solitary house. (a) The dead come out. (b) The sick person is groaning. (c) An old woman dyes a tooth with blackening and opens her big mouth to show it to the *yamabushi*. 3. The *yamabushi* is surprised and runs away and falls into the river. When he notices, the day is bright and the *yamabushi* is laughed at by people.)

Figure 7. Example of a story unit and an original description in "C. Notation."

Story Unit	(motif0336 (三枚の護符 [three talismans] ((or 泊まる1[stay] 追う1[chase]) 取り替える1[replace] 投げる1[throw] できる1[appear] 投げる1[throw] できる1[appear] 投げる1[throw] できる1[appear] (or 死ぬ1[die] (逃げ帰る1[return] 求める1[request] する1[do] 命令する1[order] 食べる1[eat] 救う1[save])))) ((**$**継起 (A (or (1a (event 泊まる 1[stay] (agent (&sc 子供[child])) (to (&sc 山姥の家[Yamamba's house])))) (1b (event 追う1[chase] (agent (&sc 山姥[Yamamba])) (counter-agent (&sc 子供[child])))))) (B (1 (event 取り替える1[replace] (agent (&sc 子供[child])) (object (&sc 山姥が腰に結びつけた縄 [A rope Yamamba tied around her waist])) (to (&sc 護符[talisman]))))) (2 (event 投げる 1[throw] (agent (&sc 子供[child])) (object (&sc 護符[talisman])))) (3 (event できる1[appear] (object (&sc 川[river])))) (4 (event 投げる 1[throw] (agent (&sc 子供[child])) (object (&sc 護符[talisman])))) (5 (event できる1[appear] (object (&sc 山[mountain])))) (6 (event 投げる 1[throw] (agent (&sc 子供[child])) (object (&sc 護符[talisman])))) (7 (event できる1[appear] (object (&sc 火[fire])))) (or (8a (event 死ぬ1[die] (agent (&sc 山姥[Yamamba])))) (8b (event 逃げ帰る 1[return] (agent (&sc 子供[child])) (to (&sc 寺[temple])))) (event 求める1[request] (agent (&sc 子供[child])) (counter-agent (&sc 和尚[monk])) (object (&sc 救い))) (event する1[do] (agent (&sc 和尚[monk])) (counter-agent (&sc 山姥[Yamamba])) (object (&sc 化け比べ [a contest of the transforming]))) (event 命令する1[order] (agent (&sc 和尚[monk])) (counter-agent (&sc 山姥[Yamamba])) (object (&sc 豆に化ける [turns her into a bean]))) (event 食べる1[eat] (agent (&sc 和尚[monk])) (object (&sc 豆[bean]))) (event 救う1[save] (agent (&sc 和尚[monk])) (counter-agent (&sc 子供[child]))))))))))
Original Text	1. 子供(小僧)が山姥の家に泊まる [*Kodomo (kozō) ga yamanba no ie ni tomaru*]。または追われる [*Mata ha owareru*]。2. 山姥が腰に結びつけた縄を護符にとりかえる [*Yamanba ga koshi ni musubi tsuketa nawa wo gofu ni torikaeru*]。三枚の護符(鏡・櫛・針・玉)を投げて (a) 川(海)・(b) 山(剣の山)・(c) 火(藪)をつくって逃げる [*Sanmai no gofu (kagami, kushi, hari, tama) wo nagete (a) kawa (umi), (b) yama (tsurugi no yama), (c) hi (yabu) wo tsukutte nigeru*]。3 (a) 山姥は火で焼け死ぬ [*Yamanba ha hi de yakeshinu*]。または (b) 寺まで逃げ帰り、和尚に救いを求める [*Mata ha (b) tera made nigekaeri, oshō ni sukui wo motomeru*]。4. 和尚は山姥と化け比べをして豆に化けさせて山姥を食い、小僧を救う [*Oshō ha yamanba to bakekurabe wo shite mame ni bakesasete yamanba wo kui, kozō wo sukuu*]。(1. A child (young Buddhist) stays at a y*amanba*'s house, or is chased away. 2. A child replaces the rope the y*amanba* tied around her waist with a talisman. The child throws three talismans (a mirror, a comb, a needle, and a ball) and escapes by making (a) a river (the sea), (b) a mountain (a mountain of swords), and (c) a fire (a bush). 3 (a) The y*amanba* is burned to death by the fire. (b) She runs back to the temple and asks the monk to save her. 4. The monk has a contest with the *yamanba* and turns her into a bean, which eats the *yamanba* and saves the boy.)

Figure 8. Example of a story unit and an original description in "D. Passive Form."

problems, including the investigation and future work of this study.

5. DISCUSSION AND FUTURE WORKS

First, semantic investigations and revisions of the created story units are necessary for the qualitative improvement of this study in the future. For example, although we used several determined verbs for nested events in the current implementation of story units, the adequacy and other semantic possibilities of these verbs need more consideration.

Second, as mentioned in the last part of the previous section, we did not investigate the results of the combination mechanism of events in the story units with the verb conceptual dictionary. A method for conducting this is to investigate and evaluate the results through an actual computer simulation of the created story units using the natural language sentence generation or the transformation mechanism mentioned in the previous

Story Unit	(motif0266 (竜神と釣 [Ryujin and fishing] (借りる 1[borrow] 取る 1[take] 返す 1[return] 承知する 1[agree] 探しに行く 1[look] 返す 1[return] 返す 1[return])) ((**$継起** (A (1 (event 借りる 1[borrow] (agent (&sc 漁夫[fisherman])) (counter-agent (&sc 友人[friend])) (object (&sc 釣り針[hook])))) (2 (event 取る 1[take] (agent (&sc 魚[fish])) (object (&sc 釣り針[hook]))))) (B (1 (event 返す 1[return] (agent (&sc 漁夫[fisherman])) (counter-agent (&sc 友人[friend])) (object (&sc 同じ物 [same things])))) (2 (event (not 承知する 1[agree]) (agent (&sc 友人[friend]))))) (C (1 (event 探しに行く 1[look] (agent (&sc 漁夫[fisherman])) (to (&sc 海底 [bottom of the sea])))) (2 (event 返す 1[return] (agent (&sc 竜神[Ryujin])) (counter-agent (&sc 漁夫[fisherman])) (object (&sc 釣り針[hook])))) (3 (event 返す 1[return] (agent (&sc 漁夫[fisherman])) (counter-agent (&sc 友人[friend])) (object (&sc 釣り針[hook]))))))))
Original Text	1. 漁夫が友人に釣り針を借りて魚にとられる [*Gyofu ga yūjin ni tsuribari wo karite sakana ni torareru*]。2. 同じものを返そうとするが、友人が承知しない [*Onaji mono wo kaesou to suru ga, yūjin ga shōchishinai*]。3. 漁夫は海底に探しに行って、竜神に釣り針を返してもらって友人に返す [*Gyofu ha kaitei ni sagashi ni itte, ryūjin ni tsuribari wo kaeshite moratte yūjin ni kaesu*]。(1. The fisherman borrows a hook from his friend and a fish takes the hook. 2. He tries to return the same hook, but his friend doesn't agree. 3. The fisherman goes to the bottom of the sea to look for the hook and gets the hook back from the *ryūjin* and returns it to his friend.)

Figure 9. Example of a story unit and an original description in "E. Negative Form."

section. Moreover, while conducting the experiment in the current stage is certainly possible, the combination of the part of noun concepts in the story units with the noun conceptual dictionary in the INGS is still incomplete. In order to ensure the efficiency of the study performance, a better process is to conduct an investigation of the quality of combination following the processing of the noun concepts.

Third, one of the ultimate objectives of this study is to use the created story units combined with conceptual dictionaries for the entire narrative generation process carried out in an INGS. While a narrative generation inside a set of story units is possible using various methods such as synthesis, transformation, and other techniques of story units, narrative generation through mutual relationships with diverse story techniques is carried out in an INGS. In such relationships, the roles and functions of the story units can be diverse. For example, there is a story unit that shows the structure of a large story. However, there is a story unit that shows the local structure of a story. In addition, the story units can be used to generate folktale-like stories. Simultaneously, by combining the story units, it is possible to create a story that is different from the original story.

Finally, one of our concrete plans for actual narrative creation is to write experimental novels or narratives using generated story units, moreover, by adding the interpretation process ourselves. In particular, original narrative texts generated through the synthesis, transformation, etc. of the story units are rewritten based on further transformation, expansion, precision, and so on. This process refers to the completion of the text generated via the narrative generation mechanism based on our interpretation.

6. CONCLUSION

In this paper, we implemented the story units produced by using Common Lisp through a comprehensive and precise survey and analysis of the study of the types of Japanese folktales. Furthermore, all the verb concepts included in the description of the story units were semantically combined with the verb conceptual dictionary in the INGS system that we have been developing. These research results open the possibility that the story units cooperatively function with the other story and narrative techniques found in an INGS. However, this study is still incomplete. For instance, there are semantic problems in the created story units, and an evaluation investigation is a work that needs to be carried out in the future. In the previous section, we listed the limitations and future directions of this study.

In addition, as stated in the first part of this paper, this study also aims to partially develop narratology. The tendency of the recent narratology emphasizes the narratives in the context of diverse cultures. In this context, this proposed study presents a computational and

cognitive approach that we have recently come to call "post-narratology" [57], a narrative phenomenon in Japan, and our narrative generation study of *kabuki* [4,5].

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