CDP Minutes Item Generation & Alignment

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Abstract

In this quarter's work, we tried to solve the problem of aligning meeting minutes items with meeting transcripts, which can make it easier for researchers to find and analyze specific parts of the meeting. We first reviewed the existing literature on generating meeting minutes items. We then attempted to reproduce previous works and built our own models for generating minutes items using state-of-the-art language models such as BART and mT5. However, we found that the major challenge was the lack of a suitable dataset for training and evaluating the models. Therefore, we turned to minutes items alignment. We built a model by combining Eva Brown's Cue-Queue method and DTW (Dynamic Time Wrapping). Then, we manually annotated a dataset of 27 meeting transcripts from the Council Data Project, which we named "cdp-minutes-item-seg". This dataset segments meeting transcripts from existing minutes items and marks how many sentences each minute item corresponds to in transcripts. We evaluated our alignment model using this dataset and achieved promising results.

Introduction

Many of the city councils covered by Council Data Project servers have "meeting minutes" which in a general sense are the "short list of things that happened or were discussed during the meeting". However, the minute items do not align with the transcripts of the meetings. It is very hard to quickly jump into the meetings to precisely locate the minutes item. Once segmented, a document can more easily be navigated, and individual sections can be used in specific analysis and further processing. So, our goal is to find a way to solve this problem to make future research in all areas of the project easier to find the parts they want to study.

Background and Related Work

Minutes Item Generation

Generating minutes items refers to the process of automatically creating a summary of a meeting or discussion that captures the most important topics, decisions, and action items. This process typically involves analyzing a transcript or recording of the meeting and identifying key discussion points, decisions, and action items. The goal of generating minutes items is to provide an accurate and concise summary of the meeting that can be shared with participants and stakeholders. In previous works, Narayan et al uses a topic-aware convolutional neural network (CNN) that is trained to identify important sentences in a document and generate a summary that is focused on a particular topic [4]. They built a dataset consists of BBC online articles and accompanying single sentence summaries. Koay et al added a sliding window on the transformer BART to analyze meeting transcripts and identify key topics and discussion points [3]. They performed their model on the ICSI meeting corpus [5].

Minutes Item Alignment

Unlike generating minutes from meeting transcripts, aligning minutes item with transcripts refers to the process of identifying corresponding segments or words in transcripts with given minutes item that convey similar meaning or information. The goal of aligning texts is to enable quick navigation to the points of meetings for user interested in, or for later downstream processing and analysis. In previous works, Eva Brown proposed a supervised method for automatically segmenting meeting transcripts into sub-events using cue-sentences or cue-windows [1]. She used three datasets: 1. SCM-TM-2021, which comprises 200+ meeting transcripts of the Seattle City Council, 2. WikiSection, which contains article abstracts, plain text of the body, positions of all sections given by the Wikipedia article editors with their original headings, and a normalized topic label, and 3. AMI Meeting Corpus, which is a multi-modal dataset consisting of 100 hours of meeting recordings.

Data and Method

For minute items generation, we tried to reproduce other's work first, and then tried to build a supervised model by using mT5. I referenced the transformers BART and mT5. However, I did not work the model out. The major reason is we did not have the dataset suitable as the input for their works. Also, some of the works do not show source code, which was difficult for me to build the model just based on their paper.

For minutes item alignment, we tried to build a model combining DTW and Eva's Cue-Queue method and then evaluated the results with our manually segmented document. The data we used is from Council Data Project. For the alignment task, I checked over 27 meetings data and then created a dataset containing the corresponding manually segmentations. We used the library ‘fastdtw’ to do the DTW (Dynamic Time Wrapping) for alignment job and evaluated the results using the ‘boundary_similarity’ function in library ‘segeval’. This time, we get the results though it shows that our algorithm still needs to improve.

Table 1: Parts of the evaluation for the similarity between corrected segmentations and algorithm’s segmentations.

alg_name	event_id	segmentation_similarity
evas_base_alg	9a0564aaccbc	0.038
evas_base_alg	8dd03d0c3da8	0.167
evas_base_alg	6d0643d86325	0.029
evas_base_alg	d6bb582ba073	0.109
evas_base_alg	c5a6c08c7135	0

"cdp-minutes-item-seg" Dataset

We created a dataset, "cdp-minutes-item-seg", which is a json format file contains 27 manually segmented meeting annotations. The 27 meetings are picked from Seattle City Council in Council Data Project server. I fetched each meeting’s id, minutes items, and transcripts to do annotation. The dataset comprised of a dictionary object contains keys representing unique IDs for segmentation data (meetings) and values that are lists of numbers representing the segmentation data itself. It segments meeting transcripts from existing minutes items orderly, and marks how many sentences for each minutes item corresponds to in transcripts. To construct dataset, I first import the csv file containing meeting's transcripts line by line in excel. Then I checked over the transcripts and minutes items to find the shifting points in the meeting that

corresponds to each minute. In this way, I can calculate how many sentences are there for each minutes item in a meeting. This dataset contains corrected segmentations, which can be used to evaluate the results of future alignment algorithms. Besides, it allows researchers to locate the meetings they would like to study easier. It also can be used as a reference for building corrected segmentation dataset. For future works, we are considering adding the name of minutes items in the dataset to give a better representation.

Conclusion

In conclusion, we tried implementing minutes item generation and alignment. For generation, we did not get the results due to the incompatible dataset. For alignment, we annotated a new dataset of 27 meeting transcripts, which can be used for future research in this area. We also proposed a model for aligning minutes items with transcripts using DTW and ran it to get the results evaluated with the manually annotated one. Our work contributes to the Council Data Project and can help researchers to more easily find and analyze specific parts of meeting transcripts. Future work could involve expanding the dataset to include more meetings and exploring different approaches for generating minutes items and aligning them with transcripts. Also, there are a lot of ambiguities to the original meeting's transcripts and minutes items in Council Data Project Server: 1. Some minutes item did not mention in the meeting at all. 2. The order of some of the meeting's minutes items are wrong and some of them mentioned together in one sentence or a chunk. 3. The transcripts to the meeting are wrong sometimes. I have some suggestions for future researchers: 1. Maybe segment some of the minutes together if they are mentioned together such as reappointments. 2. Combine the beginning minutes together to for a segmentation, such as call to order, roll call, since it is often ambiguous to set them apart in the transcripts. 3. The order of the minutes can be adjusted based on the order they mentioned in transcripts. 4. Building the algorithm based on some key words and sentences such as "Would the clerk please read agenda item 1", "The public comments are closed.", and "The agenda is adopted." These sentences or words could be in the beginning or end of a section.

References

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