论文写作的易读性原则

案例分析：基于Seq2Seq的对话数据增广

报告人：刘一佳

合作者：侯宇泰、车万翔、刘挺

http://yjliu.net/cv/res/2018-08-19-nlpcc-sws.compressed.pdf

学术报告中的一些设计技巧

报告人：刘一佳
导师：秦兵、车万翔

错误地利用
报告与论文结构的相似性

思考题

- 为什么做学术报告
  - 为了更好地交流

- 做怎样的学术报告
  - ☐ “向听众展示我对问题的深入理解”
  - ☐ “让听众明白我的论文中的技术”
  - ☐ “引起听众的兴趣”

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听众模型

理想中的听众

- 领域专家
- 已经读过你的论文
- 对于你的工作非常感兴趣

现实中的听众

- 来自其他领域
- 刚刚了解到你的工作
- 这个时段没什么可听的，恰巧发现这屋子网络比较好

类比审稿人模型

审稿

你以为审稿人应该是这样审稿的：

审稿人一定是专家，无所不知。打印出来，仔细研读揣摩数天，对于看不懂的地方反复推敲。即使你的英文写得极其糟糕、即使你的文章组织很混乱、即使你的表述很难看懂，审稿人花费了大量的时间后终于看懂了，他认为你的工作是有意义的，决定给你个border line或以上的分数。

审稿人实际上往往是这样审稿的：

他不一定是专家，一直忙于其他事，在deadline到来之前一天要完成n篇。审稿时他往往先看题目、摘要，扫一下introduction（知道你做什么），然后直接翻到最后找核心实验结果（做得好不好），然后基本确定录还是不录（也许只用5分钟！）。如果决定录，剩下就是写些赞美的话，指出些次要的小毛病。如果决定拒，下面的过程就是细看中间部分找理由拒了。

第一印象定录拒，5分钟内打动审稿人

12

刘洋. 2014. 机器翻译学术论文写作方法与技巧

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"You have **two minutes** to engage your audience before they start to doze." -- Simon Peyton Jones in *How to give a great research talk*

简介部分：展示最好的部分

(Zhang and Nivre 2011, Martins et al. 2013)

Our Work

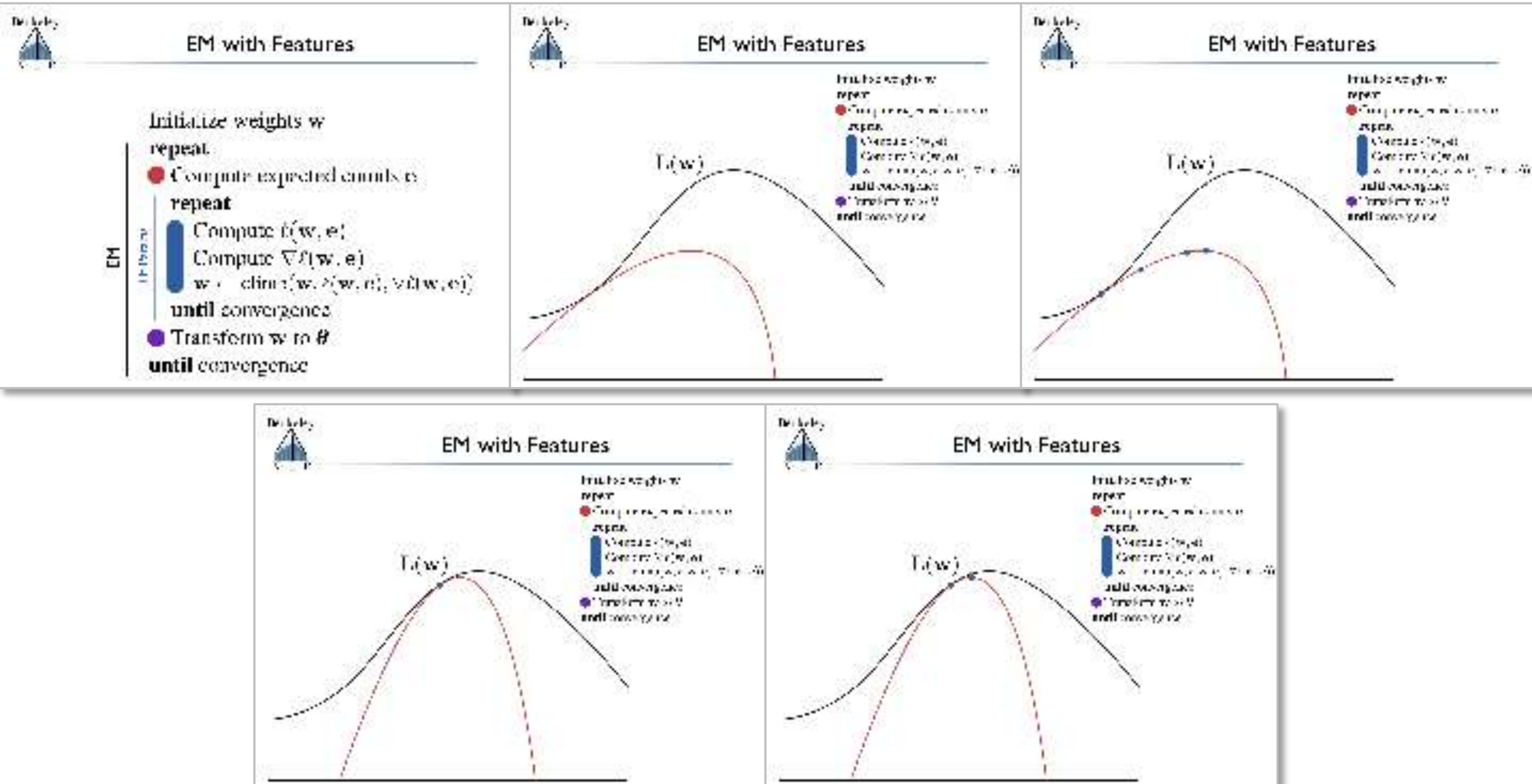
- A neural network based dependency parser!

Parsing on English Penn Treebank (§23):

		Unlabeled attachment score (UAS)	sent / s
Transition -based	MaltParser (greedy)	89.9	560
	Our Parser (greedy)	92.0 (+2.1)	1013 (×1.8)
	Zpar: beam = 64	92.9*	29*
Graph -based	MSTParser	92.0	12
	TurboParser	93.1*	31*

Danqi Chen and Christopher Manning. 2014. A Fast and Accurate Dependency Parser using Neural Networks，第三页

模型部分：多用例子



Taylor Berg-Kirkpatrick, Alexandre Bouchard-Côté, John DeNero, and Dan Klein. 2010. Painless Unsupervised Learning with Features，第28到54页

模型部分：反例

Transition	Current State	Resulting State	Description
DROP	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ \beta,\ A]$	pops out the word that doesn't convey any semantics (e.g., function words and punctuations).
MERGE	$[\sigma \mid s_0,\ \delta,\ b_0 \mid b_1 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ b_0\_b_1 \mid \beta,\ A]$	concatenates a sequence of words into a span, which can be derived as a named entity (`name`) or `date-entity`.
CONFIRM(c)	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ c \mid \beta,\ A]$	derives the first element of the buffer (a word or span) into a concept c.
ENTITY(c)	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ c \mid \beta,\ A \cup \text{relations}(c)]$	a special form of CONFIRM that derives the first element into an entity and builds the internal entity AMR fragment.
NEW(c)	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ c \mid b_0 \mid \beta,\ A]$	generates a new concept c and pushes it to the front of the buffer.
LEFT(r)	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A \cup \{s_0 \xleftarrow{r} b_0\}]$	links a relation r between the top concepts on the stack and the buffer.
RIGHT(r)	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A \cup \{s_0 \xrightarrow{r} b_0\}]$	
CACHE	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma,\ s_0 \mid \delta,\ b_0 \mid \beta,\ A]$	passes the top concept of the stack onto the deque.
SHIFT	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma \mid s_0 \mid \delta \mid b_0,\ [\,],\ \beta,\ A]$	shifts the first concept of the buffer onto the stack along with those on the deque.
REDUCE	$[\sigma \mid s_0,\ \delta,\ b_0 \mid \beta,\ A]$	$[\sigma,\ \delta,\ b_0 \mid \beta,\ A]$	pops the top concept of the stack.

实验部分：图比表格好

LDC2014T12 Experiments

- alignment F-score

Aligner	Alignment F1 (on hand-align)	Oracle's Smatch (on dev. dataset)
JAMR	90.6	91.7
Our	95.2	94.7

- parser improvements

model	newswire	all
JAMR parser: Word, POS, NER, DEP		
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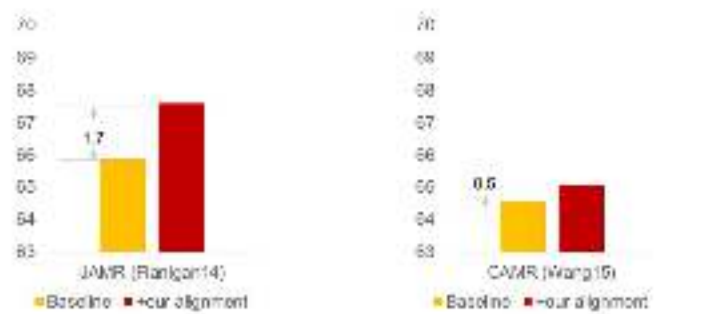
Aligner Experiments: Two Open-sourced AMR Parsers



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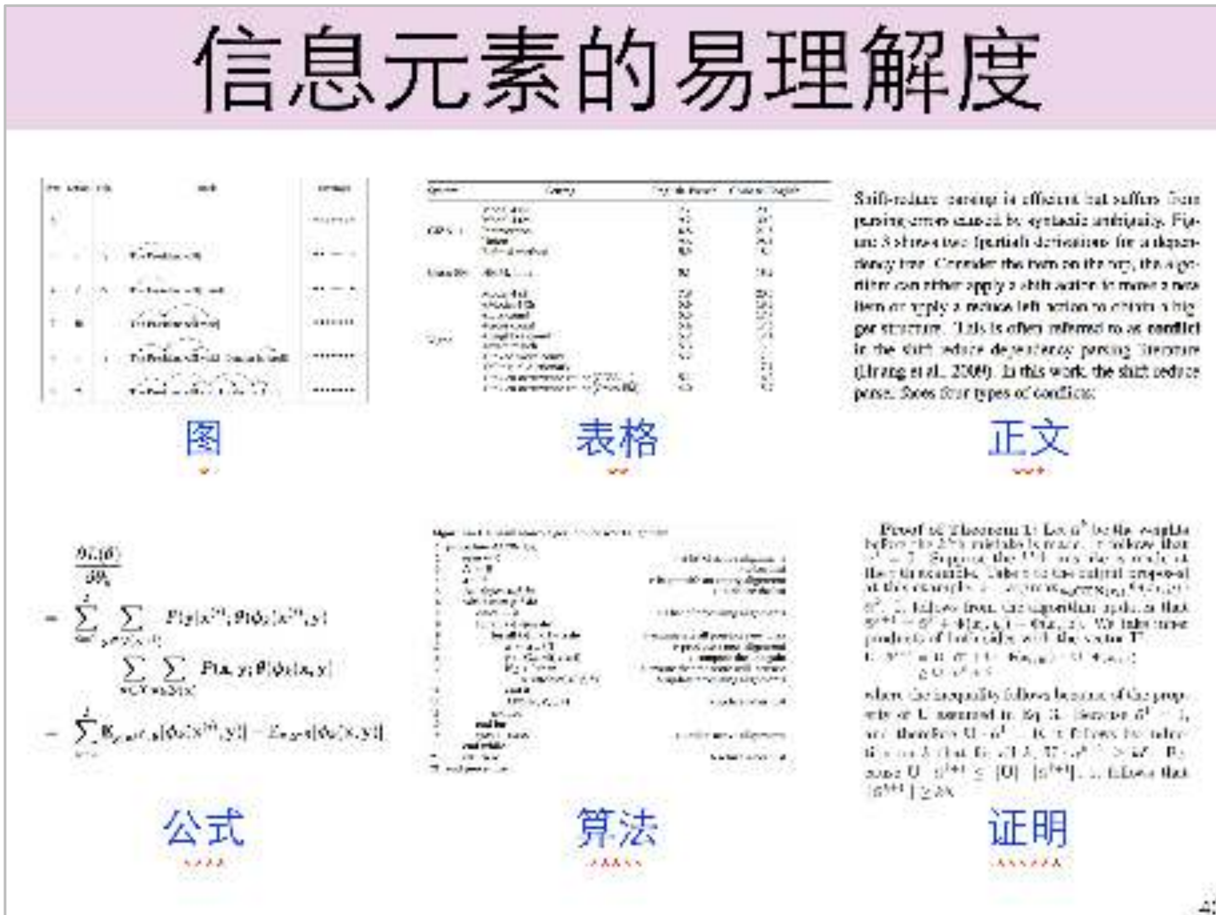

刘洋. 2014. 机器翻译学术论文写作方法与技巧

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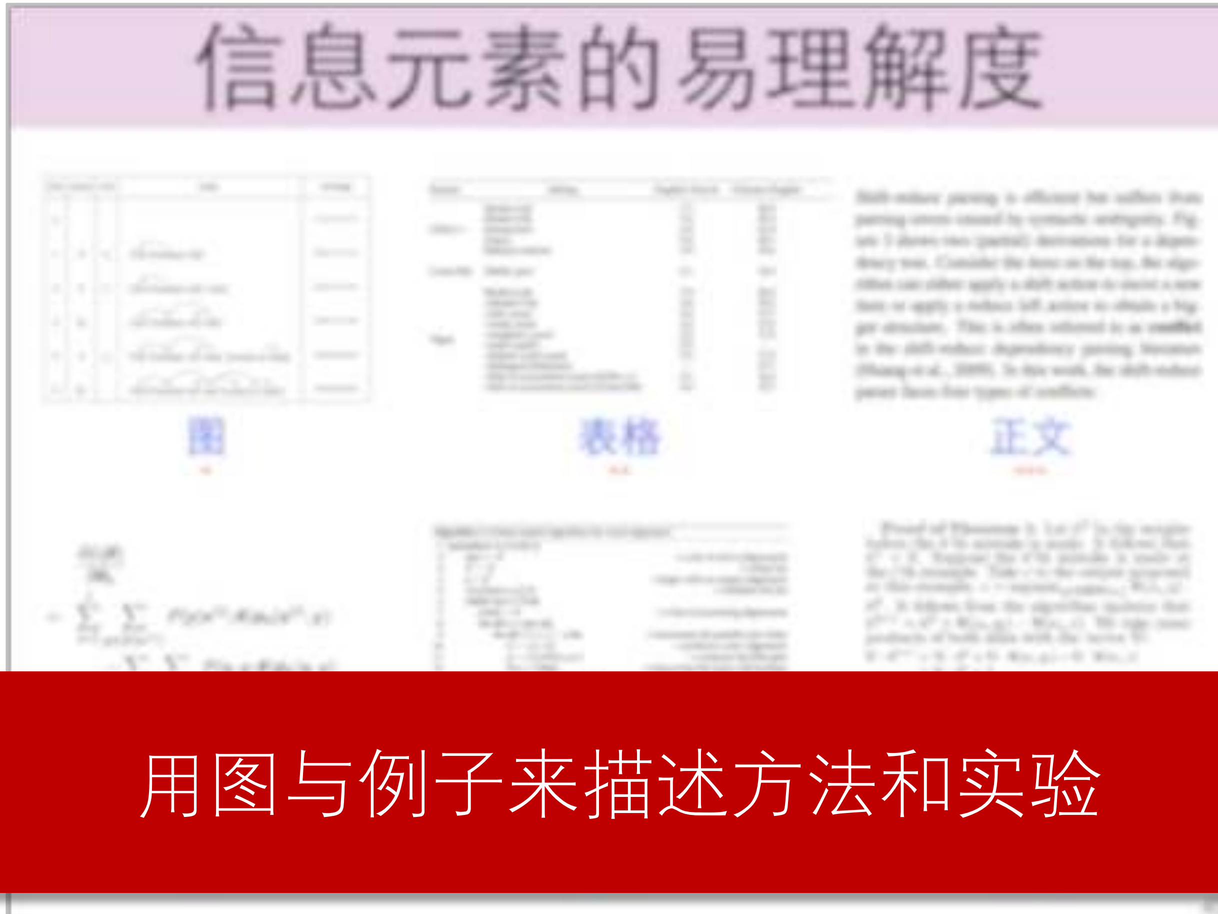
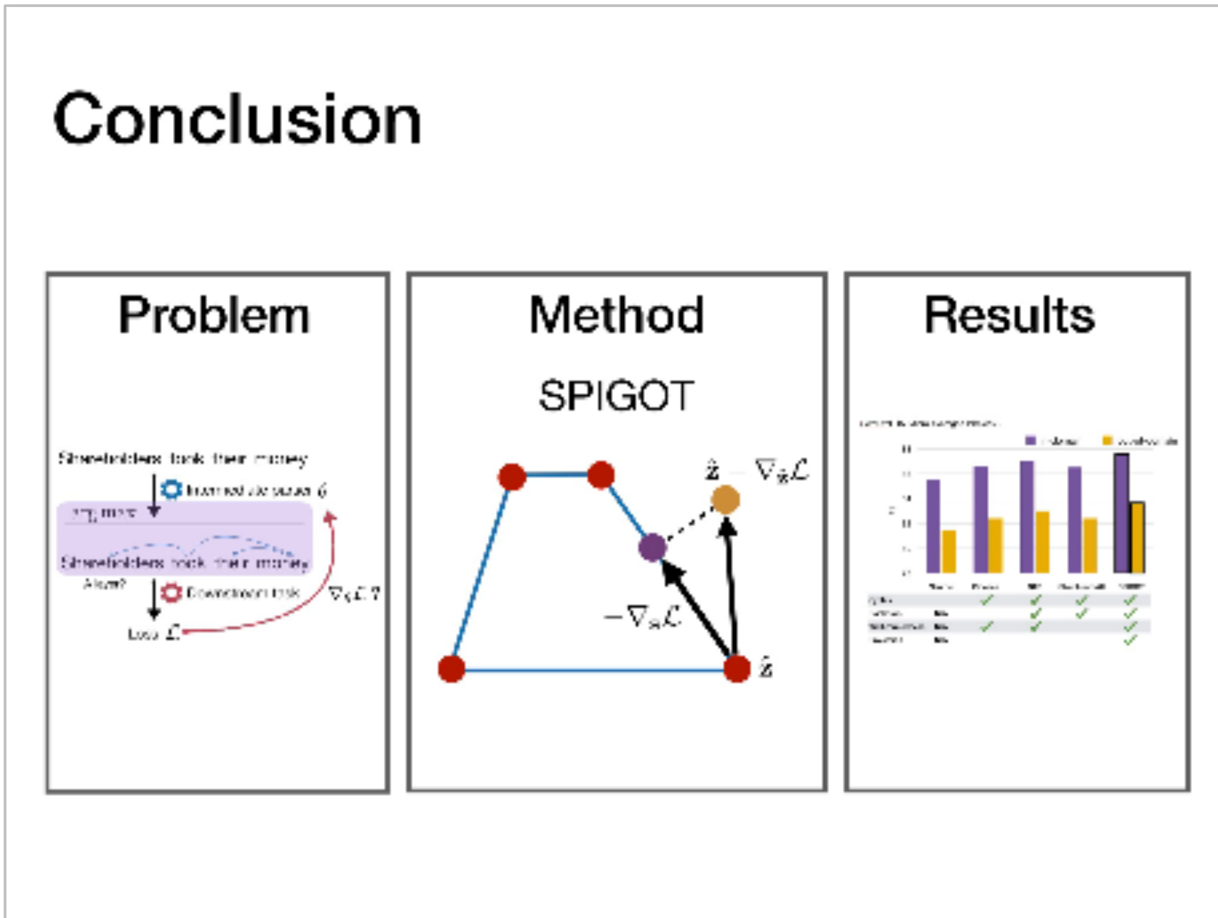


用图与例子来描述方法和实验

结论部分：新的展现形式

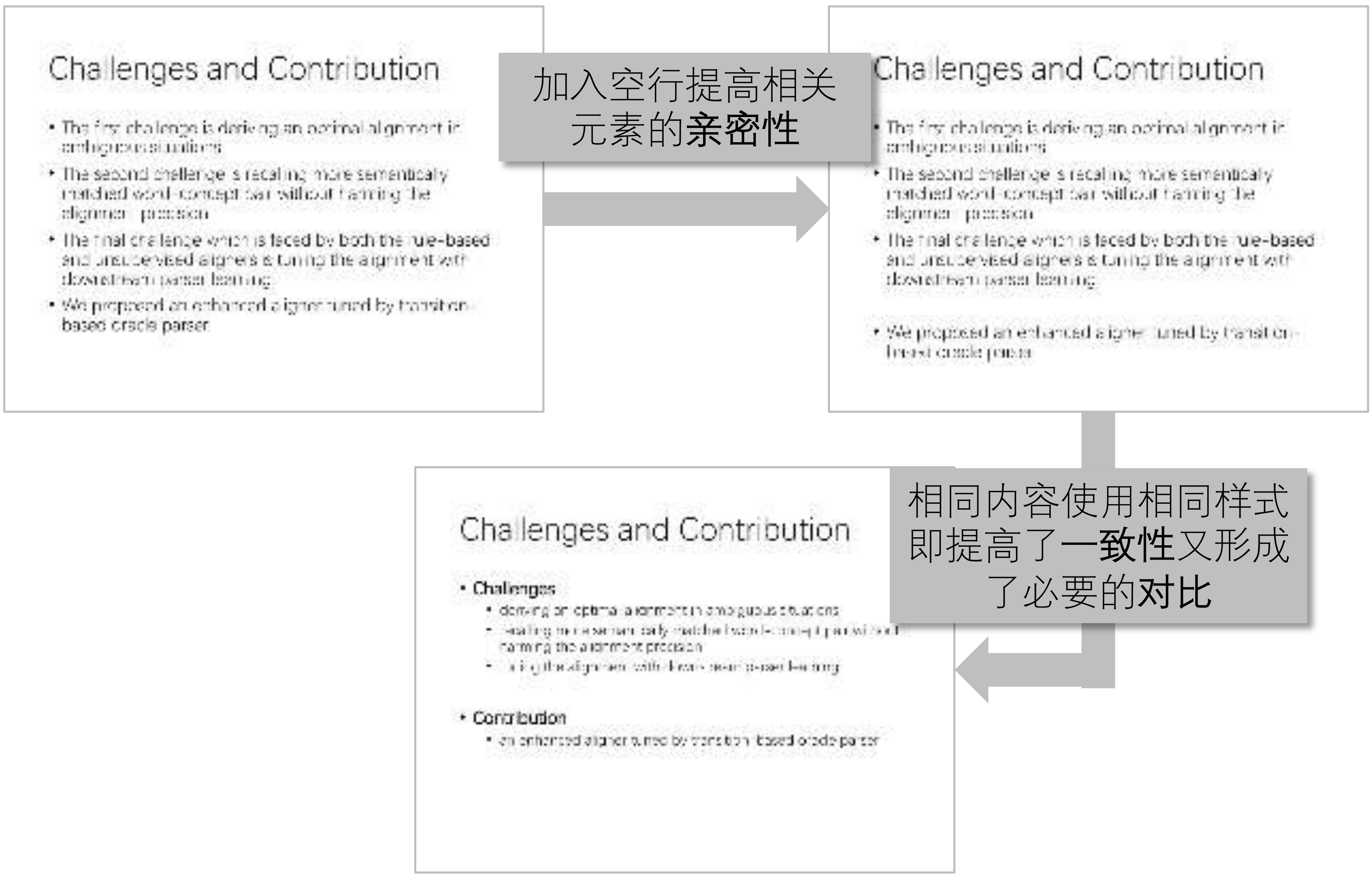


Hao Peng, Sam Thomson, and Noah A. Smith. 2018. Backpropagating through Structured Argmax using a SPIGOT，最后一页

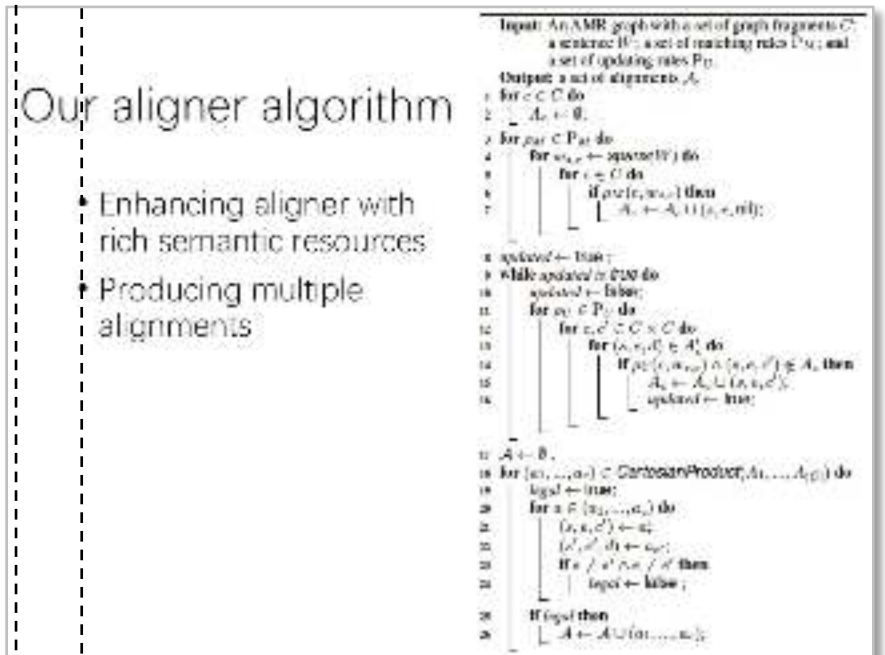
设计原则

- 亲密性：相关的元素应该组织到一起
- 重复：相同的内容达到形式的统一
- 对比：如果两项不完全相同，就应使之截然不同
- 对齐：使元素之间产生关联，有关联的都应对齐

根据设计原则做幻灯片


Challenges and Contribution
加入空行提高相关元素的**亲密性**
Challenges and Contribution
相同内容使用相同样式即提高了**一致性**又形成了必要的**对比**
Challenges and Contribution
Challenges
Contribution

避免不对齐


Our aligner algorithm
Enhancing aligner with rich semantic resources
Producing multiple alignments

“乱” 的原因：视线跳动过多

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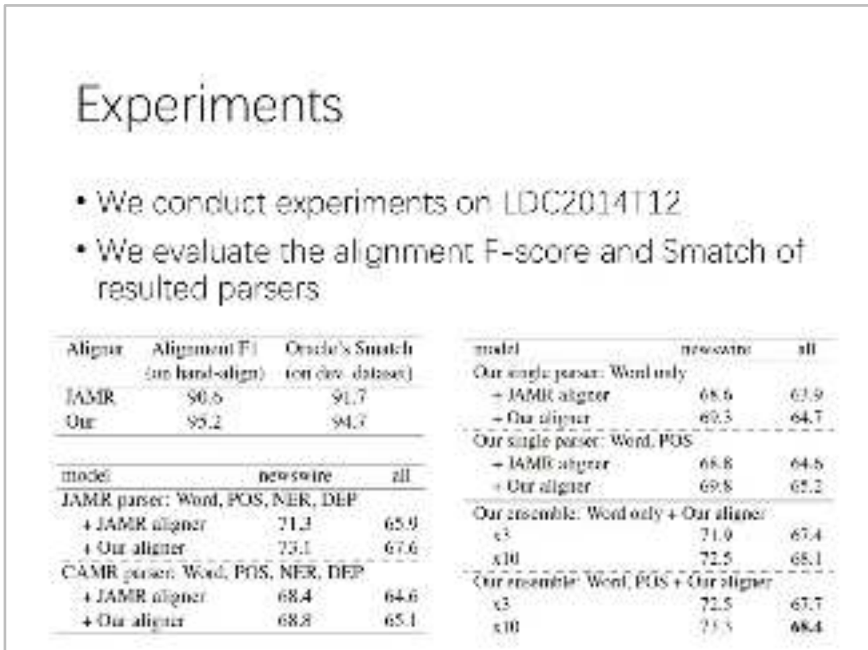
“乱” 的解法：重新组织内容



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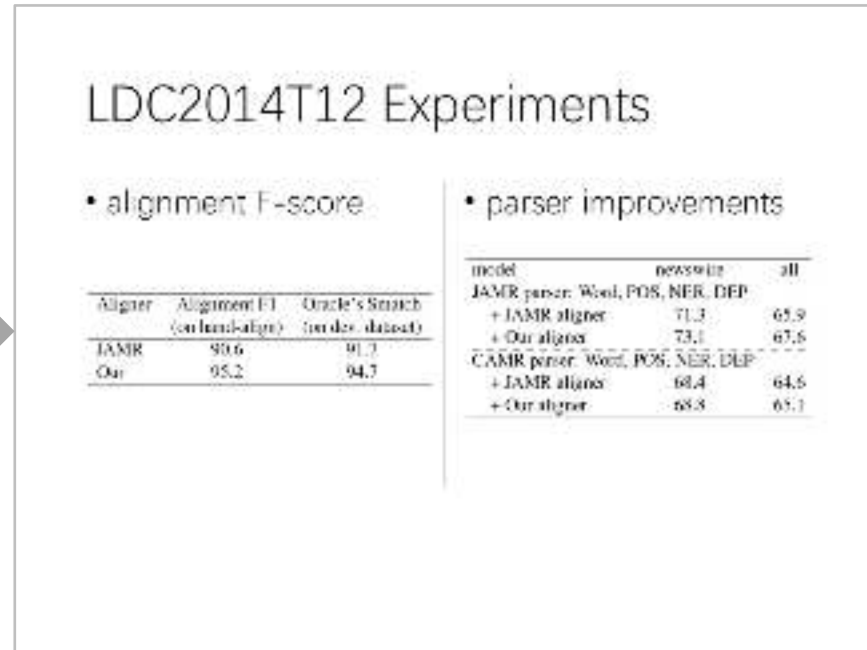

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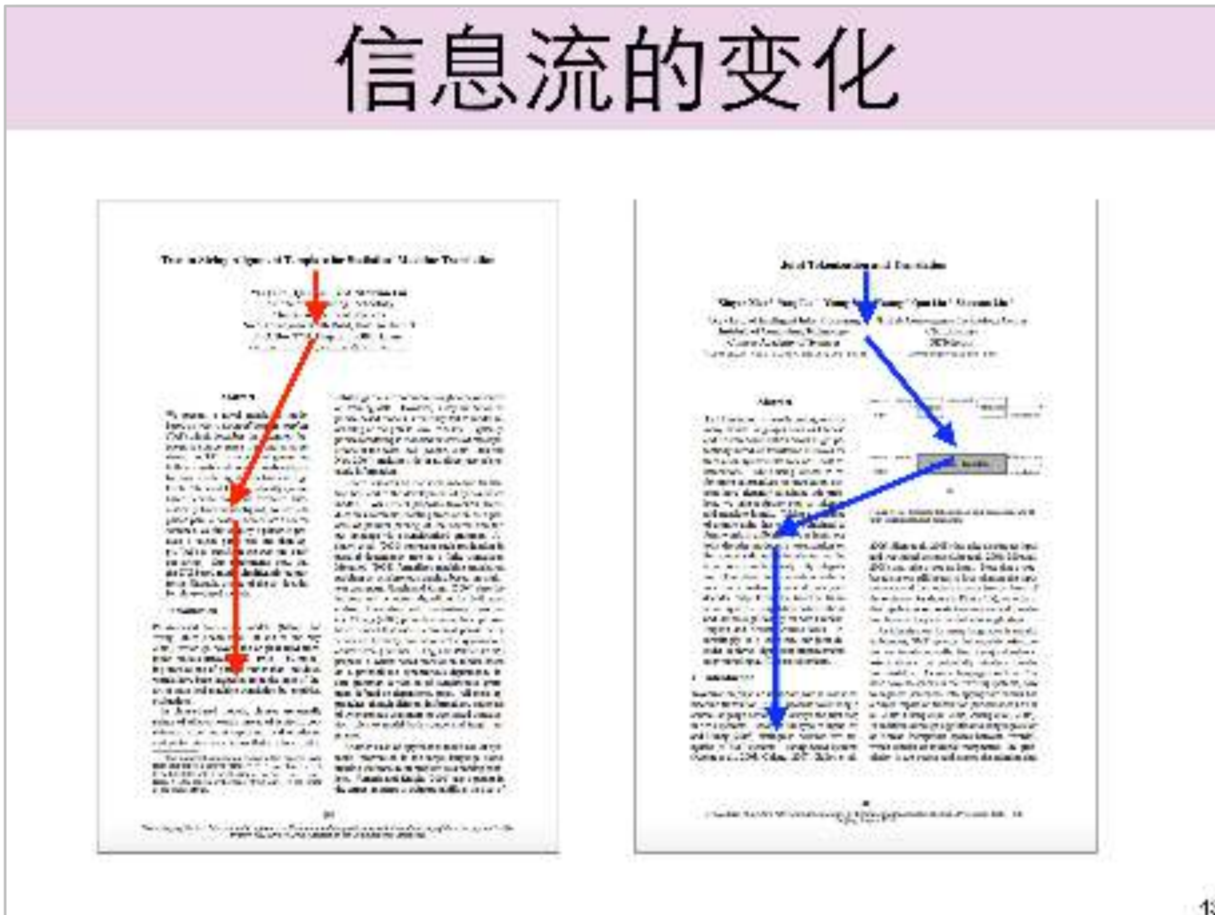
视线跳动在论文写作中的作用



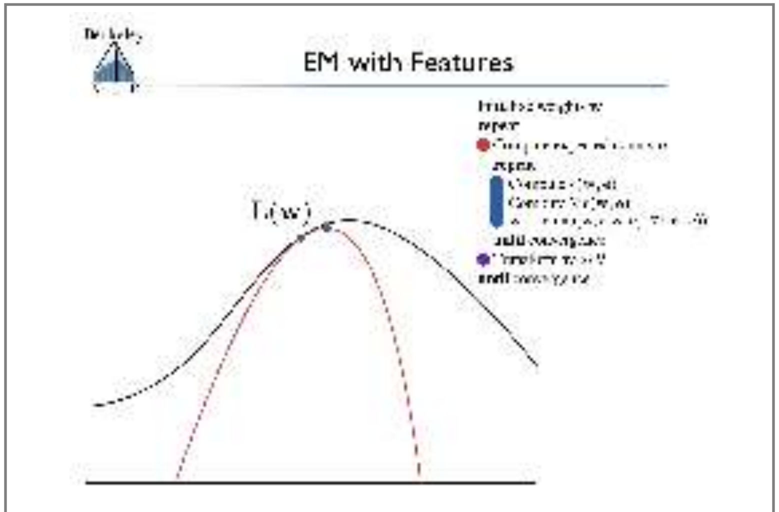
刘洋. 2014. 机器翻译学术论文写作方法与技巧

参考文献

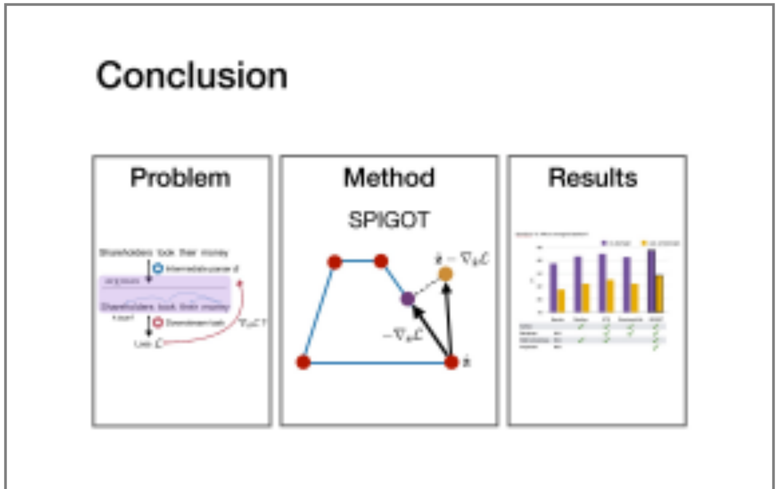
- Simon Peyton Jones: How to give a great talk
- 写给大家看的设计书
- 机器翻译学术论文写作方法与技巧
- 知乎专栏：跟我学个P

总结

为了抓住听众，把最好的部分前置



模型部分有取舍，用好图和例子



“结论” 也有新思路

亲密性

重复

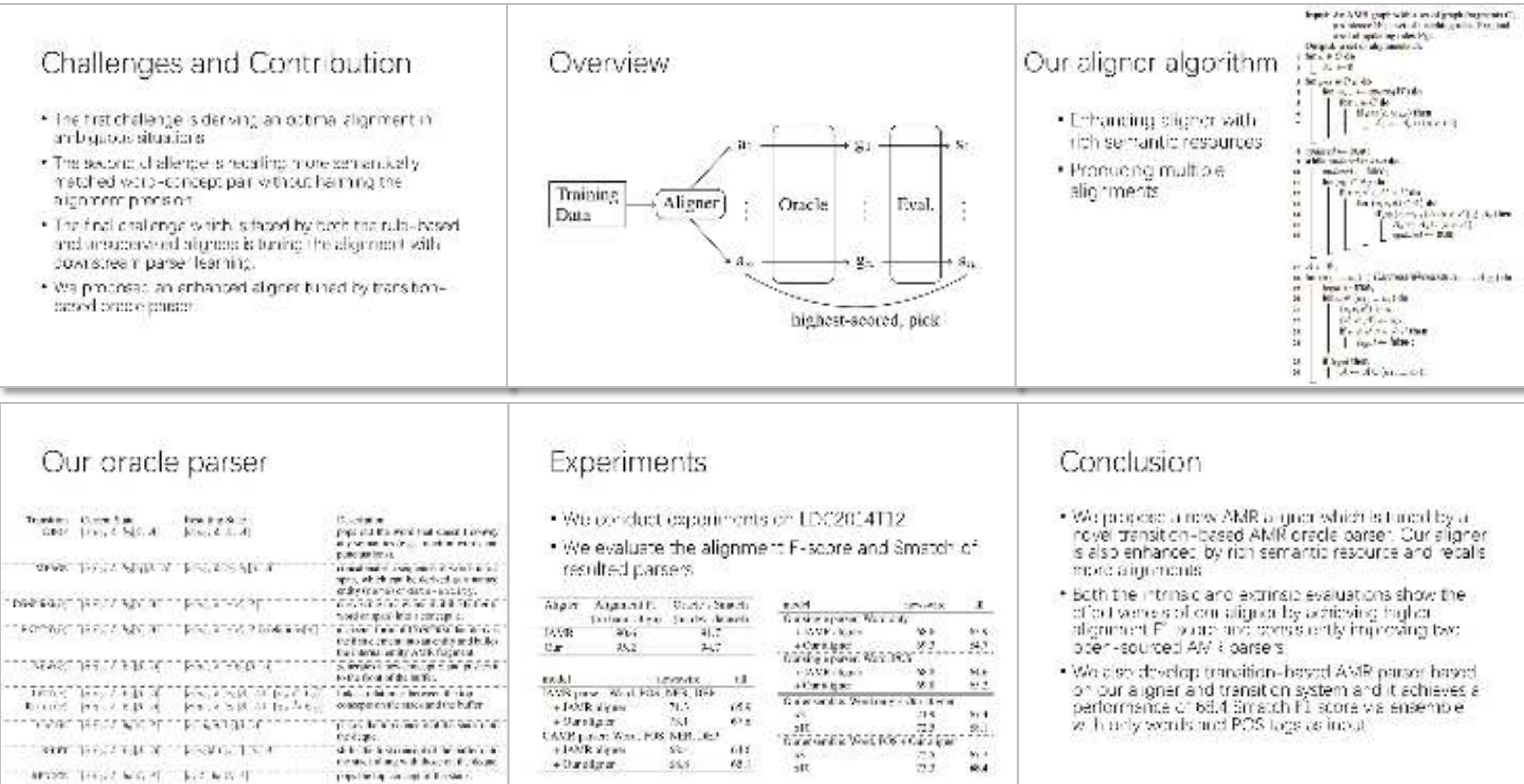
对比

对齐

四项设计的基本原则

祝大家产出优秀的学术工作

最简单做法：复制粘贴


Challenges and Contribution
Overview
Training Data
Aligner
Oracle
Eval.
highest-scored, pick
Our aligner algorithm
Enhancing aligner with rich semantic resources
Producing multiple alignments
Our oracle parser
Experiments
We conduct experiments on LDC2014T12
We evaluate the alignment F-score and Smatch of resulted parsers
Conclusion

Challenges and Contribution

- The first challenge is deriving an optimal alignment in ambiguous situations
- The second challenge is recalling more semantically matched word-concept pair without harming the alignment precision
- The final challenge which is faced by both the rule-based and unsupervised aligners is tuning the alignment with downstream parser learning.
- We proposed an enhanced aligner tuned by transition-based oracle parser

Overview

Our aligner algorithm

- Enhancing aligner with rich semantic resources
- Producing multiple alignments

Our oracle parser

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设计原则(1): 亲密性

相关的元素应该组织到一起

- 目的：实现组织性
- 亲密性检查：眯起眼
  - 视线跳动的次数不宜超过3次
  - 过多的跳动需要重新设计
- 实现方式：加空行

Challenges and Contribution

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[illegible]		
x5	[illegible]	[illegible]
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“过多跳动” 的反例

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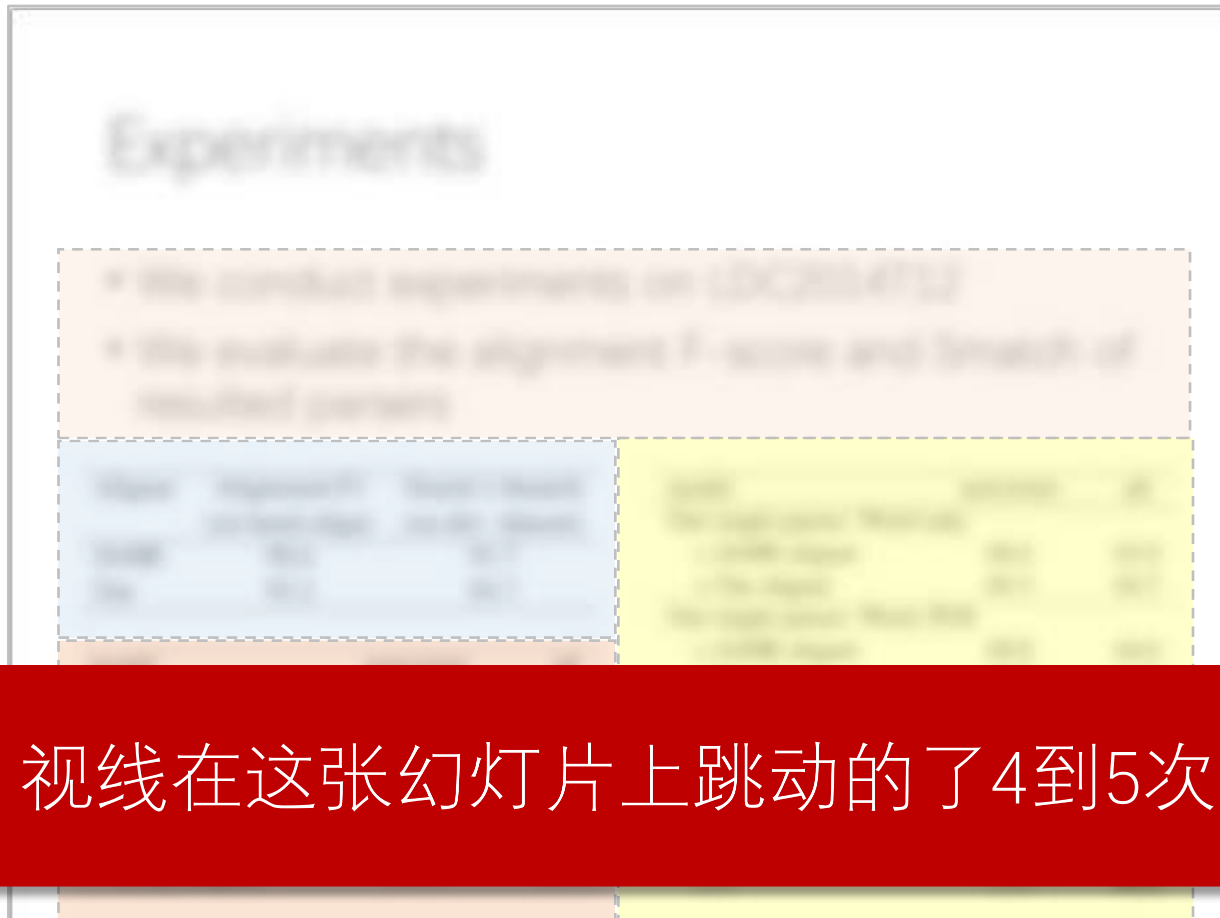
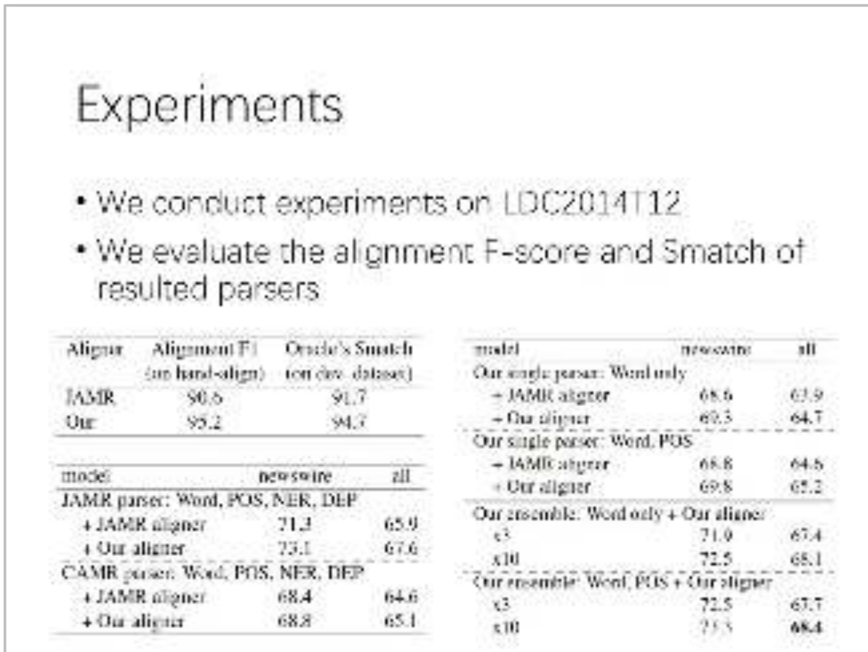


视线在这张幻灯片上跳动的了4到5次

修改方法：重新组织内容



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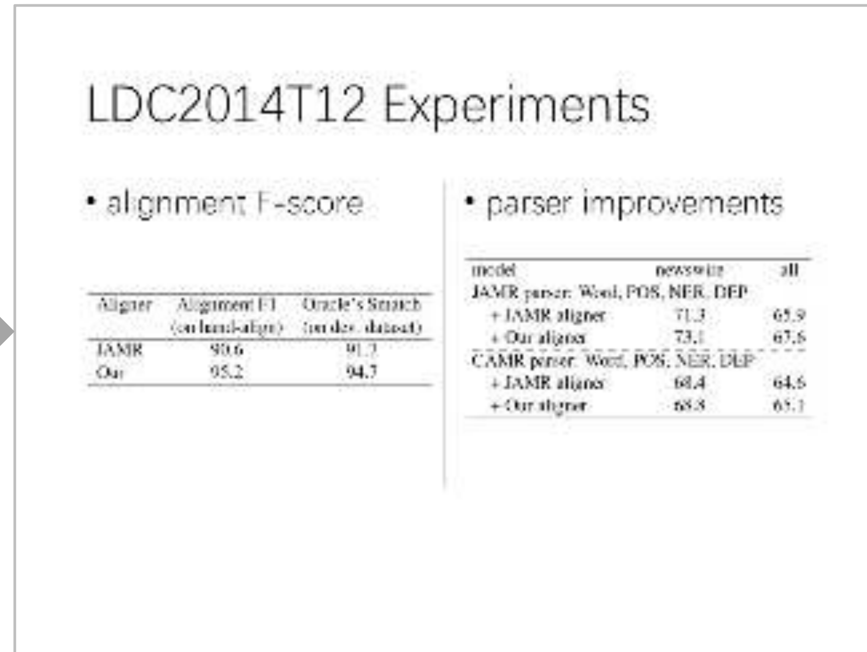

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+ JAMR aligner	71.3	65.9
+ Our aligner	73.1	67.6
CAMR parser: Word, POS, NER, DEP		
+ JAMR aligner	68.4	64.6
+ Our aligner	68.8	65.1

设计原则

- 亲密性：相关的元素应该组织到一起

Challenges and Contribution

- The first challenge is deriving an optimal alignment in ambiguous situations
- The second challenge is recalling more semantically matched word-concept pair without harming the alignment precision.
- The final challenge which is faced by both the rule-based and unsupervised aligners is tuning the alignment with downstream parser learning.
- We proposed an enhanced aligner tuned by transition-based oracle parser.

Overview

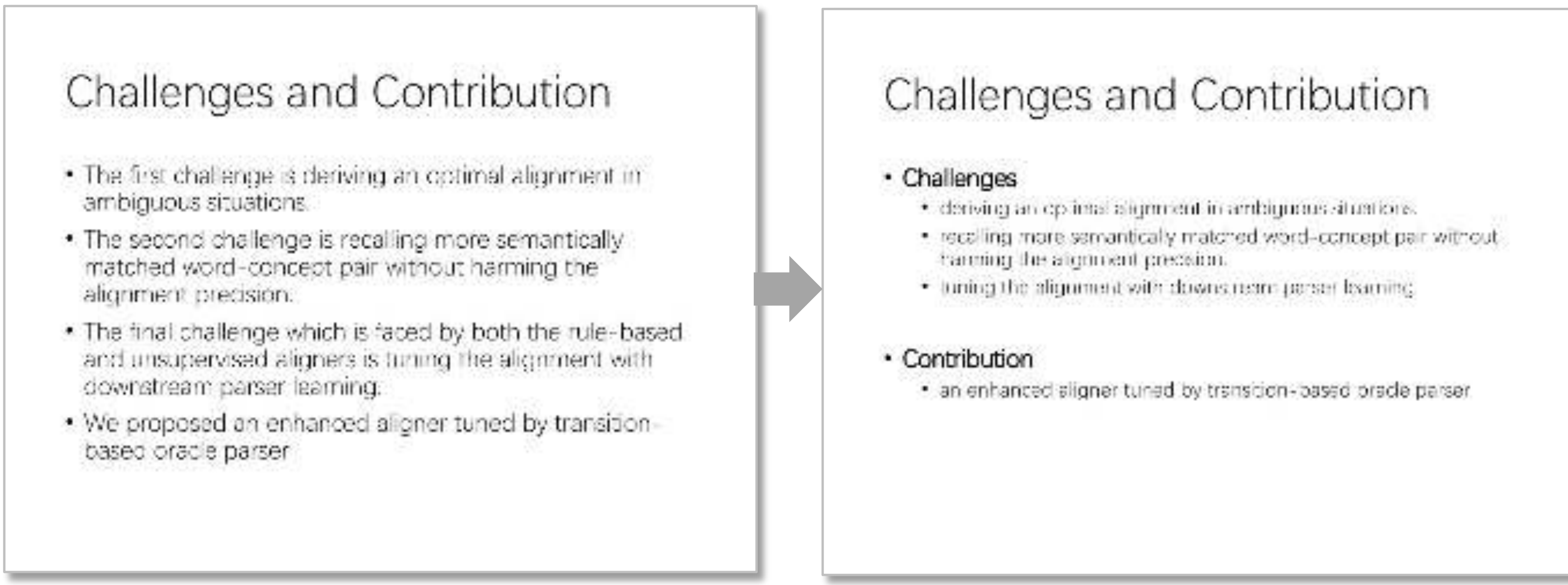
Our aligner algorithm

Our oracle parser

Experiments

Conclusion

进一步合并，并加粗



Challenges and Contribution
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Challenges and Contribution
• Challenges
• deriving an optimal alignment in ambiguous situations
• recalling more semantically matched word-concept pair without harming the alignment precision
• tuning the alignment with downstream parser learning
• Contribution
• an enhanced aligner tuned by transition-based oracle parser

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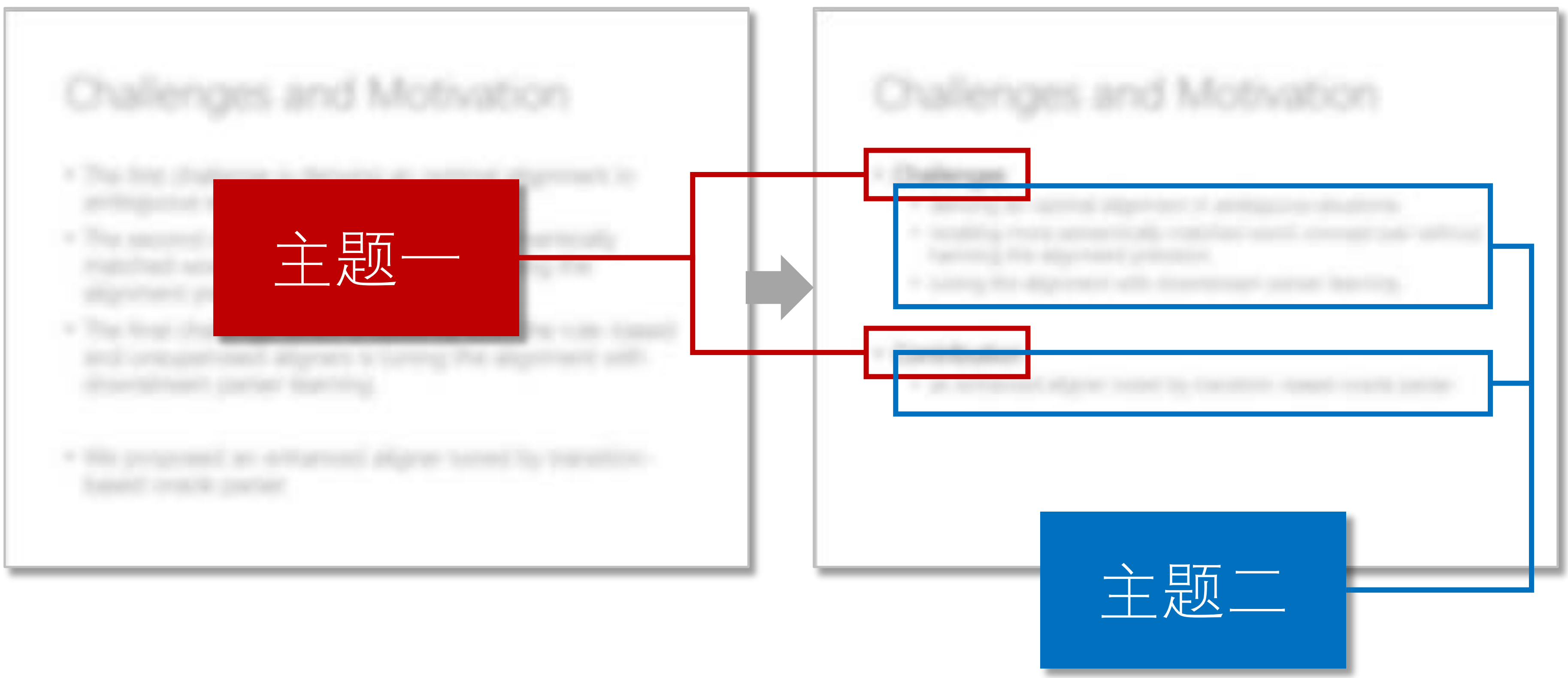

Challenges and Motivation
主题一
Challenges and Motivation
主题二

设计原则(2): 重复

重复相同的内容达到形式的统一

- 目的：提高组织性
- 重复检查：是否使用相同的字体样式等
- 实现方式：使用不同的样式、对齐方式

设计原则

- 亲密性：相关的元素应该组织到一起
- 重复：相同的内容达到形式的统一

“‘过多跳动’的反例”中的对比

设计原则(3): 对比

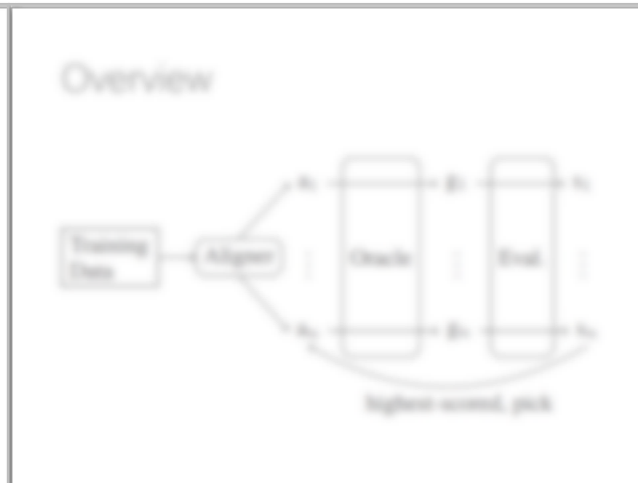
如果两项不完全相同，就应使之截然不同

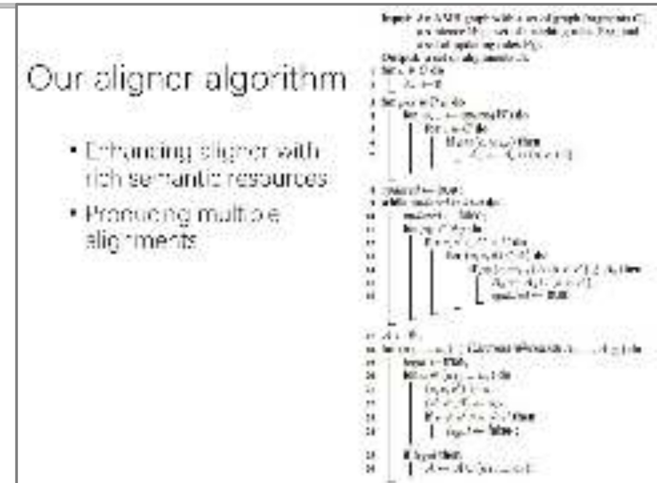
- 目的：增强页面效果和提高组织性
- 实现方式：使用不同的样式

设计原则

- 亲密性：相关的元素应该组织到一起
- 重复：相同的内容达到形式的统一
- 对比：如果两项不完全相同，就应使之截然不同

Challenges and Contribution


Overview
Training Data
Aligner
Oracle
Eval
highest scored, pick

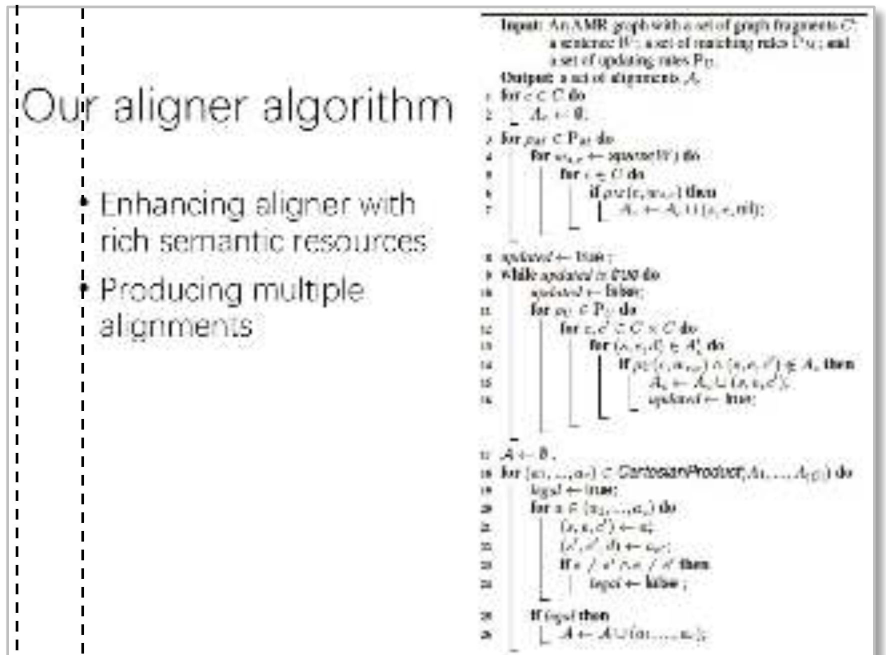

Our aligner algorithm
• Enhancing aligner with rich semantic resources
• Producing multiple alignments


Our oracle parser


Experiments


Conclusion

对齐


Our aligner algorithm
Enhancing aligner with rich semantic resources
Producing multiple alignments

设计原则(4): 对齐

使元素之间产生关联，有关联的都应对齐

- 目的：使元素产生关联，而统一且有条理
- 对齐检查：隐线

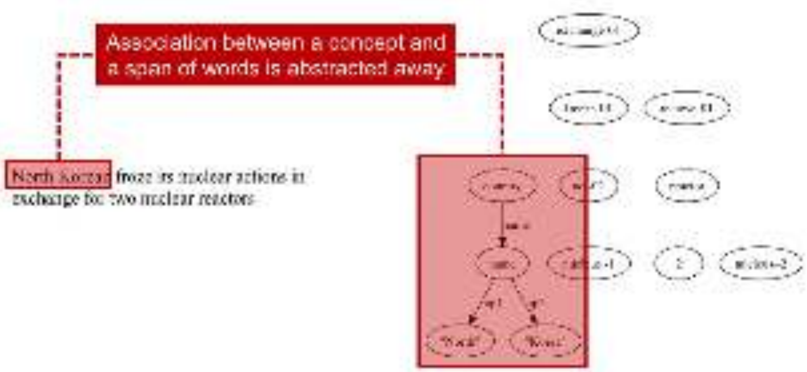
设计原则

- 亲密性：相关的元素应该组织到一起
- 重复：相同的内容达到形式的统一
- 对比：如果两项不完全相同，就应使之截然不同
- 对齐：使元素之间产生关联，有关联的都应对齐

Challenges and Contribution

- Challenges
  - deriving an optimal alignment in ambiguous situations
  - recalling more semantically matched word-concept pair without harming the alignment precision
  - tuning the alignment with downstream parser learning
- Contribution
  - an enhanced aligner tuned by transition-based oracle parser

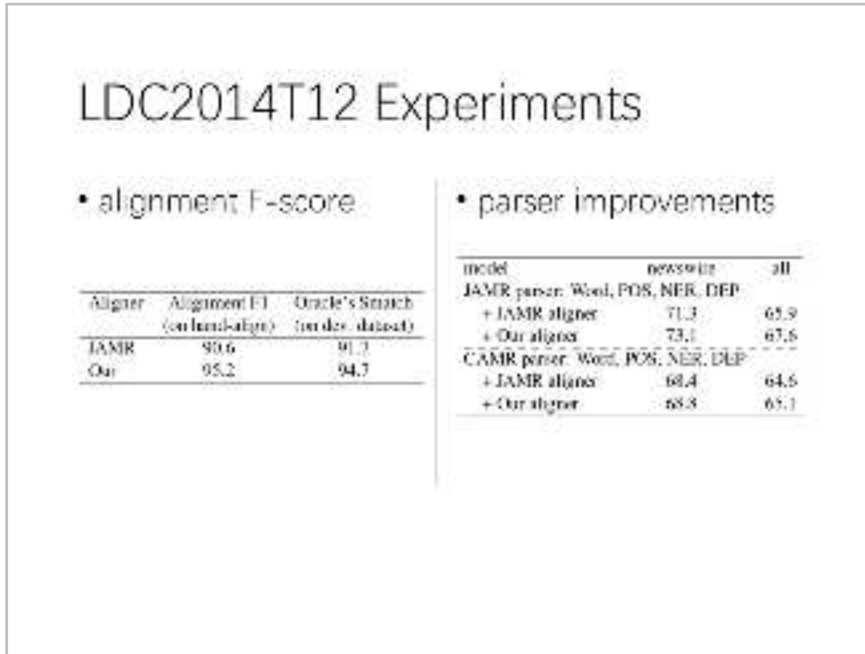
Alignment Challenge



Problems in Previous Work

- Ambiguities in matching results
- Limited semantic resources
- Parser training does not feed back to alignment

An example of ambiguities



Aligner	Alignment F1 (on hand-align)	Oracle's Smatch (on dev. dataset)
JAMR	90.6	91.7
Our	95.2	94.7

model	newswire	all
JAMR parser: Word, POS, NER, DEP		
+ JAMR aligner	71.3	65.9
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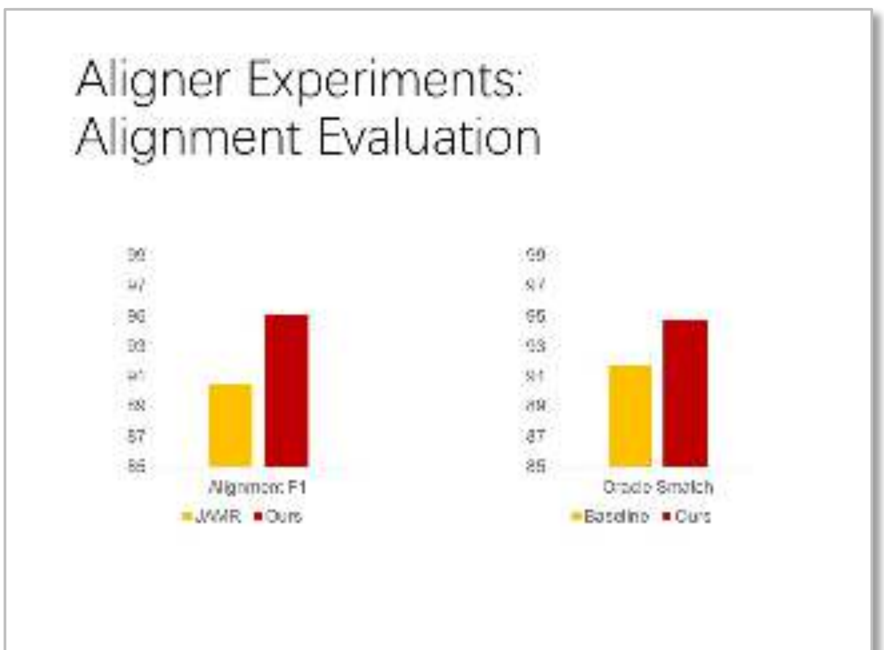
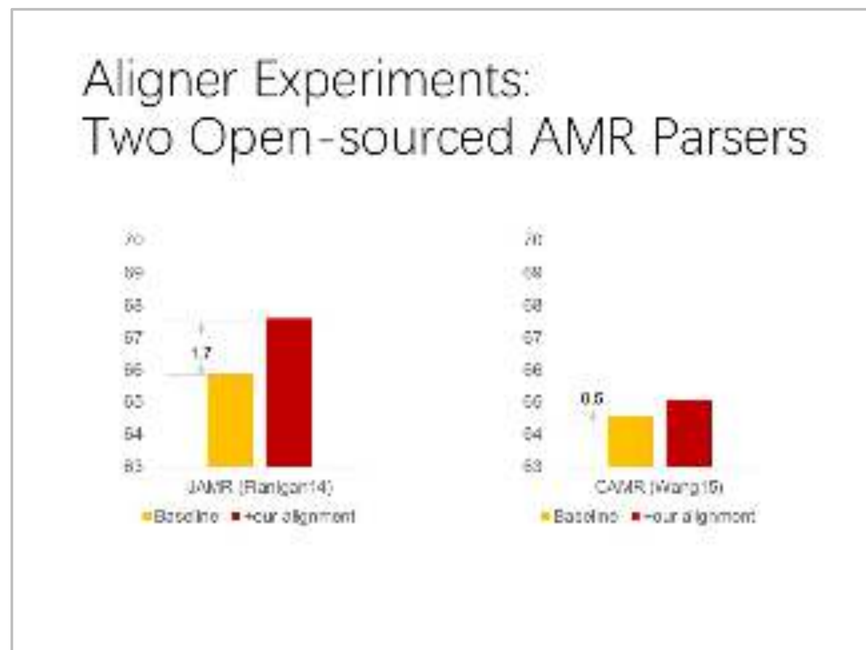
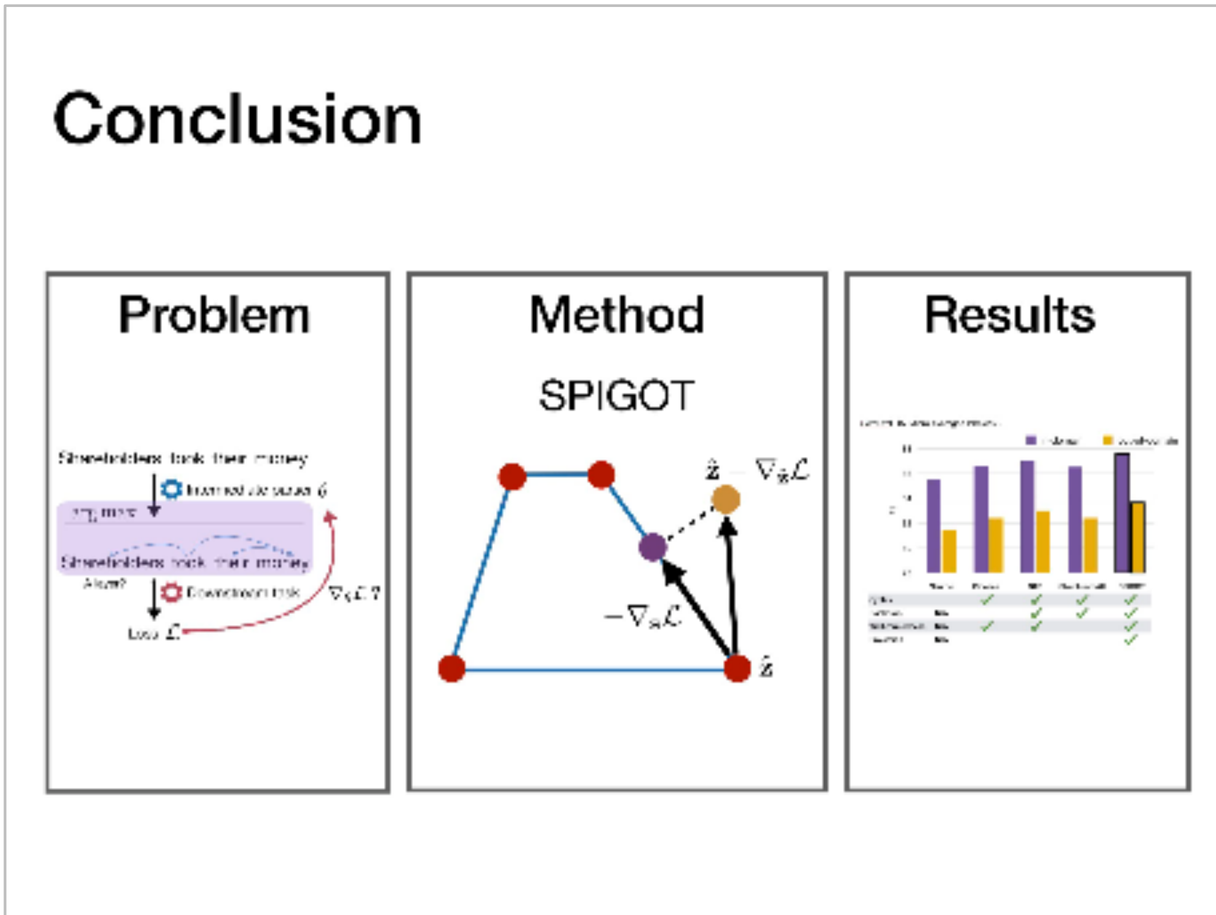




“结论” 的新的展现形式

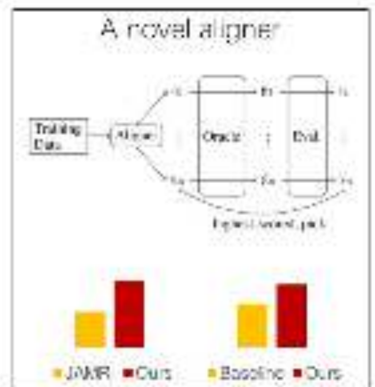


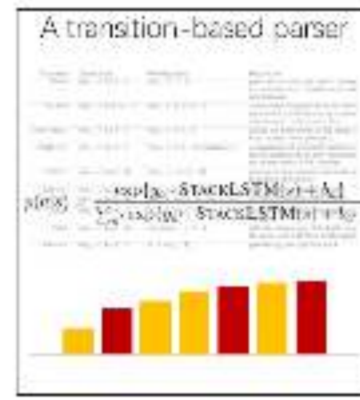
Hao Peng, Sam Thomson, and Noah A. Smith. 2018. Backpropagating through Structured Argmax using a SPIGOT，最后一页

Conclusion

- We propose a new AMR aligner which is tuned by a novel transition-based AMR oracle parser. Our aligner is also enhanced by rich semantic resource and recalls more alignments.
- Both the intrinsic and extrinsic evaluations show the effectiveness of our aligner by achieving higher alignment F1 score and consistently improving two open-sourced AMR parsers.
- We also develop transition-based AMR parser based on our aligner and transition system and it achieves a performance of 68.4 Smatch F1 score via ensemble with only words and POS tags as input.

Conclusions





Alignment Challenge

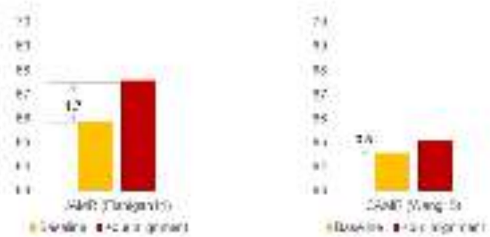
Problems in Previous Work

- Ambiguities in matching results
- Limited semantic resources
- Parser training does not feed back to alignment

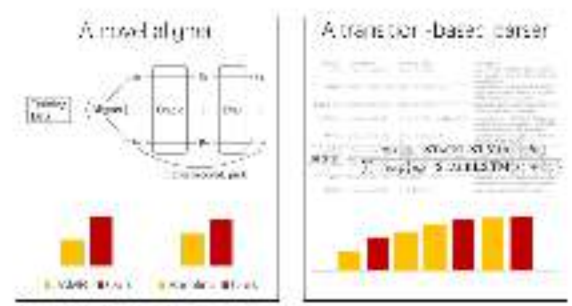
这里有方法的动画

Aligner Experiments: Alignment Evaluation

Aligner Experiments: Two Open-sourced AMR Parsers



Conclusion



Challenges and Contribution

- Challenges
  - deriving an optimal alignment in ambiguous situations.
  - recalling more semantically matched word-concept pair without harming the alignment precision.
  - tuning the alignment with downstream parser learning.

- Contribution
  - an enhanced aligner tuned by transition-based oracle parser

Challenges and Contribution

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- We proposed an enhanced aligner tuned by transition-based oracle parser

LDC2014T12 Experiments

- alignment F-score

Aligner	Alignment F1 (on hand-align)	Oracle's Smatch (on dev. dataset)
JAMR	90.6	91.7
Our	95.2	94.7

- parser improvements

model	newswire	all
JAMR parser: Word, POS, NER, DEP		
+ JAMR aligner	71.3	65.9
+ Our aligner	73.1	67.6
CAMR parser: Word, POS, NER, DEP		
+ JAMR aligner	68.4	64.6
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Our aligner algorithm

- Enhancing aligner with rich semantic resources
- Producing multiple alignments

Input: An AMR graph with a set of graph fragments C; a sentence W; a set of matching rules P_M; and a set of updating rules P_U.

Output: a set of alignments $\mathcal{A}$.

```
for c ∈ C do
    A_c ← ∅;
for ρ_M ∈ P_M do
    for w_{s,e} ← spans(W) do
        for c ∈ C do
            if ρ_M(c, w_{s,e}) then
                A_c ← A_c ∪ (s, e, nil);
updated ← true ;
while updated is true do
    updated ← false;
    for ρ_U ∈ P_U do
        for c, c' ∈ C × C do
            for (s, e, d) ∈ A'_c do
                if ρ_U(c, w_{s,e}) ∧ (s, e, c') ∉ A_c then
                    A_c ← A_c ∪ (s, e, c');
                    updated ← true;
𝒜 ← ∅ ;
for (a_1, ..., a_c) ∈ CartesianProduct(A_1, ..., A_|C|) do
    legal ← true;
    for a ∈ (a_1, ..., a_c) do
        (s, e, c') ← a;
        (s', e', d) ← a_c';
        if s ≠ s' ∧ e ≠ e' then
            legal ← false ;
    if legal then
        𝒜 ← 𝒜 ∪ (a_1, ..., a_c);
```

Conclusion

- We propose a new AMR aligner which is tuned by a novel transition-based AMR oracle parser. Our aligner is also enhanced by rich semantic resource and recalls more alignments.
- Both the intrinsic and extrinsic evaluations show the effectiveness of our aligner by achieving higher alignment F1 score and consistently improving two open-sourced AMR parsers.
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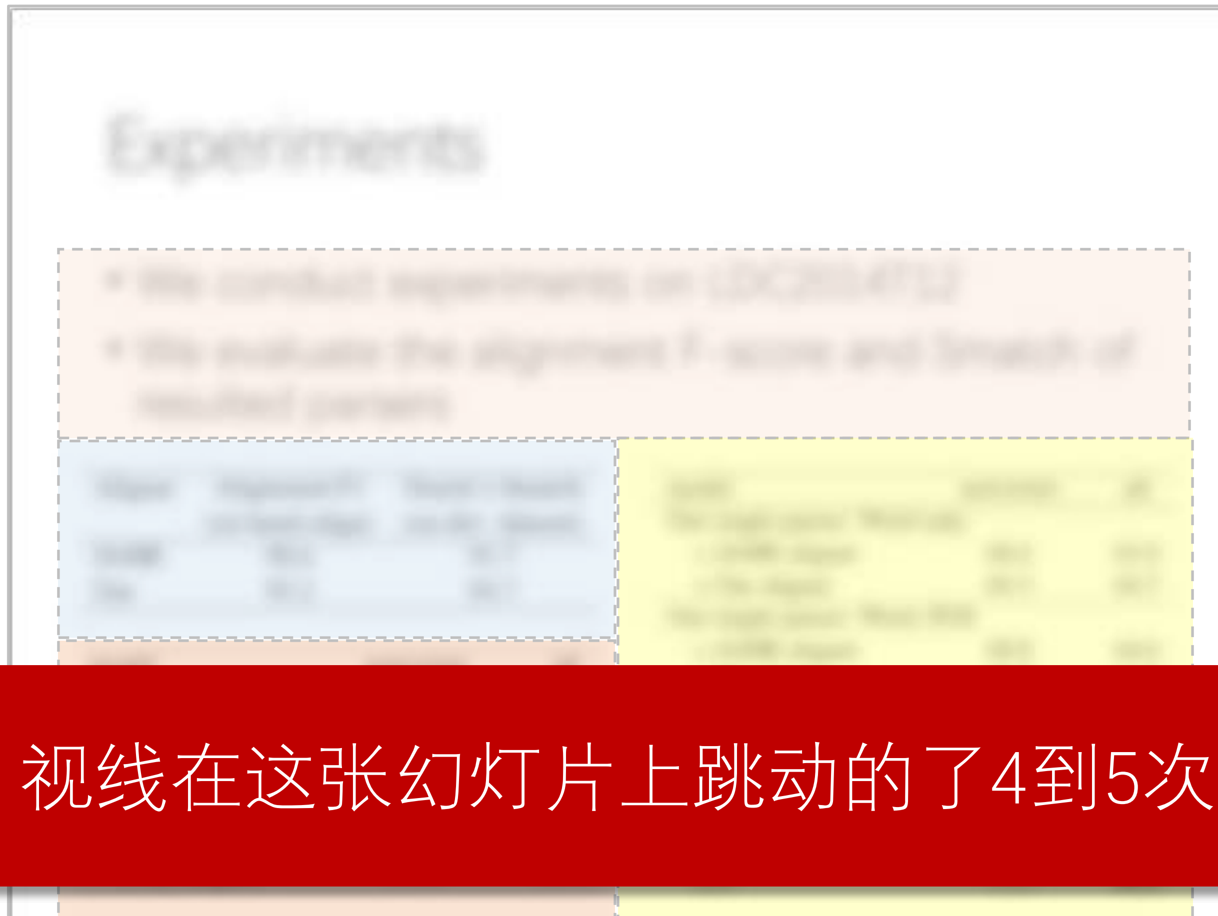


视线在这张幻灯片上跳动的了4到5次

Experiments

- We conduct experiments on LDC2014T12
- We evaluate the alignment F-score and Smatch of resulted parsers

Aligner	Alignment F1 (on hand-align)	Oracle's Smatch (on dev. dataset)
JAMR	90.6	91.7
Our	95.2	94.7

model	newswire	all
Our single parser: Word only		
+ JAMR aligner	68.6	63.9
+ Our aligner	69.3	64.7
Our single parser: Word, POS		
+ JAMR aligner	68.8	64.6

视线在这张幻灯片上跳动的了4到5次

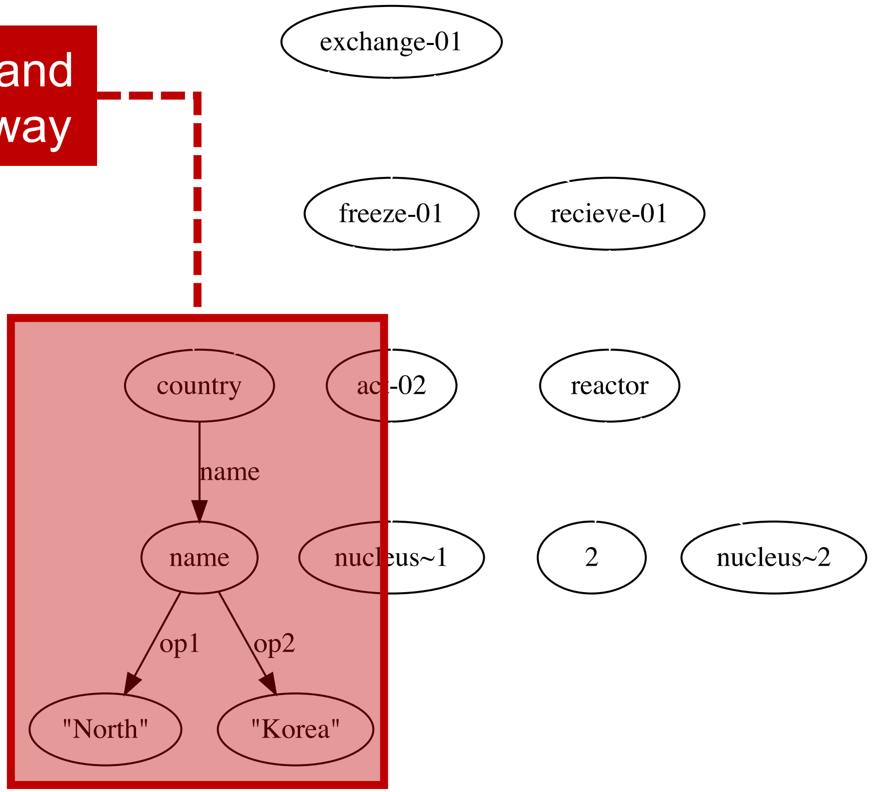
Our oracle parser

Transition	Current State	Resulting State	Description
DROP	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ \beta,\ A]$	pops out the word that doesn't convey any semantics (e.g., function words and punctuations).
MERGE	$[\sigma \| s_0,\ \delta,\ b_0 \| b_1 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ b_0\_b_1 \| \beta,\ A]$	concatenates a sequence of words into a span, which can be derived as a named entity (`name`) or `date-entity`.
CONFIRM(c)	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ c \| \beta,\ A]$	derives the first element of the buffer (a word or span) into a concept c.
ENTITY(c)	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ c \| \beta,\ A \cup \text{relations}(c)]$	a special form of CONFIRM that derives the first element into an entity and builds the internal entity AMR fragment.
NEW(c)	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ c \| b_0 \| \beta,\ A]$	generates a new concept c and pushes it to the front of the buffer.
LEFT(r)	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A \cup \{s_0 \xleftarrow{r} b_0\}]$	links a relation r between the top concepts on the stack and the buffer.
RIGHT(r)	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A \cup \{s_0 \xrightarrow{r} b_0\}]$	
CACHE	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma,\ s_0 \| \delta,\ b_0 \| \beta,\ A]$	passes the top concept of the stack onto the deque.
SHIFT	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma \| s_0 \| \delta \| b_0,\ [\,],\ \beta,\ A]$	shifts the first concept of the buffer onto the stack along with those on the deque.
REDUCE	$[\sigma \| s_0,\ \delta,\ b_0 \| \beta,\ A]$	$[\sigma,\ \delta,\ b_0 \| \beta,\ A]$	pops the top concept of the stack.

Alignment Challenge

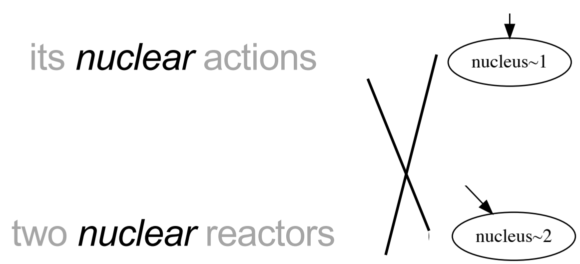
Association between a concept and a span of words is abstracted away

North Korean froze its nuclear actions in exchange for two nuclear reactors



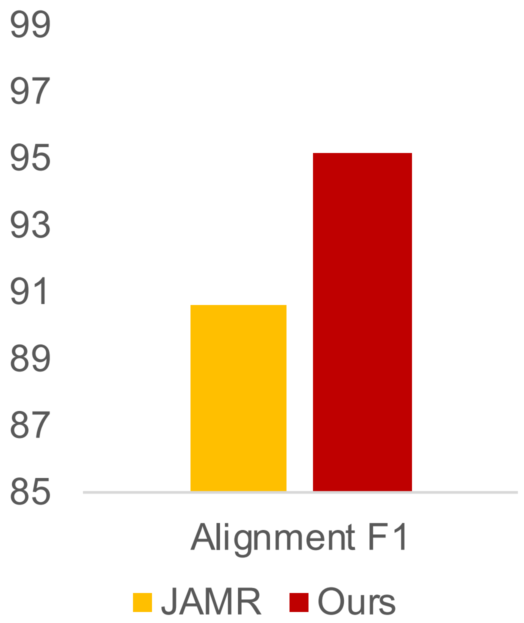
Problems in Previous Work

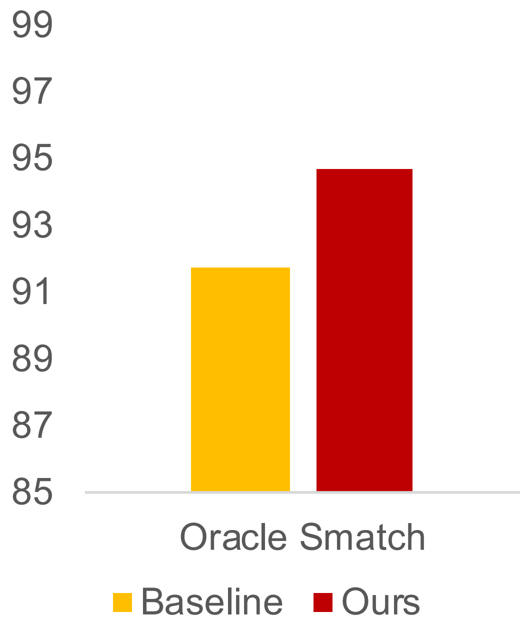
- Ambiguities in matching results
- Limited semantic resources
- Parser training does not feed back to alignment



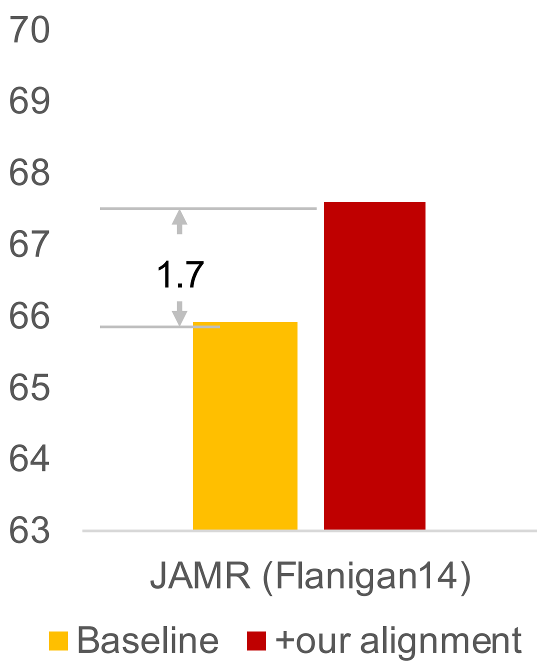
An example of ambiguities

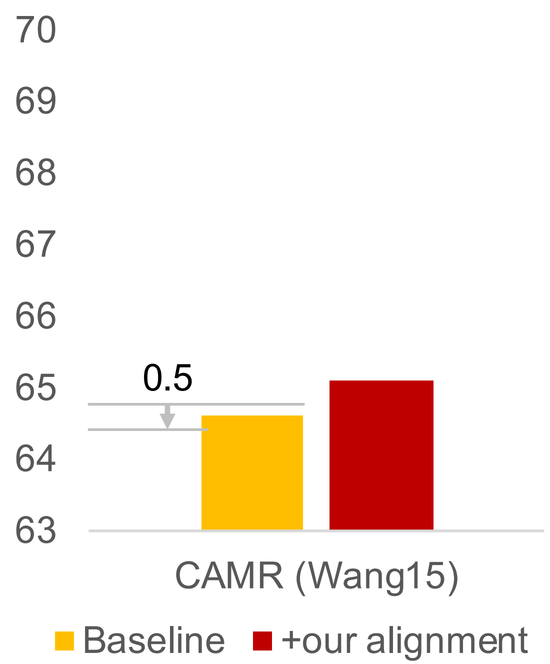
Aligner Experiments: Alignment Evaluation





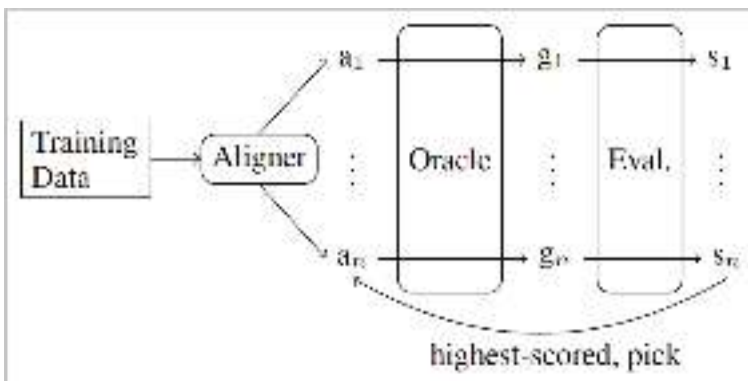
Aligner Experiments: Two Open-sourced AMR Parsers

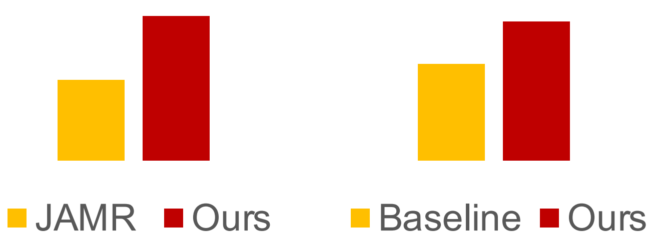




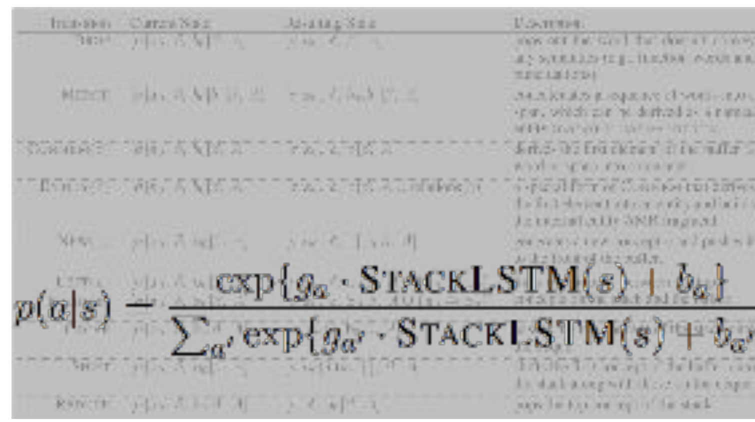
Conclusion

A novel aligner





A transition-based parser



$$p(a|s) = \frac{\exp\{g_a \cdot \textsc{StackLSTM}(s) + b_a\}}{\sum_{a'} \exp\{g_{a'} \cdot \textsc{StackLSTM}(s) + b_{a'}\}}$$