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# Narrative Discourse Structure Creation Support System for Reflecting Theme and Emotional Impression

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**Abstract:** Authors sometimes create narratives for the purpose of conveying the message (*theme*). In addition, they often start with deciding the emotional genre (*emotional impression*), such as "sad story." So far, our research group has defined a narrative discourse structure and has proposed the process for creating it from the theme and emotional impression. The process determines the order of deriving the elements in the discourse structure. However, some authors found difficult to derive them. This paper proposes a system for the step-by-step creation of the discourse structure along with the process by giving supports of deriving the elements.

**Keywords:** Narrative writing, emotional impression, questioning, idea generation

## 1. Introduction

Narratives sometimes are used as a means of conveying a message (*theme*) to the readers. For example, the story of "the ant and the grasshopper" conveys the theme of "laziness leads to miserable situations." On the other hand, when creating narratives, authors often start with deciding the emotional genre (*emotional impression*) that expected readers may prefer, such as "sad story." However, to create narratives that satisfy both the theme and the emotional impression is difficult for novice authors.

Several researches proposed the systems that give candidates of narrative elements. For instance, Radford et al. developed the system which proposes a typical synopsis from opening sentences using the neural network that learned existing novels sentences (Radford et al., 2019). The system of Nishihara et al. gave choices for characters' behaviors by analyzing Russian folktales (Nishihara & Miura, 2015). However, the support method for creating the narrative elements based on the theme and the emotional impression is not proposed.

Our research group has defined narrative elements and their relations as a discourse structure and proposed a process for creating elements in the discourse structure step-by-step from the theme and the emotional impression (Ashida et al., 2020). However, some authors still find difficulties to follow the process and induce elements. The objective of this study is to develop a support system for creating the discourse structure along with the proposed process by giving triggers of deriving the elements.

## 2. Discourse Structure Creation Process Based on Theme and Emotional Impression

### *2.1 Discourse Structure*

Figure 1 shows the discourse structure defined in our research group (Ashida et al., 2020). Narratives are composed of various events, which change the states of the objects in the narrative world. Events and states can be grouped together from a spatio-temporal continuity to form scenes.

The narrative progresses from left to right in the structure. The sequence of scenes represents the basic structure of the narrative, and in this study, "Introduction-development-turn-conclusion", which is often used in Japanese creative writing, is adopted.

States represent the conditions of the narrative world. They consist of time, place, and objects existing in that time and space, and their attributes and values. The narrative can be completed by converting these events and states into sentences from left to right.

### *2.2 Discourse Structure Creation Process*

We have proposed the process of creating a discourse structure that reflects the theme and the emotional impression (Ashida et al., 2020). Figure 2 shows the process.

Since readers have the emotional impression of the narrative by the changes of the emotions while reading the narrative, authors need to set the expected emotional changes of readers along with the progress of narrative that can give the emotional expression (Step 1). Readers are often emotionally involved with characters, so that it is necessary to set the characters' emotions to follow the emotional changes defined in Step 1. In Step 2, authors define the values of emotional attributes of characters of the last state of the scene based on the emotional changes defined in Step 1.

On the other hand, since many themes convey whether the particular action is good/bad by showing its result state, themes can be described in the form of "if <action>, then <state>," such as "If you are lazy, you will be poor." In order to convey such a theme throughout the narrative, the event corresponding to the <action> and the state representing the <state> should be included in the narrative, and <state> should come in the end of the narrative. In Step 3, authors create event of <action> and set <state> as the final state of the narrative. In Step 4, authors create events and states that can lead to or are derived from the event, the state, and the emotional attributes defined in Step 2 and Step 3 to complete the discourse structure.

## 3. Discourse Structure Creation Support System

In the process in Section 2, the following difficulties exist for deriving the elements;

1. inability to derive reader's emotional changes to reflect the emotional impression (Step 1),
2. inability to identify the characters' emotions corresponding to the reader's emotional changes defined in Step 1 (Step 2), and
3. inability to associate states or events that have the causal relations with the elements derived in Step 2 and Step 3 to form one consistent discourse structure (step 4).

So far, our research group has proposed the support functions for the difficulties 1 and 2. For the difficulty 1, the story arc which represents the change in the reader's happiness according to the progress of the narrative is proposed and typical story arcs are given as candidates of readers' emotional changes (Ashida et al., 2019). For the difficulty 2, since readers often have sympathy with particular characters, a list of candidates of characters' emotions is given and feedback on whether the authors' selected emotions correspond to the story arc is given (Ashida et al., 2019). This study proposes a support method for the difficulty 3 and develops the discourse structure creation support system that has functions to resolve these difficulties.

For the difficulty 3, authors need to create events and states by associating from the existing elements derived in Step 2 and Step 3, and select a sequence of states and events that form a consistent discourse structure. Therefore, this research divides the activity of Step 4 into two activities: divergent thinking and convergent thinking and provides support functions for each activity.

The divergent thinking associates new events and states with an existing element. For the purpose of making authors clear what to derive from the existing elements, the system gives questions for the existing elements. Questions vary to which elements (*target elements)* they are given. Table 1 shows the target elements and expected elements to derive from each question.

On the other hand, convergent thinking selects a sequence of states and events to be introduced into the discourse structure. For creating the consistent discourse structure, the states and events that

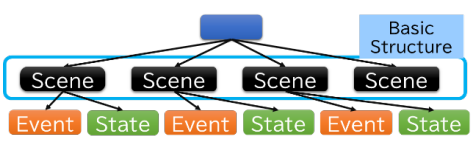


*Figure 1*. Discourse structure.

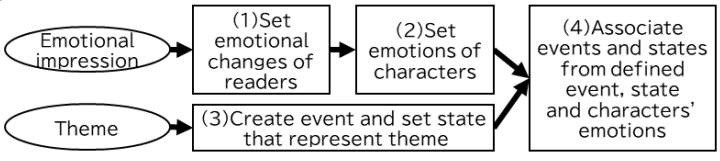


*Figure 2*. Discourse structure creation process.

have the causal relations from the existing elements should be selected. Therefore, the system selects sequences of states and events to reach the existing elements as candidates. For example, for the purpose of creating the discourse structure that can represents the theme, a sequence of events and states that reach the state set in Step 3 is selected.

Figure 3 shows the interface of the system for Step 4 that embeds the proposed functions. The system runs on a single web page. The system interface consists of two areas; the divergent thinking area and the convergent thinking area. In the divergent thinking area, the derived states and events are represented by the graph structure. States and events are represented by nodes, and their causal relationships are shown by links. Clicking on a node, questions in Table 1 are displayed. When states or events are created based on the question, a link is created from the element of the cause to the element of the result based on the question. In the convergent thinking area, the discourse structure is displayed as a tree structure with the left side as the root and the right side as the leaves. When a scene node is selected, sequences of states and events that can lead to the last state of the scene, which contains the character's emotional attribute created in Step 2, are highlighted in the divergent thinking area.

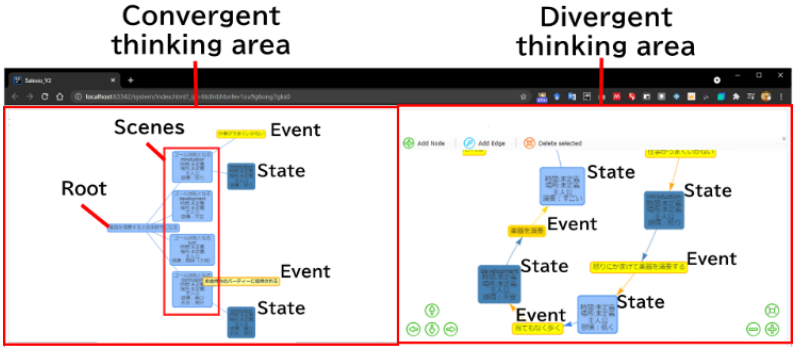


*Figure 3*. System interface.

Table 1. *Provided Questions*

| Question | Expected element to derive | Target element |
|---|---|---|
| When? | Time attribute of state | State |
| Where? | Place attribute of state | State |
| Who else is show up? | Object attribute of state | State |
| What to focus on? | Object attribute of state | State |
| What is the state? | Attribute and value of object | State |
| What state is next? | Object attribute of state that comes after event | Event |
| How did that happen? | Object attribute of state that comes before event | Event |
| What happens next? | Next event | State |
| What was happening? | Previous event | State |

## 4. Conclusion

This paper proposes a narrative writing support system for the step-by-step creation of the discourse structure from the theme and the emotional impression. It also proposes the support functions of each step. In the future, we need to conduct evaluation experiments using the developed system to verify the effectiveness of the proposed system in writing narratives.

## References


Ashida, A., Tokumaru, M., & Kojiri, T. (2019). Novel Writing Support System for Target Readers' Story Arcs and Characters' Emotional Changes. *Proc. of the 27th ICCE*, 22-31.

Ashida, A., Tokumaru, M., & Kojiri, T. (2020). Plot-creation Process for Conveying Theme to Expected Readers. *Proc. of the 45th Annual Conf. of JSiSE*, D3-4, 137-138 [in Japanese].

Nishihara, S., & Miura, M. (2015). A Web-based Application for Writing Novels. *Procedia Computer Science, 60*(1), 1014-1020.

Radford, A. J., Wu, J., Child, R., Luan, D., Amodei, D., & Sutskever, I. (2019). Language Models Are Unsupervised Multitask Learners. *OpenAI Blog*, 1(8).