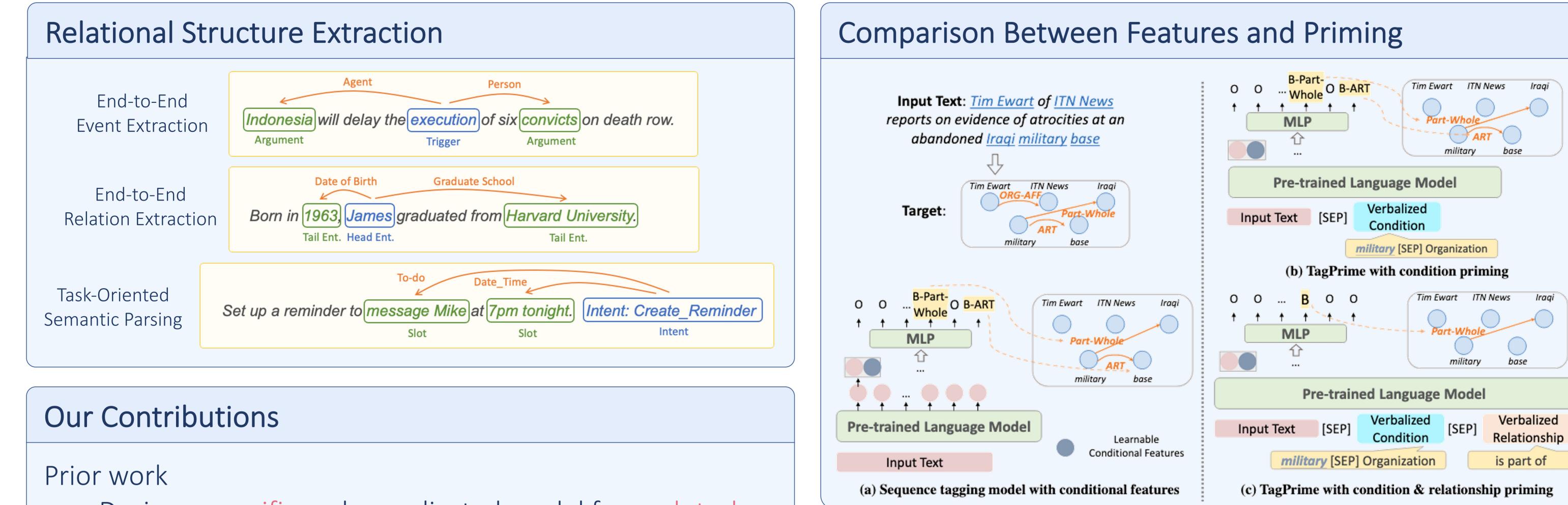


## Plus lab **TAGPRIME: A Unified Framework for Relational Structure Extraction**

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	S	Slot	Slot	Intent

- Design a specific and complicated model for each task Our work
  - Take a unified view of relational structure extraction
  - Propose TAGPRIME, simple but effective for all tasks
  - Adapt priming techniques to boost performance

A Unified View of Relational Structure Extraction

Extract word spans and corresponding relationships based on conditions

End-to-End **Event Extraction** 

### Condition

Agent 0 0 Ο trigger Indonesia will delay the execution of six convicts on death row. execution

# Task 1: End-to-End Event Extraction

Model	ACE05-E (en)			AC	Е05-Е	(zh)	1	ERE (ei	n)	ERE (es)			
	Tri-C	Arg-I	Arg-C	Tri-C	Arg-I	Arg-C	Tri-C	Arg-I	Arg-C	Tri-C	Arg-I	Arg-C	
DyGIE++* (Wadden et al., 2019)	69.7	53.0	48.8	72.3	63.0	59.3	58.0	51.4	48.0	65.8	49.2	46.6	
TANL (Paolini et al., 2021)	68.4	50.1	47.6	-	-	-	54.7	46.6	43.2	-	-	-	
Text2Event (Lu et al., 2021)	71.9	-	53.8	-	-	-	59.4	-	48.3	-	-	-	
OneIE* (Lin et al., 2020)	74.7	59.2	56.8	73.3	63.4	60.5	57.0	50.1	46.5	66.5	54.5	52.2	
DEGREE (Hsu et al., 2022b)	73.3	-	55.8	-	-	-	57.1	-	49.6	-	-	-	
TAGPRIME w/ Cond. Priming	74.6	60.0	56.8	71.9	63.2	60.5	57.3	52.1	49.3	66.3	55.2	52.6	
TAGPRIME w/ Cond. & Rela. Priming	74.6	59.8	58.3	71.9	64.7	62.4	57.3	52.4	49.9	66.3	55.1	53.6	

## Task 2: End-to-End Relation Extraction

Model	A	ACE05-	R	ACE04-R					
WIGGET	Ent	Rel	Rel+	Ent	Rel	Rel+			
Table-Sequence (Wang and Lu, 2020)	89.5	67.6	64.3	88.6	63.3	59.6			
PFN (Yan et al., 2021)	89.0	-	66.8	89.3	-	62.5			
Cascade-SRN (late fusion) (Wang et al., 2022)	89.4	-	65.9	-	-	-			
Cascade-SRN (early fusion) (Wang et al., 2022)	89.8	-	67.1	-	-	-			
PURE (Zhong and Chen, 2021)	89.7	69.0	65.6	88.8	64.7	60.2			
PURE <sup>\$</sup> (Zhong and Chen, 2021)	90.9	69.4	67.0	90.3	66.1	62.2			
UniRE <sup>\$</sup> (Wang et al., 2021)	90.2	-	66.0	89.5	-	63.0			
TAGPRIME w/ Cond. Priming	89.6	69.7	67.3	89.0	65.2	61.6			
TAGPRIME w/ Cond. & Rela. Priming	89.6	70.4	<b>68.1</b>	89.0	66.2	62.3			

End-to Relation Ex		Condition <i>Head Ent.</i> <i>James</i> Born in 1963, James graduated free	O School School om Harvard University.	PURE (Zhong and Che PURE <sup>+</sup> (Zhong and Ch	on) (Wang et al., 2022) sion) (Wang et al., 2022) n, 2021) en, 2021)	89.0 89.4 89.8 89.7 90.9	- 69.0 69.4	66 65 67 65 67
Task-Orie Semantic		ConditionIntentOOOOOOTo-doTo-doCreate_ReminderSet up a reminder to message Mike	do O Time Time se at 7pm tonight.	UniRE <sup>*</sup> (Wang et al., 2 TAGPRIME w/ Cond. P TAGPRIME w/ Cond. &	riming			66 67 <b>68</b>
Condi	tion Pi	riming Agent 0 0 0 0 0 0 Perso	n 0 0 0	Task 3: Task-Orie		MTOP (es)		N
	equence Tagging	Text Representations		JointBERT (Li et al., 2021) JointBERT (reproduced) TAGPRIME + Cond. Priming TAGPRIME + Cond. & Rela. Priming	96.7       -       92.8       95.2         97.1       94.2       92.7       96.6         97.1       94.8       93.4       96.6	- 8 91.6 8 91.6 9	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	.8 .8 .8
	Agent	Language Model Indonesia will delay the execution of six convic	ts on death row.	Ablation Studies	5			
Sequence Tagging +	, gen	Condition-Specific Text Representations	Priming Representations	Cond.   Rela.   ACE05-E	(en) ACE05-E (zh) MTOP ( rg-C Arg-I Arg-C Slot-I Sl	· · ·	TOP (fr) I Slot-C	
Condition		Language Model				0.2 90.5		

Model	MTOP (en)			M	ITOP (e	es)	Ν	ITOP (f	r)	MTOP (de)			
Widdei	Intent	Slot-I	Slot-C	Intent	Slot-I	Slot-C	Intent	Slot-I	Slot-C	Intent	Slot-I	Slot-C	
JointBERT (Li et al., 2021)	96.7	-	92.8	95.2	-	89.9	94.8	-	88.3	95.7	-	88.0	
JointBERT (reproduced)	97.1	94.2	92.7	96.6	91.6	89.5	95.8	90.2	87.7	96.5	89.2	87.6	
TAGPRIME + Cond. Priming	97.1	<b>94.8</b>	93.4	96.6	91.6	90.3	95.8	90.6	88.6	96.5	<b>89.6</b>	87.9	
TAGPRIME + Cond. & Rela. Priming	97.1	94.7	<b>93.5</b>	96.6	<b>91.8</b>	<b>90.7</b>	95.8	90.6	<b>89.1</b>	96.5	89.5	<b>88.1</b>	

## **Ablation Studies**

Tagging	Condition-Specific Text Representations	Priming Representations		~ .	1						1 (11)		1 2 0000	-				-	
+				Cond. t. Prim.	Rel Feat.			-E (en) Arg-C						OP (fr) Slot-C	ACE0: Rel	5-R (en) Rel+	ACE04- Rel	R (en) Rel+	Average
Condition Priming						X	57.8 58.1	54.2	60.2 60.4	57.2 58.1	91.8 92.0	90.2 90.4	90.5 90.6	88.4	67.8 67.5	65.5 65.2	62.2 61.8	58.9 58.4	69.1 69.4
	Indonesia will delay the execution of six convicts on death rov	/. <sep> execution <sep> Justice</sep></sep>	×		××	××	59.6 60.0	56.7	62.0 63.2	59.7 60.5	91.8 91.6	90.4 90.3	<b>90.7</b> 90.6	88.8	69.6 69.7	67.2 67.3	64.7	60.7 61.6	70.6 70.9
		Verbalized Condition	✓ × ✓ ✓	×	✓ × ×	×	57.3 59.3 59.8 59.7	57.6 58.3	61.4 63.0 <b>64.7</b> 64.3	59.4 61.2 62.4 62.4	91.7 91.7 91.8 91.5	90.5 90.5 <b>90.7</b> 90.4	90.2 90.5 90.6 90.6	88.5 88.9 <b>89.1</b> <b>89.1</b>	68.0 <b>70.6</b> 70.4 70.5	65.6 68.2 68.1 68.1	61.6 66.0 <b>66.2</b> 65.8	58.3 62.2 62.3 62.2	69.6 71.4 <b>71.8</b> 71.7
Kelati	ionship Priming																		
(	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			000	ovir	$\infty \rightarrow t$	ion	000	1 C		J I I.	~							
	Relationship-Specific Text Representations P	riming Representations	A	hhi	OXII	IIdl	lion	and	y Sh	Jeeu		Ο							
	Language Model												Trend				-=-		
	esia will delay the execution of six convicts on death row.  Verbalized Condit ent O 			℃ 	trained L	anguag	e Model	Layer (k	$+ 1 \sim L$	2)	sification Score	74.0 - 	Argui	ment Class	fication Se	core	_	/-	- 240 
	Relationship-Specific Text Representations P	riming Representations		Pre-train Model L	-	-	No Parame			anguage $(1 \sim k)$	at a	72.5 <b>-</b> 72.0 <b>-</b>						$\wedge$	- 180 (j) - 160 do
Indon	Language Model	ion coops luctice coops Agant	In	put Text	INFPI	/erbalize Conditior			Verbaliz Relations		Araı	71.5 -							- 140
Indon	nesia will delay the execution of six convicts on death row. <pre><sep> execut</sep></pre>											71.0 <del>-</del> 0	2 4	6 8 Number	3 10 of Non-S	12 14 1 haring Laye		0 22	- 120