

# Extracting cause and effect from sentences

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# Task

Extract cause, effect and relation from text passage.

===== ::: {.block} ## Example

The firm's gross margin is set to stabilize as Harley refocuses its efforts on more profitable markets, and our base case assumes that it stabilizes around 32% in 2029, helped by a more measured approach to entering new markets.

- **Cause:** Harley refocuses its efforts on more profitable markets
- **Effect:** The firm's gross margin is set to stabilize
- **Relation:** cause :::

## Structured output example

[Cause] Harley refocuses its efforts on more  
profitable markets [Relation] cause [Effect] The  
firm's gross margin is set to stabilize

# Evaluation

The standard metric, Exact Match, is not a good metric for this task.

## Annotation

BB&T and SunTrust have completed their merger, forming Truist, which we believe will drive the next step up in profitability for the franchises.

## Model prediction

BB&T and SunTrust have completed their merger, forming Truist, which we believe will drive the next step up in profitability for the franchises.

Cause Effect

# Reinforcement learning

- We can't use supervised learning with the because that tries to learn exact wording
- Use Reinforcement Learning to train the extraction model
- Reward models:
  - Entailment: entailment/neutral/contradiction
  - Valid: valid/invalid
- Reward is the logit of the true class (entailment or valid)

## Evaluation results

Models	Human	Token F1	EM
ChatGPT (10-shot)	35.13%	67.52%	31.95%
Supervised	64.38%	80.59%	54.31%
RL with entailment	59.23%	76.58%	47.06%
RL with valid	60.48%	78.65%	50.02%
RL with entailment (no FT)	-	75.65%	44.92%
Ensemble (entailment)	-	80.56%	54.21%
Ensemble (valid)	-	80.55%	54.21%
Ensemble (entailment, no FT)	-	80.59%	54.31%

# Thanks!

[github.com/oyarsa/event\\_extraction/self\\_critique](https://github.com/oyarsa/event_extraction/self_critique)