CLAIMS

1. A computer-implemented method executed on a processor for performing Q-learning with language model for unsupervised text summarization, the method comprising:

mapping each word of a sentence into a vector by using word embedding via a deep learning natural language processing (NPL) model;

assigning, via an editorial agent associated with Q-learning, each of the words of the sentence to an action and operation status one by one;

determining, for each of the words whose operation status represents “unoperated,” a status by calculating a local encoding and a global encoding, and concatenating the local encoding and the global encoding, wherein the local encoding is calculated based on a vector, an action, and an operation status of the word, and the global encoding is calculated based on each of the local encodings of the words by employing self-attention; and

determining a Q-value for each of the words in terms of each of three actions based on the status.

2. The method of claim 1, wherein the three actions are “replace,” “keep,” and “remove.”

3. The method of claim 2, further comprising updating the action and the operation status of the word with the highest Q-value to an action with the highest Q-value and the operation status to “operated.”

4. The method of claim 3, further comprising repeating the determining steps and the updating step until all of the operation statuses of the words represent “operated.”

5. The method of claim 4, further comprising converting, via a language model converter, the sentence to a masked sentence where the words with “keep” remain and the words with “replace” and “remove” change to null tokens.

6. The method of claim 5, further comprising compressing the sentence by converting each of the null tokens with “replace” in the masked sentence to a predicted word by using a masked language model for predicting masked portions in a given sentence.

7. The method of claim 6, further comprising reconstructing the sentence from the compressed sentence by converting each of the null tokens in the masked sentence to a predicted word by employing the masked language model.

8. A non-transitory computer-readable storage medium comprising a computer-readable program executed on a processor in a data processing system for performing Q-learning with language model for

unsupervised text summarization, wherein the computer-readable program when executed on the processor causes a computer to perform the steps of:

mapping each word of a sentence into a vector by using word embedding via a deep learning natural language processing (NPL) model;

assigning, via an editorial agent associated with Q-learning, each of the words of the sentence to an action and operation status one by one;

determining, for each of the words whose operation status represents “unoperated,” a status by calculating a local encoding and a global encoding, and concatenating the local encoding and the global encoding, wherein the local encoding is calculated based on a vector, an action, and an operation status of the word, and the global encoding is calculated based on each of the local encodings of the words by employing self-attention; and

determining a Q-value for each of the words in terms of each of three actions based on the status.

9. The non-transitory computer-readable storage medium of claim 8, wherein

the three actions are “replace,” “keep,” and “remove.”

10. The non-transitory computer-readable storage medium of claim 9, wherein the action and the operation status of the word with the highest Q-value are updated to an action with the highest Q-value and the operation status to “operated.”

11. The non-transitory computer-readable storage medium of claim 10, wherein the determining steps and the updating step are repeated until all of the operation statuses of the words represent “operated.”

12. The non-transitory computer-readable storage medium of claim 11, wherein the sentence is converted, via a language model converter, to a masked sentence where the words with “keep” remain and the words with “replace” and “remove” change to null tokens.

13. The non-transitory computer-readable storage medium of claim 12, wherein the sentence is compressed by converting each of the null tokens with “replace” in the masked sentence to a predicted word by using a masked language model for predicting masked portions in a given sentence.

14. The non-transitory computer-readable storage medium of claim 13, wherein the sentence is reconstructed from the compressed sentence by converting each of the null tokens in the masked sentence to a predicted word by employing the masked language model.

15. A system for performing Q-learning with language model for unsupervised text summarization, the system comprising:

a memory; and

one or more processors in communication with the memory configured to:

map each word of a sentence into a vector by using word embedding via a deep learning natural language processing (NPL) model;

assign, via an editorial agent associated with Q-learning, each of the words of the sentence to an action and operation status one by one;

determine, for each of the words whose operation status represents “unoperated,” a status by calculating a local encoding and a global encoding, and concatenate the local encoding and the global encoding, wherein the local encoding is calculated based on a vector, an action, and an operation status of the word, and the global encoding is calculated based on each of the local encodings of the words by employing self-attention; and

determine a Q-value for each of the words in terms of each of three actions based on the status.

16. The system of claim 15, wherein the three actions are “replace,” “keep,” and “remove.”

17. The system of claim 16, wherein the action and the operation status of the word with the highest Q-value are updated to an action with the highest Q-value and the operation status to “operated.”

18. The system of claim 17, wherein the determining steps and the updating step are repeated until all of the operation statuses of the words represent “operated.”

19. The system of claim 18, wherein the sentence is converted, via a language model converter, to a masked sentence where the words with “keep” remain and the words with “replace” and “remove” change to null tokens.

20. The system of claim 19, wherein the sentence is compressed by converting each of the null tokens with “replace” in the masked sentence to a predicted word by using a masked language model for predicting masked portions in a given sentence.

21. The system of claim 20, wherein the sentence is reconstructed from the compressed sentence by converting each of the null tokens in the masked sentence to a predicted word by employing the masked language model.

22. A computer-implemented method executed on a processor for performing Q-learning with language model for unsupervised text summarization, the method comprising:

mapping each word of a sentence into a vector by using word embedding via a deep learning natural language processing model;

assigning, via an editorial agent associated with Q-learning, each of the words of the sentence to an action and operation status one by one;

determining, for each of the words whose operation status represents “unoperated,” a status by calculating a local encoding and a global encoding, wherein the local encoding and the global encoding are concatenated; and

determining a Q-value for each of the words based on edit operations “replace,” “keep,” and “remove.”

23. The method of claim 22, wherein the local encoding is calculated based on a vector, an action, and an operation status of the word, and the global encoding is calculated based on each of the local encodings of the words by employing self-attention.

24. The method of claim 23,

wherein the sentence is converted, via a language model converter, to a masked sentence where the words with “keep” remain and the words with “replace” and “remove” change to null tokens; and

wherein the sentence is compressed by converting each of the null tokens with “replace” in the masked sentence to a predicted word by using a masked language model for predicting masked portions in a given sentence.

25. A system for performing Q-learning with language model for unsupervised text summarization, the system comprising:

a memory; and

one or more processors in communication with the memory configured to:

map each word of a sentence into a vector by using word embedding via a deep learning natural language processing model;

assign, via an editorial agent associated with Q-learning, each of the words of the sentence to an action and operation status one by one;

determine, for each of the words whose operation status represents “unoperated,” a status by calculating a local encoding and a global encoding, wherein the local encoding and the global encoding are concatenated; and

determine, via an editorial agent, a Q-value for each of the words based on edit operations “replace,” “keep,” and “remove.”