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Transition-based dep

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### Transition systems for dependency parsing

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Transitions are between **configurations** edu\_assist\_protein triples  $C \to (\sigma, \beta, A)$ , where  $\sigma$  is the stack, uffer, and A is the list of arc Transition system ttps://eduassistpro.github.io/

- Arc-standard
- Arc-eager Add WeChat edu\_assist\_pro

### The arc-standard system

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t.

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The arc-standard system is closely related to the shi algorithm for phrase structive pursuative related to the shi that the REDUCE action is split into two action -LEFT and ARC RICHE. don

ARC-RIGHT, dep https://eduassistpro.github.io/

- SHIFT  $(\sigma, i|\beta, A) \Rightarrow (\sigma|i, \beta, A)$ ARC-LEFT  $(\sigma, i|\beta, A) \Rightarrow (\sigma|i, \beta, A)$ ARC-LEFT  $(\sigma, i|\beta, A) \Rightarrow (\sigma, i|\beta, A)$   $(\sigma, i|\beta, A) \Rightarrow (\sigma|i, \beta, A)$  $(\sigma, i|\beta, A) \Rightarrow (\sigma|i, \beta, A)$
- ► ARC-RIGHT  $(\sigma|i,j|\beta,A) \Rightarrow (\sigma,i|\beta,A \oplus i \xrightarrow{r} j)$

### Arc-standard derivation

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	A.s	<u>ssionment P</u>	roiect Exam	<u>Heln</u>
	σ	$\beta$	action	arc added to $\mathcal A$
1.	[ROOT]	they like bage	els with lox	-1-1
2.	[ROOK the g ]	on the contractor	els with lox inat edu_as ith lox	SalST_+DifeO
3.	[ROOT]	tike bagels w	ith lox	
4.	$[ROOT, \mathit{like}]$			
5.	[ROOT, like, ba	https://pdus	assistpro.git	huh in/
6.	[ROOT, like, ba	mps.//educ	เออเอเษาบ.ษูแ	(with $\leftarrow lox$ )
7.	[ROOT, like, ba	gels] lox		$(bagels \rightarrow lox)$
8.	$[ROOT, \mathit{like}]$	Add Wagels Ch	at <mark>edu_ass</mark> is	$+$ (like $\rightarrow$ bagels)
9.	[ROOT]	Auu Vilket CII	ai cuu_assi	$(R \bowtie Iike)$
10.	[ROOT]	Ø	ONE	

Table 11.2: Arc-standard derivation of the unlabeled dependency parse for the input *they like bagels with lox*.

#### Arc-eager transition system

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Arc-eager dependency parsing changes the Arc-right action so that right dependents can be attached before all of their dependents have been found. Rather than removing from both Arcsignal action to the sta

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 A precondition is required to ensure that t

- A precondition is required to ensure that t RC-LEFT action cannot de a le When techo dessist pro already has a parent A.
- A new Reduce action is introduced, which can remove elements from the stack if they have a parent A:  $(\sigma|i,\beta,A) \Rightarrow (\sigma,\beta,A)$

### Arc-eager derivation

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	Ass	gnment Project Exam Help are added to A
	σ	action are added to A
1.	[ROOT]	they like bagels with lox
2.	[ROOTAthey]	Additive sillent edu_assist + piro
3.	[ROOT]	- the bagels with lox $ 0$ $0$ $0$ $0$ $0$ $0$ $0$
4.	[Root, like]	HT $(like  ightarrow bagels)$
5.	[ROOT, like, bag	
6.	[ROOT, like, ba	tps://eduassistpro.onthเผ <b>ล</b> เอ <i>โ</i> ด
7.	[ROOT, like, bag	tps://eduassistpro.github.io/x) HT (bagels \rightarrow lox)
8.	[ROOT, like, bagels	$lox$ ] $\varnothing$
9.	[ROOT, like, bagels	dd WeChat edu_assist_pro
10.	[ROOT, like]	Ø
11.	[ROOT]	Ø Done

Table 11.3: Arc-eager derivation of the unlabeled dependency parse for the input *they like bagels with lox*.

### Oracle-based training

An oracle is a function sequence. Given such an oracle, a dependency treebank can be converted into a set of action sequences (AC) and The passer can be trained by stepping through the oracle action sequenting oracle action. A commonly used objective is to maximize the conditional likelihood). https://eduassistpro.github.io/

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$$P(a|c, \mathbf{w}) = \frac{\exp}{\sum_{a' \in \mathcal{A}(c)} \exp \psi(a', c, \mathbf{w}; \boldsymbol{\theta})}$$
$$\hat{\boldsymbol{\theta}} = \underset{\boldsymbol{\theta}}{\operatorname{argmax}} \sum_{i=1}^{N} \sum_{t=1}^{|\mathcal{A}^{(i)}|} \log P(a_t^{(i)}|c_t^{(i)}, \mathbf{w})$$