

the room." and a simple sentence T22 "Peter drank something."

The simple sentence T11 and simple sentence T22 have a similar relationship to each other. The simple sentence 12 and simple sentence T21 have a similar relationship to each other. In this case, when the technology described in NPL 1 or NPL 2 is applied, it is determined that the target text T1 entails the hypothesis text T2. However, "Peter went out of (left) the room." of the hypothesis text T2 and "Peter drank a glass of water (something)." differ from each other in terms of chorological order. Thus, actually, the target text T1 does not entail the hypothesis text T2.

[0007]

Embodiments of the present invention provide an entailment evaluation device, an entailment evaluation method, and a program capable of solving the above-described problem.

[Solution to Problem]

[0008]

According to a first aspect of the present invention, there is provided an entailment evaluation device comprising: a generation unit configured to generate first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text and generates second information indicating at least an order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence being related to the first simple sentence, the fourth simple sentence being related to the second simple sentence; a calculation unit configured to obtain a calculation result by comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and the order of occurrence of events of third and fourth simple sentences; and a determination unit configured to determine, based on at least the calculation result, whether or not the target text entails the hypothesis text.

[0009]

The above entailment evaluation device may further include a division unit which obtains, by dividing the hypothesis text, a plurality of simple sentences, including the first and second simple sentences, each having one predicate and obtains, by dividing the target text, a plurality of simple sentences, including the third and fourth simple sentences, each having one predicate.

[0010]

The above entailment evaluation device may further include a storage unit which stores a first conjunction and the order of occurrence of events of simple sentences connected by the first conjunction in association with each other. The generation unit may determine whether or not the first conjunction and a second conjunction connecting the first and second simple sentences are identical and make, when determining that the first and second conjunctions are identical, the order of the first and second simple sentences in the first information coincide with the order of occurrence of an event associated with the first conjunction.

The above entailment evaluation device may further include a storage unit which stores a first conjunction and the order of occurrence of events of simple sentences connected by the first conjunction in association with each other. The generation unit may determine whether

in meaning between the first and third simple sentences and a second similarity in meaning between the second and fourth simple sentences. The calculation unit may determine whether or not the event of the second simple sentence occurs before the event of the first simple sentence and the event of the fourth simple sentence occurs after the event of the third simple sentence. The determination unit may determine, when the first and second similarities are high, the event of the second simple sentence occurs before the event of the first simple sentence, and the event of the fourth simple sentence occurs after the event of the third simple sentence, that the target text does not entail the hypothesis text.

[0014]

According to a second aspect of the present invention, there is provided an entailment evaluation method comprising: generating first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text; generating second

information indicating at least an order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence beings related to the first simple sentence, the fourth simple sentence being related to the second simple sentence; obtaining a calculation result by
5 comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and order of occurrence of events of third and fourth simple sentences; and determining, based on at least the calculation result, whether or not the target text entails the hypothesis text.

10 [0015]

According to a third aspect of the present invention, there is provided a non-transitory recording medium storing a program allowing a computer to execute: generating first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text; generating second information indicating at least the order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence being related to the first simple sentence, the fourth simple sentence being related to the second simple sentence; obtaining a calculation result by comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and order of occurrence of events of third and fourth simple sentences; and determining, based on at least the calculation result, whether or not the target text entails the hypothesis text.

15 [Advantageous Effects of Invention]

[0016]

According to the exemplary embodiments of the present invention, it is possible to determine that target text does not entail the hypothesis

text when the discourse relationship between the simple sentences of the hypothesis text and the discourse relationship between the simple sentences of the target text are not similar.

5 [Brief Description of Drawings]

[0017]

Fig. 1 is a schematic block diagram illustrating a configuration of an entailment evaluation device according to a first exemplary embodiment of the present invention.

10 Fig. 2 is a flowchart illustrating operation of the entailment evaluation device according to the first exemplary embodiment of the

CLAIMS:

1. An entailment evaluation device comprising:
 - a generation unit configured to generate first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text and generates second information indicating at least an order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence being related to the first simple sentence, the fourth simple sentence being related to the second simple sentence;
 - a calculation unit configured to obtain a calculation result by comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and the order of occurrence of events of third and fourth simple sentences; and
 - a determination unit configured to determine, based on at least the calculation result, whether or not the target text entails the hypothesis text.
2. The entailment evaluation device according to claim 1, further comprising an extraction unit configured to extract, as the third simple sentence, a simple sentence similar in meaning to the first simple sentence from the target text.
3. The entailment evaluation device according to claim 1, further comprising a division unit configured to obtain,
 - by dividing the hypothesis text, a plurality of simple sentences, including the first and second simple sentences, each having one predicate and
 - obtain, by dividing the target text, a plurality of simple sentences, including the third and fourth simple sentences, each having one predicate.
4. The entailment evaluation device according to claim 1, further comprising a storage unit configured to store a first conjunction and an order of occurrence of events of simple sentences connected by the first conjunction in association with each other, wherein
 - the generation unit determines whether or not the first conjunction and a second conjunction connecting the first and second simple sentences are identical and makes, when determining that the first and second conjunctions are identical, the order of the first and second simple sentences in the first information coincide with the order of occurrence of an event associated with the first conjunction.

5. The entailment evaluation device according to claim 1, further comprising a storage unit configured to store a first conjunction and an order of occurrence of events of simple sentences connected by the first conjunction in association with each other, wherein the generation unit
 - determines whether or not the first conjunction and a second conjunction connecting the third and fourth simple sentences are identical and
 - makes, when determining that the first and second conjunctions are identical, the order of the third and fourth simple sentences in the second information coincide with the order of occurrence of an event associated with the first conjunction.
6. The entailment evaluation device according to claim 1, wherein
 - the extraction unit identifies a first simple sentence distance between the first and third simple sentences and a second simple sentence distance between the second and fourth simple sentences, and
 - the determination unit determines, based on at least the calculation result and first and second simple sentence distances, whether or not the target text entails the hypothesis text.
7. The entailment evaluation device according to claim 1, wherein
 - the calculation unit determines whether or not the event of the second simple sentence occurs before the event of the first simple sentence and the event of the fourth simple sentence occurs after the event of the third simple sentence, and
 - the determination unit determines, when the event of the second simple sentence occurs before the event of the first simple sentence and the event of the fourth simple sentence occurs after the event of the third simple sentence, that the target text does not entail the hypothesis text.
8. The entailment evaluation device according to claim 1, wherein
 - the extraction unit calculates a first similarity in meaning between the first and third simple sentences and a second similarity in meaning between the second and fourth simple sentences,
 - the calculation unit determines whether or not the event of the second simple sentence occurs before the event of the first simple sentence and the event of the fourth simple sentence occurs after the event of the third simple sentence, and
 - the determination unit determines, when the first and second similarities are high, the event of the second simple sentence occurs before the event of the first simple sentence, and

the event of the fourth simple sentence occurs after the event of the third simple sentence, that the target text does not entail the hypothesis text.

9. An entailment evaluation method comprising:

generating first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text;

generating second information indicating at least an order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence being related to the first simple sentence, the fourth simple sentence being related to the second simple sentence;

obtaining a calculation result by comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and order of occurrence of events of third and fourth simple sentences; and

determining, based on at least the calculation result, whether or not the target text entails the hypothesis text.

10. A non-transitory recording medium storing a program allowing a computer to execute:

generating first information indicating at least an order of occurrence of events of first and second simple sentences included in a hypothesis text;

generating second information indicating at least the order of occurrence of events of third and fourth simple sentences included in a target text, the third simple sentence being related to the first simple sentence, the fourth simple sentence being related to the second simple sentence;

obtaining a calculation result by comparing, based on the first and second information, the order of occurrence of events of first and second simple sentences and order of occurrence of events of third and fourth simple sentences; and

determining, based on at least the calculation result, whether or not the target text entails the hypothesis text.