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Event argument extraction (EAE)

Goal: extract the participants (arguments) for an event described in the given sentence.

- Input: sentence, event trigger and the event type
- Output: (arguments, role) pairs

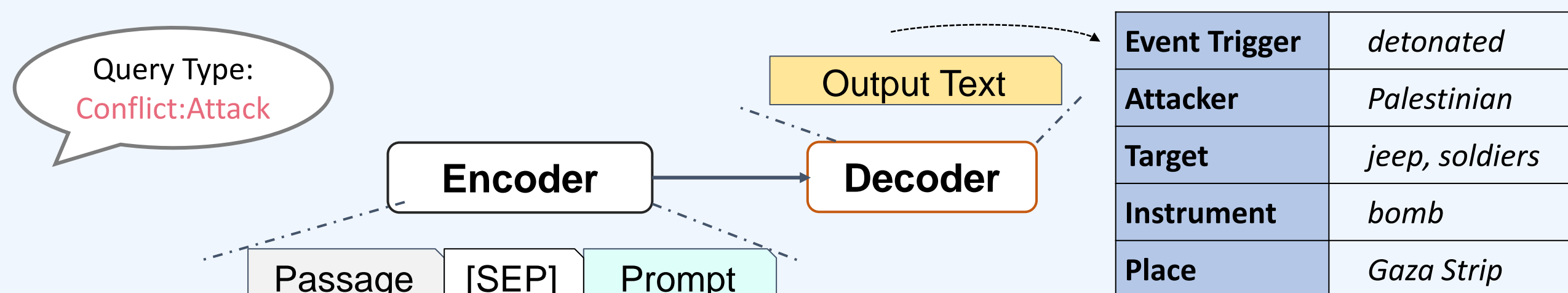
Indonesia will delay the execution of six convicts including an Indian on death row after five of them appealed to the Supreme Court for a second review.

Justice:Appeal	
Plaintiff	five of them
Prosecutor	None
Adjudicator	Supreme Court
Place	Indonesia

Generation-based EAE models

EAE is typically solved by classification-based models.

- Focus on improving token representations
- More and more generation-based models for EAE are proposed.
- Leverage large language models' power
- TANL [Paolini+ 2021], Text2Event[Li+ 2021], DEGREE [Hsu+ 2022], etc.
- For example, DEGREE:



Passage: Earlier Monday, a 19-year-old Palestinian riding a bicycle detonated a 30-kilo (66-pound) bomb near a military jeep in the Gaza Strip, injuring three soldiers.

Prompt	
Event Type Description	The event is related to conflict and some violent physical act.
Event Keywords	Similar triggers such as war, attack, terrorism.
E2E Template	Event trigger is <Trigger>. \n <u>some attacker</u> attacked <u>some facility, someone, or some organization</u> by <u>some way</u> in <u>some where</u> .
Output Text	
Event trigger is <u>detonated</u> . \n <u>Palestinian</u> attacked <u>jeep and soldiers</u> by <u>bomb</u> in <u>Gaza Strip</u> .	

Most of the works focus on how to reformulate the problem and how to prompt the generative models!

How to enhance generative models using auxiliary information?

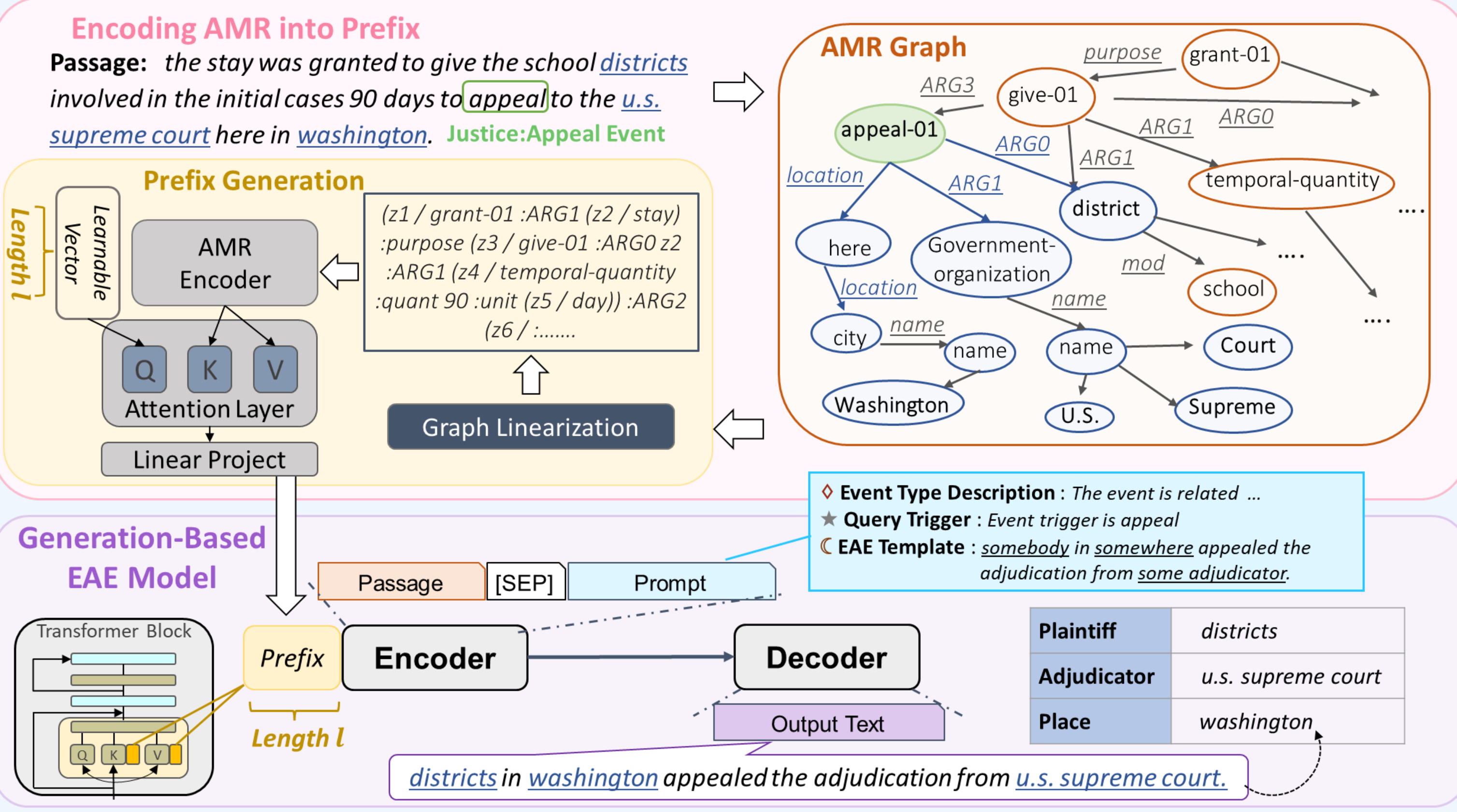
Several auxiliary information, such as POS taggings, dependency parsing, Abstract meaning representations (AMR), is helpful for EAE.

- Classification-based EAE methods incorporate such information by enriching the features.

Challenges -- Can we do better than prompting?

- Lengthy for linearized AMR
- AMR information is different from input passage in nature.
- Containing words with special meaning
- Graphical structure

AMR-Aware Prefix



More details

1. Adapt DEGREE as the generation-based EAE model.
2. Two variations of AMR Encoders
 - AMPERE(AMRBART): Use the encoder of AMRBART, which is the current SOTA AMR-to-Text model.
 - AMPERE(RoBERTa): RoBERTa-large as the AMR encoder. Add AMR-specific tokens as special tokens.
3. Training:
 - Copy mechanism :
 - To encourage copy:

$$P(y_i = t | y_{<i}, x_1, \dots, x_m) = w_{gen}^i P_{gen}(y_i = t | y_{<i}, x_1, \dots, x_m) + (1 - w_{gen}^i) \left(\sum_{j=0}^m P_{copy}^i(j | y_{<i}, x_1, \dots, x_m) \times \mathbb{1}(x_j = t) \right)$$

$$Loss_{AMPERE} = - \log \left(\sum_i P(y_i | y_{<i}, x_1, \dots, x_m) \right) + \lambda \sum_i w_{gen}^i$$

Experimental results on two benchmarks

Baselines

- Classification-based: DyGIE++ [Wadden+ 2019], OneIE[Lin+ 2020]
- Classification-based with AMR: AMR-IE [Zhang+ 2021]
- Generation-based : PAIE [Ma+ 2022], DEGREE

