Neural Networks for Discourse Coherence

Roy Aslan, Dwayne Campbell, Chris Kedzie

Task


1. blah blah...
2. blah blah...
3. blah…
4. ...
5. ...
6. ...


2. blah blah...
4. ...
5. ...
1. blah blah...
3. blah…
6. ...

Task

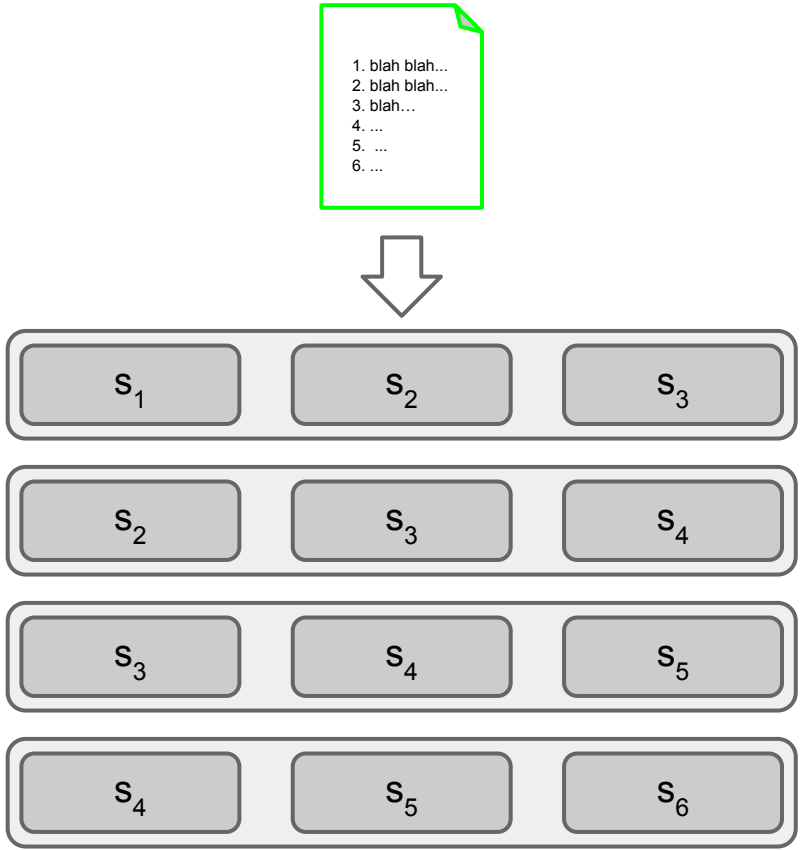
rank(

) > rank(

)

Task

Task


1. blah blah...
2. blah blah...
3. blah…
4. ...
5. ...
6. ...
s_1 s_2 s_3
s_2 s_3 s_4
s_3 s_4 s_5
s_4 s_5 s_6

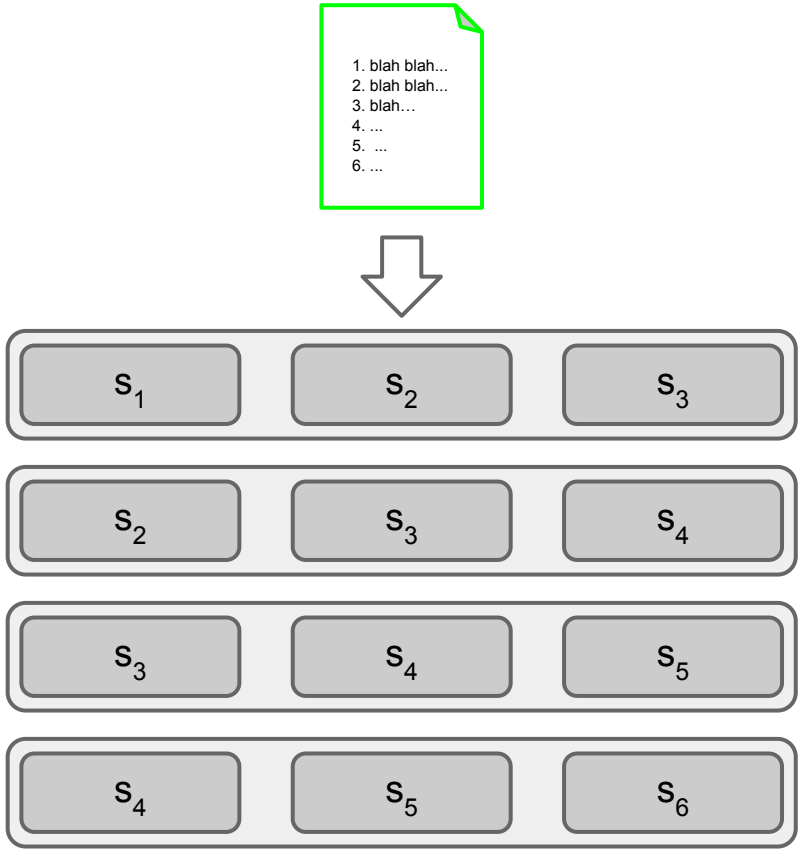
Task

$\log p(y_1 = \textit{coherent} \mid s_1, s_2, s_3)$

$\log p(y_2 = \textit{coherent} \mid s_2, s_3, s_4)$

$\log p(y_3 = \textit{coherent} \mid s_3, s_4, s_5)$

$\log p(y_4 = \textit{coherent} \mid s_4, s_5, s_3)$



Task

$$\log p(y_1 = \textit{coherent} \mid s_1, s_2, s_3)$$

$$+ \quad \log p(y_2 = \textit{coherent} \mid s_2, s_3, s_4)$$

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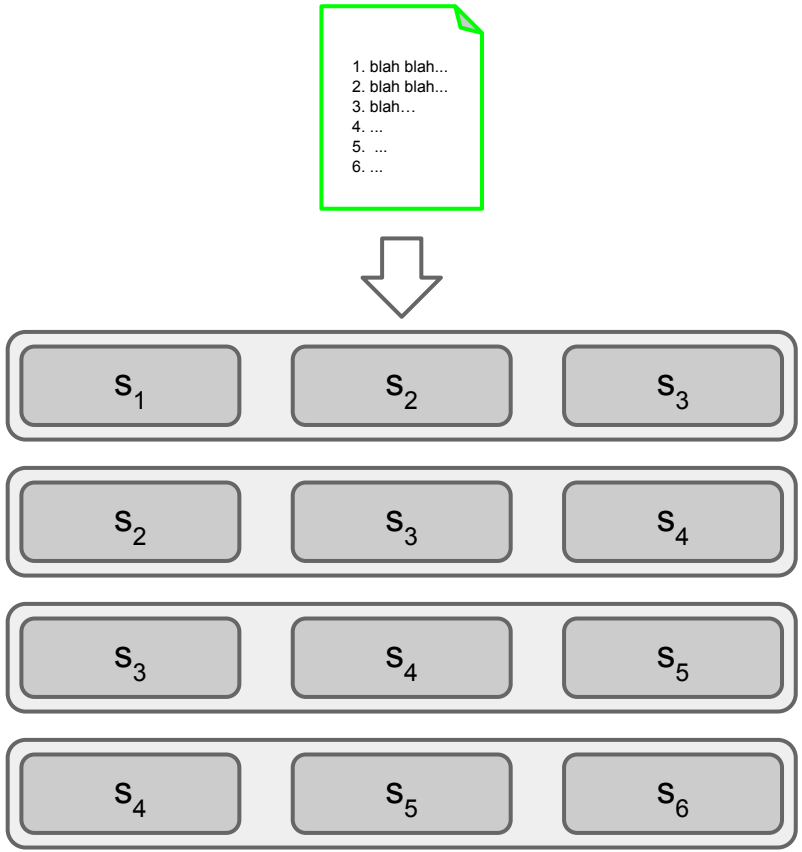
$$+ \quad \log p(y_4 = \textit{coherent} \mid s_4, s_5, s_3)$$

$$= \quad \log p(\ \square\ = \textit{coherent})$$



Task

$$\log p(y_1 = \textit{coherent} \mid s_1, s_2, s_3)$$

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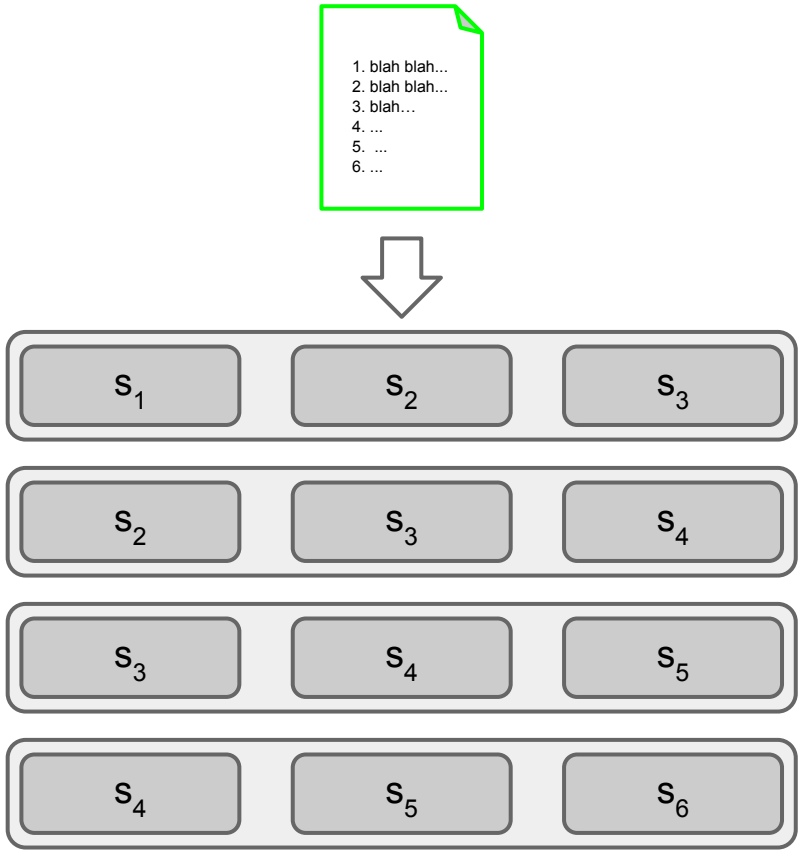
$$= \quad \log p(\ \square\ = \textit{coherent}) \triangleq \text{rank}(\ \square\ )$$



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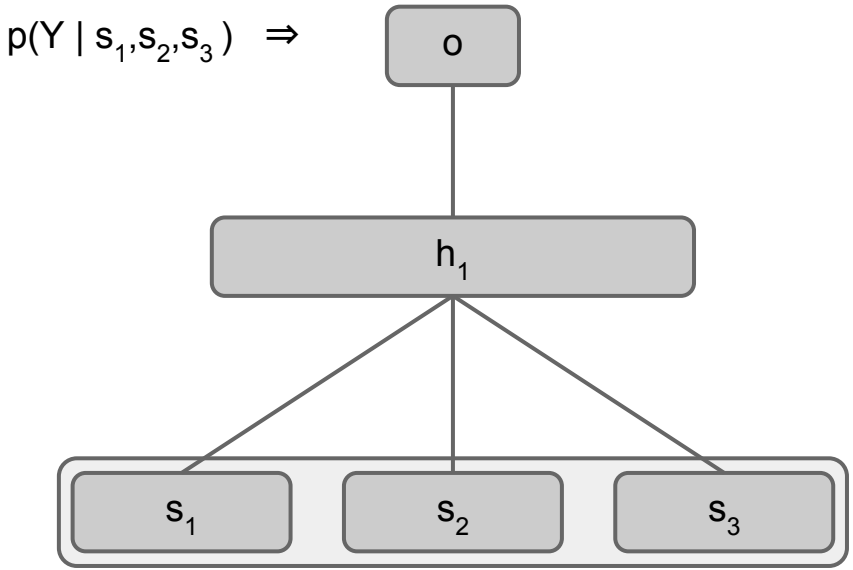
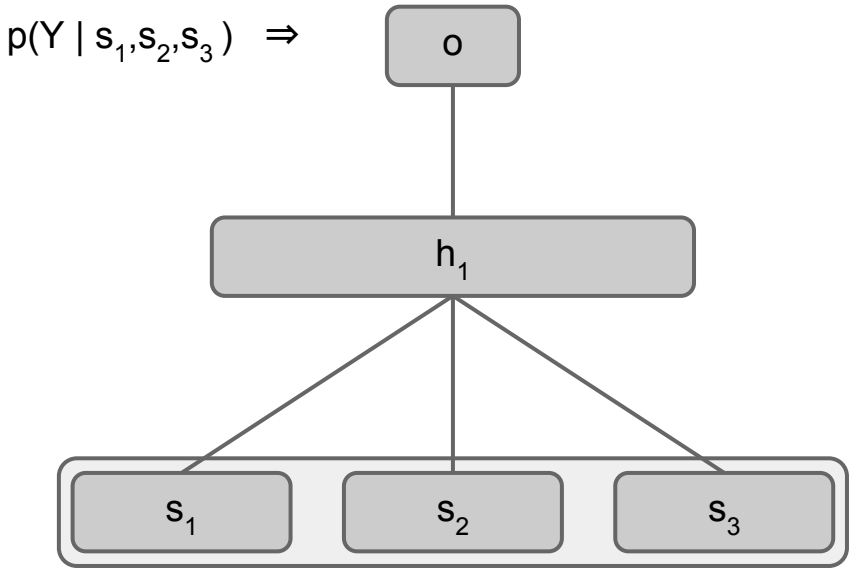
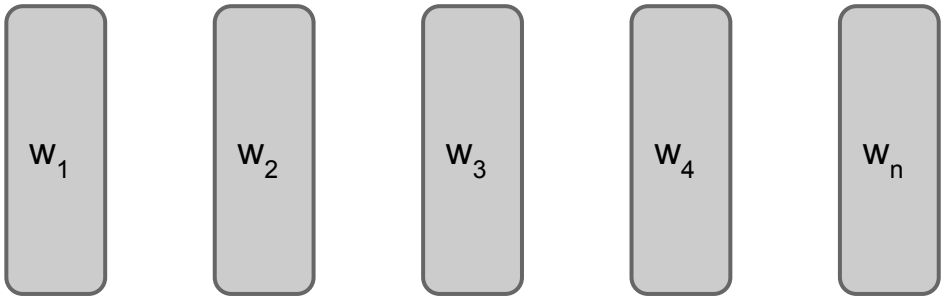


Task

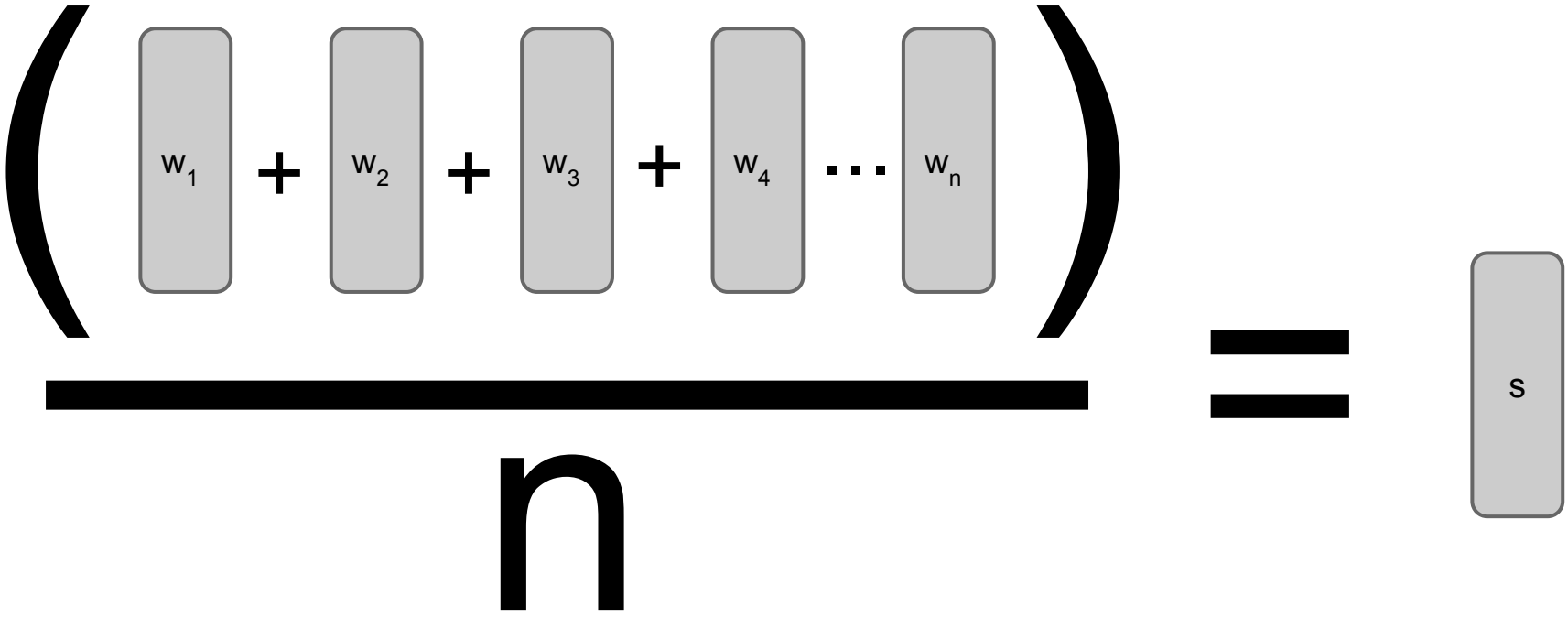
- 3 models implemented with this framework
- models vary differ at the sentence layer



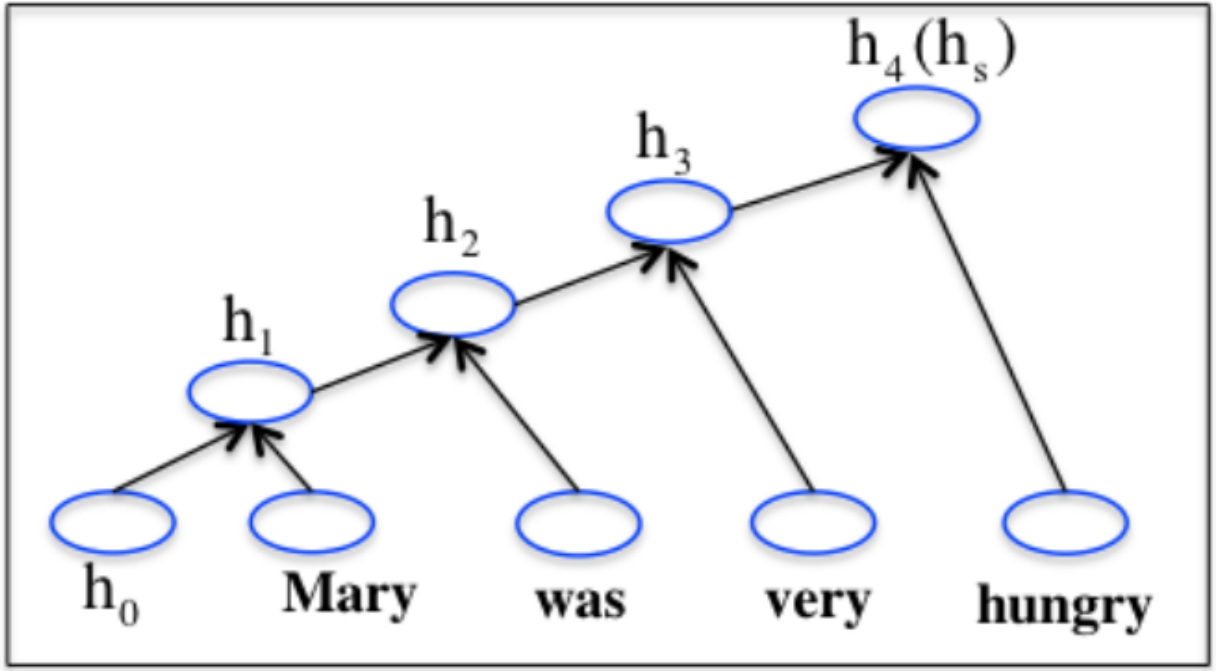
Model 1: CBOW Model



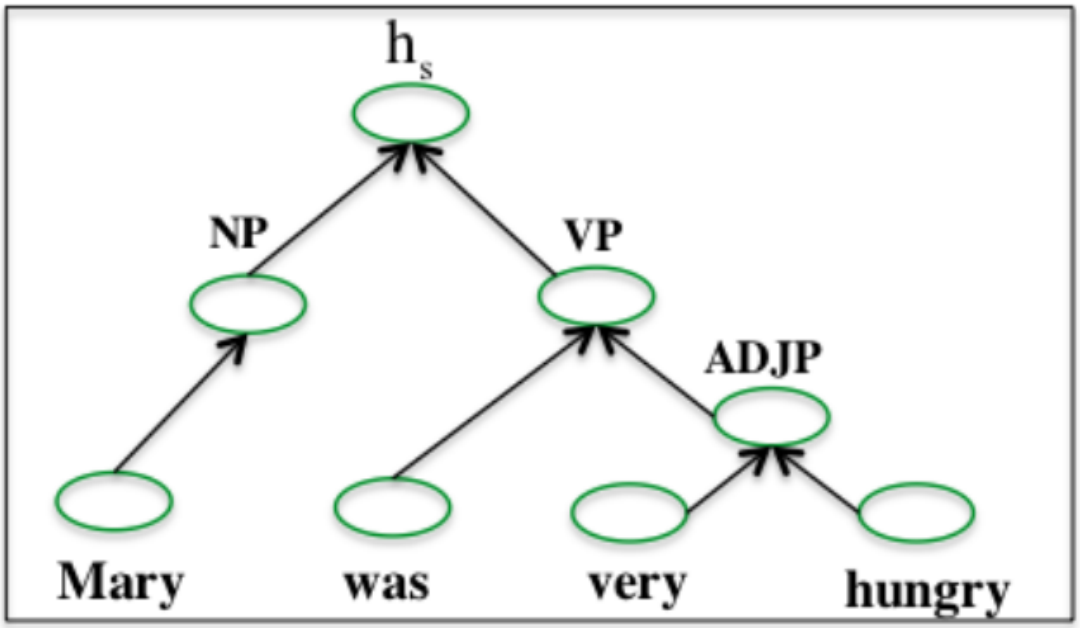
Model 1: CBOW Model



Model 2: Recurrent Model



Model 3: Recursive Model



Results

Results

See our final paper :)

Why is this useful?

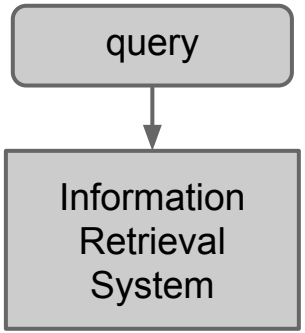
Discourse might be helpful for non-factoid Question Answering.

> ``Empirically we show that modeling answer discourse structures is complementary to modeling lexical semantic similarity and that the best performance is obtained when they are tightly integrated.''

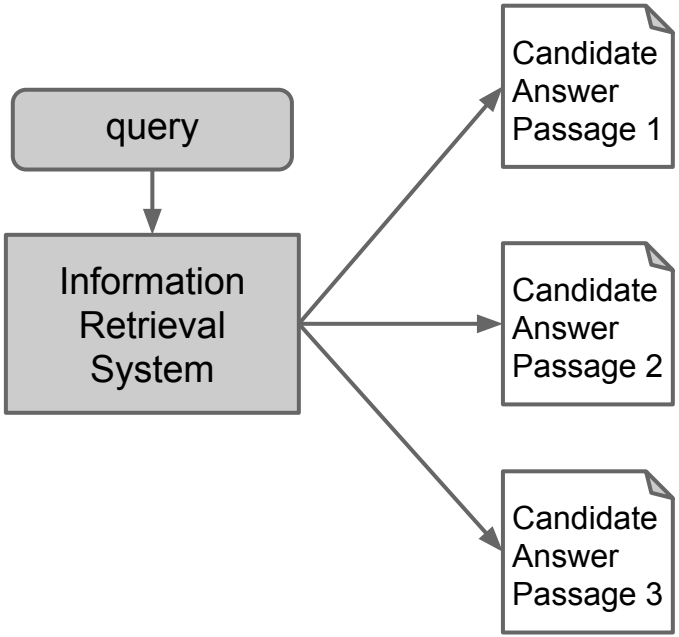
Jansen, Peter, Mihai Surdeanu, and Peter Clark.

"Discourse Complements Lexical Semantics for Non-factoid Answer Reranking."

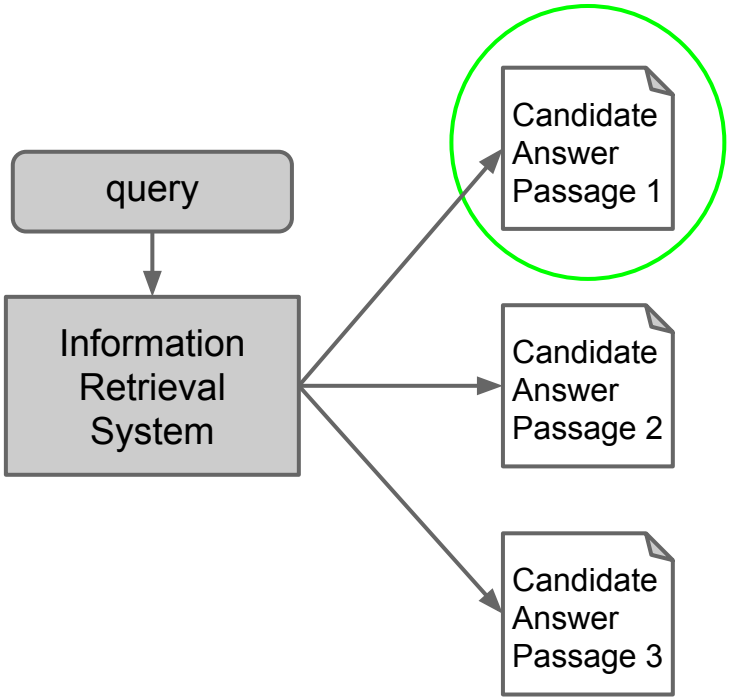
Application to QA



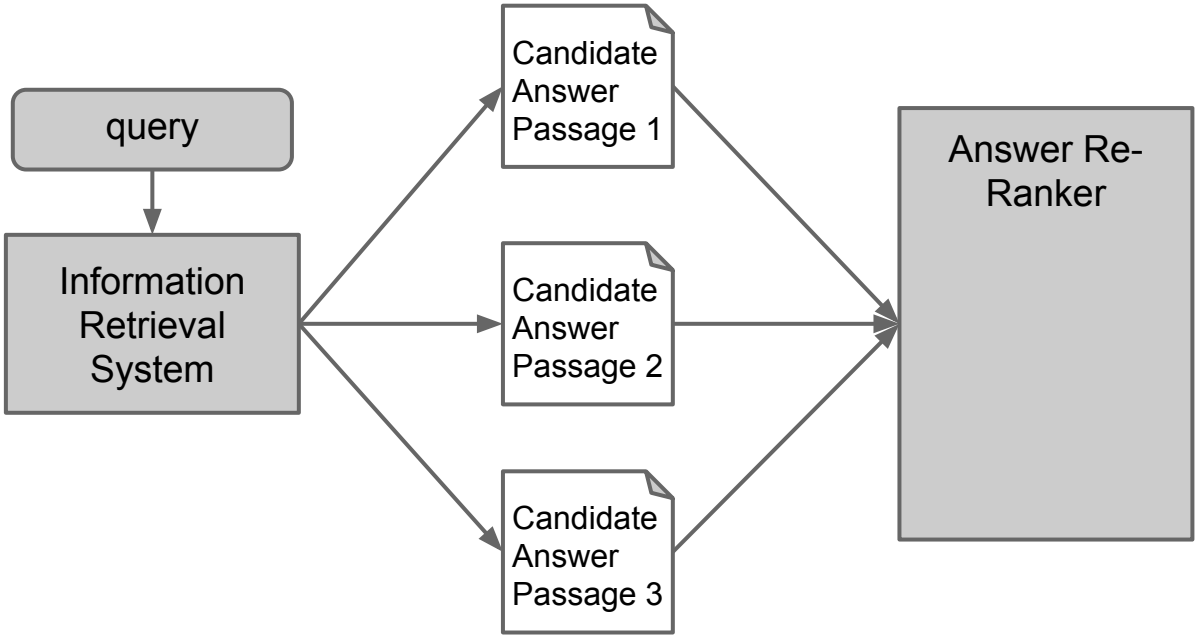
Application to QA



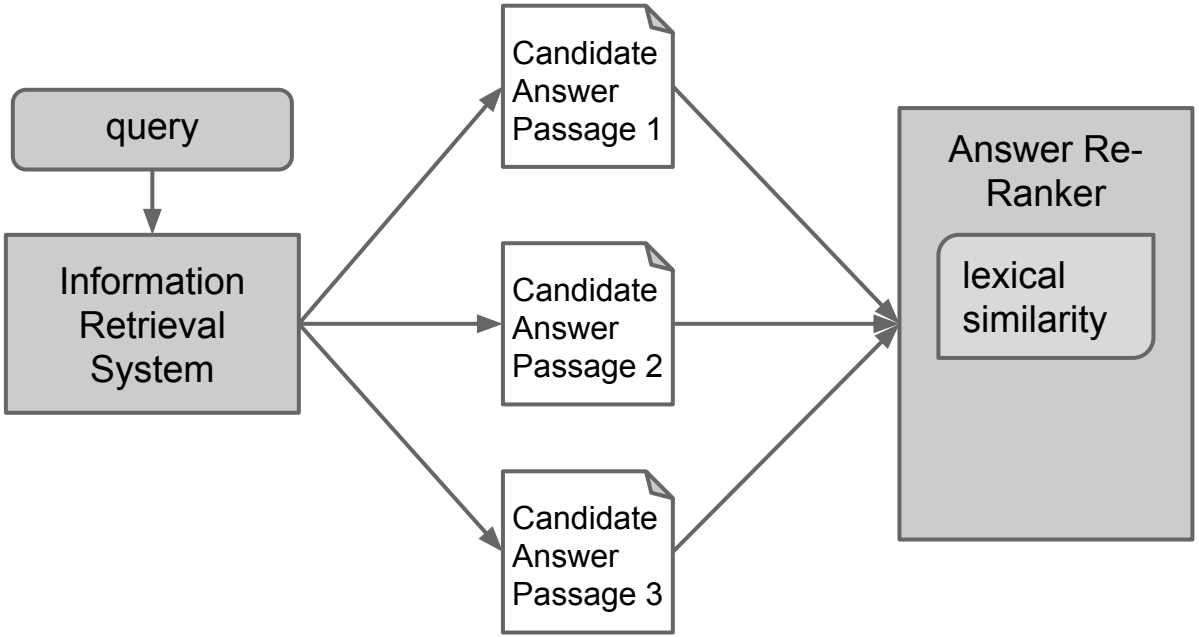
Application to QA



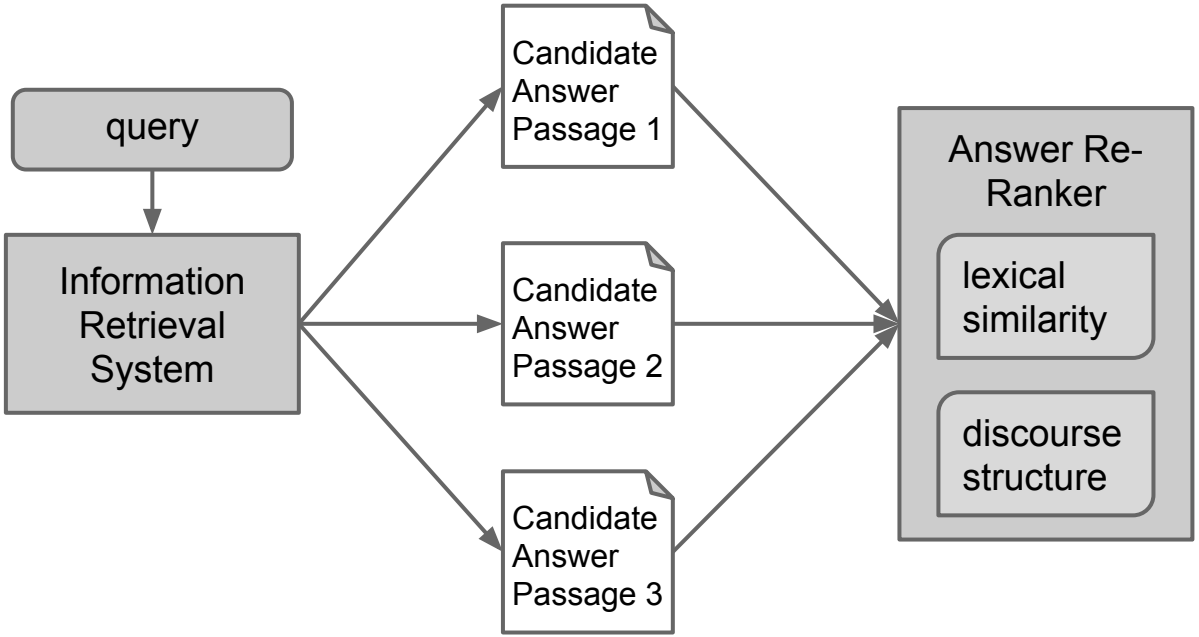
Application to QA



Application to QA



Application to QA



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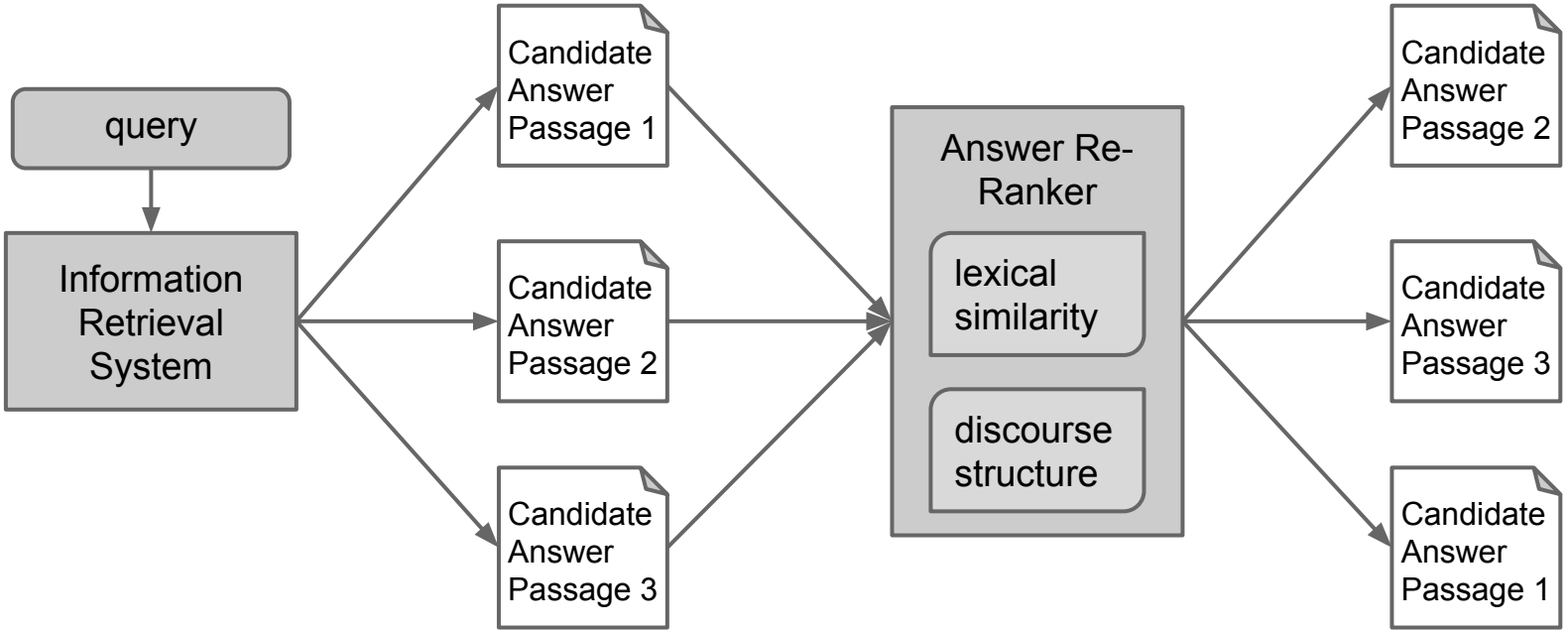

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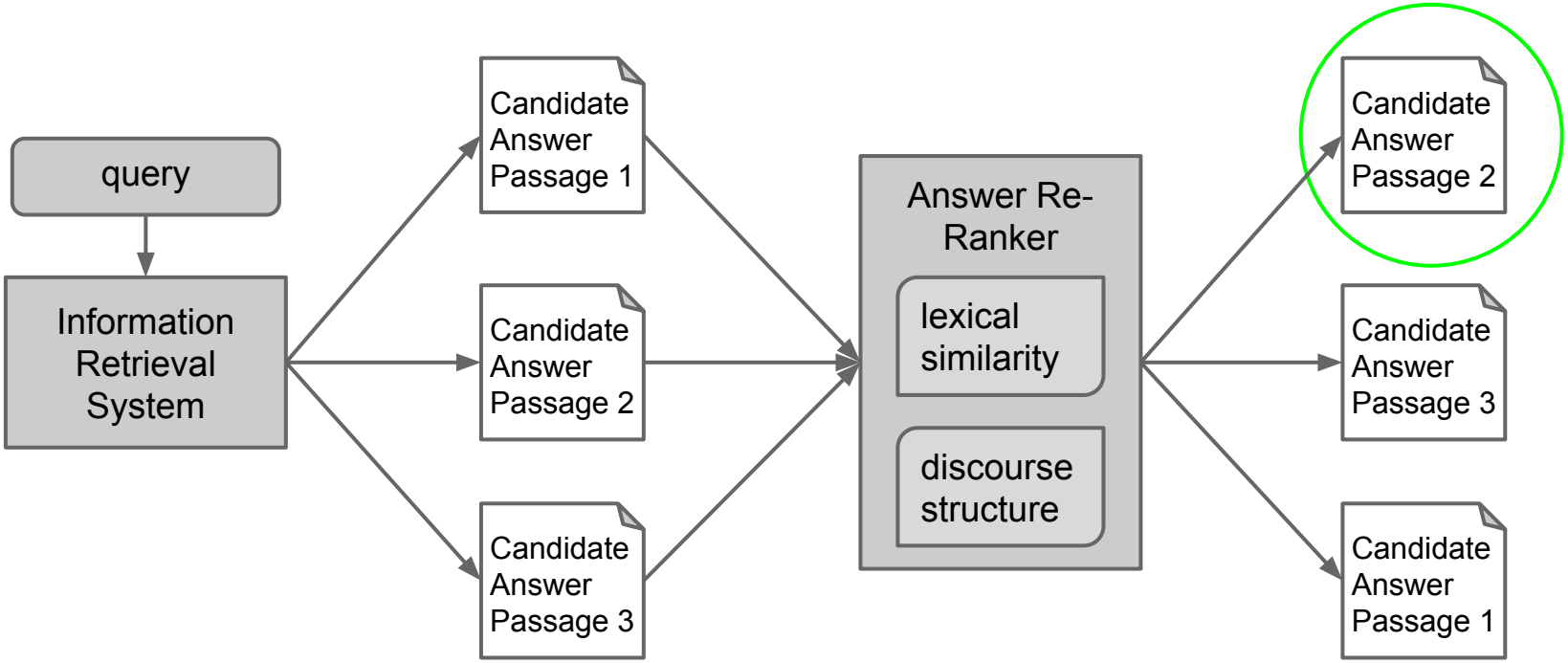

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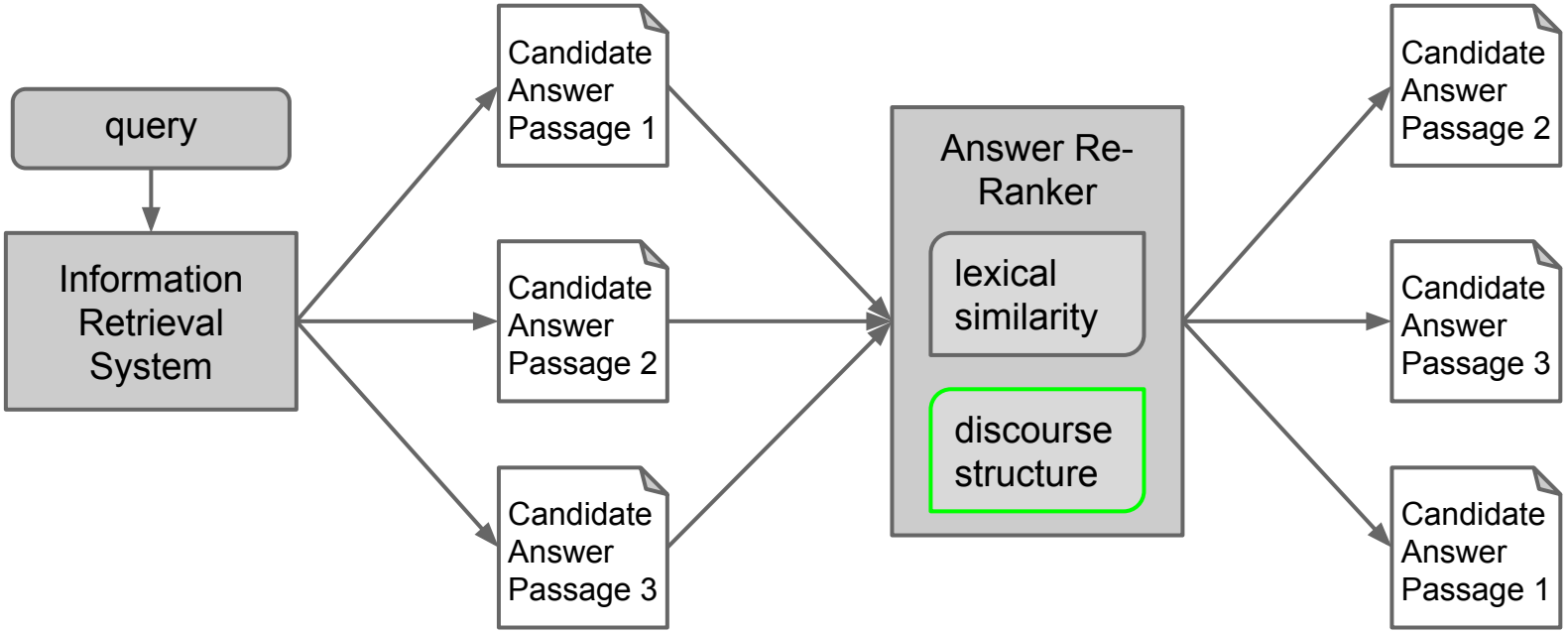
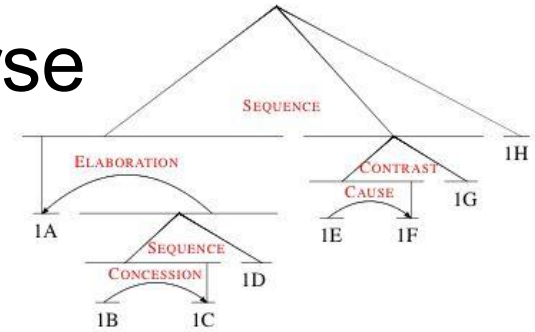


Discourse Structure

Features

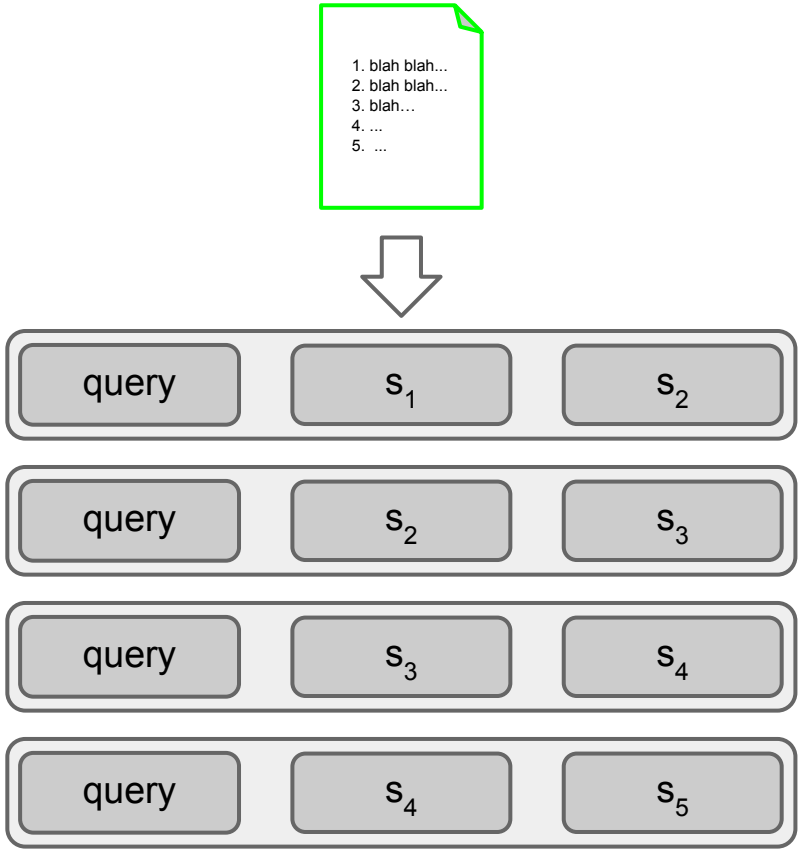
- Explicit discourse markers
  - “because”, “however”, …

- RST Parse



[Yesterday, the delegates chose their new representative.]^{1A} [Even though Smith received only 24 votes,]^{1B} [he accepted the election with a short speech.]^{1C} [Then the assembly applauded for three minutes.]^{1D} [Due to the upcoming caucus meeting,]^{1E} [the subsequent discussion was very short.]^{1F} [Nonetheless the most pressing questions could be resolved.]^{1G} [The meeting was closed at 7pm.]^{1H}

Discourse Structure (NNET features)



Results

See our final paper :)

The End

Thanks!