Report for HW2

Jingwei Shen

ID:js1

1. Overview

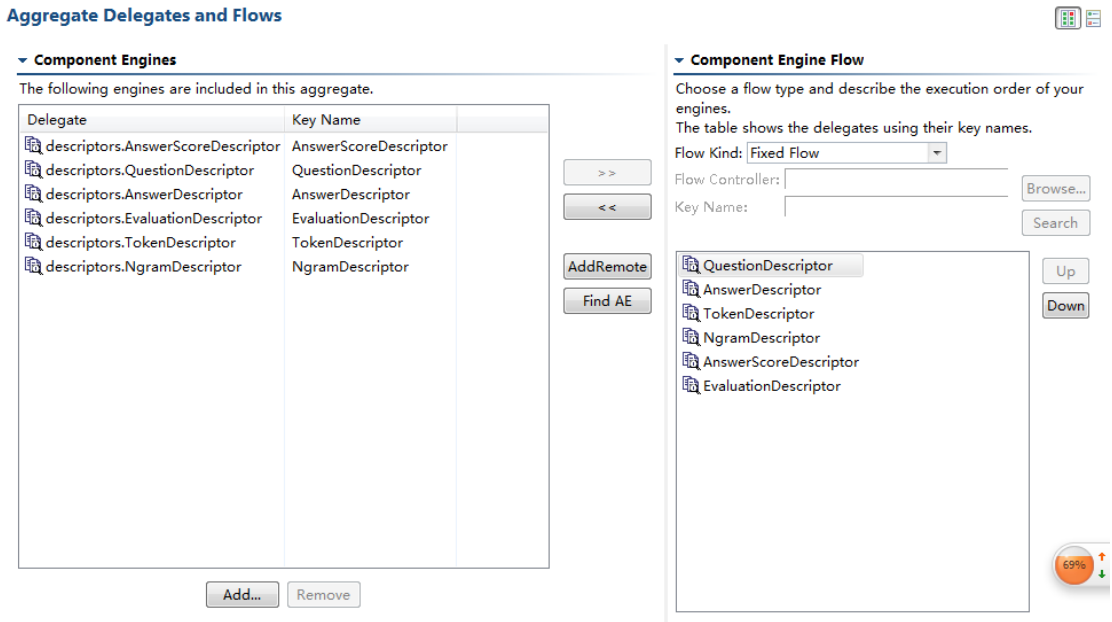
During this assignment, an appropriate design patterned is developed. And the pipeline shows expected performance in scoring. In addition, the results turn out even better on the example datasets than the results shown by Professor, which means that the algorithm designed by myself gives a higher precision.

Below the report is organized as follows: part 2 illustrate the design pattern in detail. Part 3 introduces my own algorithm for scoring answers. And part 4 shows the performance of this project. Finally, part 5 is a brief summary.

2. Design Pattern

In this problem, the task is to find likely answers to a particular question given the question and potential answers. It is important to separate the document into two parts: the question and answers. Then tokens can by analyzed through each single sentence. So is Ngram. Then under some algorithm, a score is given to each answer. Finally, an evaluation part will show the performance of the total project.

Below is picture of the aggregate analysis engine file. There are 6 descriptors in total and the they work in the order shown on the right part of the picture.



3. Algorithm

Three aspects are considered in the “scoring” algorithm.

First, the overlapping of the question and the answer indicates the similarity of the two sentences, and they are likely to be a correct match. So in this aspect, it gives a score proportional to the overlapping of question and answer.

Second, the negation can change the meaning of a sentence by just one single word. There is a negation, then the answer will get a minus score, otherwise a positive one.

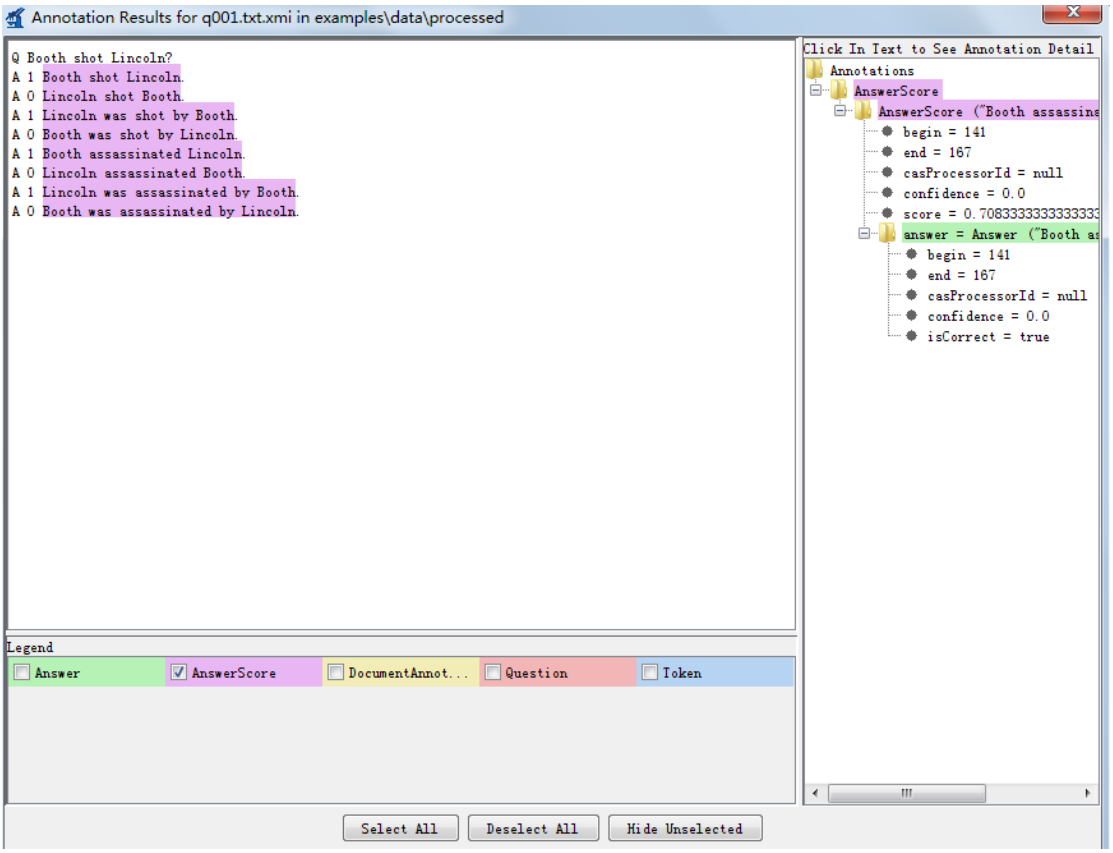
Third, passive voice is considered, since it will also lead to different meanings even the overlapping is high. If passive voice exists in the answer, then the subject of the answer can be determined with high probability. And the subject is supposed to appear in front positions in the question if it is also the subject of the question, otherwise the word is likely to be a object if it appear in the rear.

For example:
A: Booth was shot by Lincoln.
It can be found that “Lincoln” appears after “by”, it is likely to be the real subject(taking the action of shooting). Then if this is a correct answer, the word “Lincoln” should appear in front positions of the question indicating that it is also the subject of the question. However, the word “Lincoln” is in the last position of “Booth shot Lincoln?”. So this answer is not likely to be a good one.

Final score is a weighted average of the three scores.

4. Performance

Here is a picture of the result shown by “Document Analyzer”



And below is the output in the console

```
Booth shot Lincoln
successful launch of 'QuestionAnnotator'
successful launch of 'AnswerAnnotator'
************ the display of answer scores************
+ 0.875 Booth shot Lincoln
- 0.875 Lincoln shot Booth
+ 0.7916666666666667 Lincoln was shot by Booth
- 0.625 Booth was shot by Lincoln
+ 0.7083333333333333 Booth assassinated Lincoln
- 0.7083333333333333 Lincoln assassinated Booth
+ 0.625 Lincoln was assassinated by Booth
- 0.4583333333333333 Booth was assassinated by Lincoln
**********the precision********
precision of 4.0:  0.75
John loves Mary
successful launch of 'QuestionAnnotator'
successful launch of 'AnswerAnnotator'
************ the display of answer scores************
+ 0.875 John loves Mary with all his heart
+ 0.625 Mary is dearly loved by John
```

```
- 0.3333333333333333 Mary doesn't love John
- 0.3333333333333333 John doesn't love Mary
+ 0.875 John loves Mary
**********the precision********
precision of 3.0:  1.0
```

As we see, the precision is good, even better than what the professor showed in class.

5. Summary and future work

In summary this project meets the basic requirements and give good performance.

In spite of the good performance, there are still some problems not fixed yet.

The total score is not normalized between(0,1) (there are even minus score!). Ngram is not used since the algorithm used in the project works better.