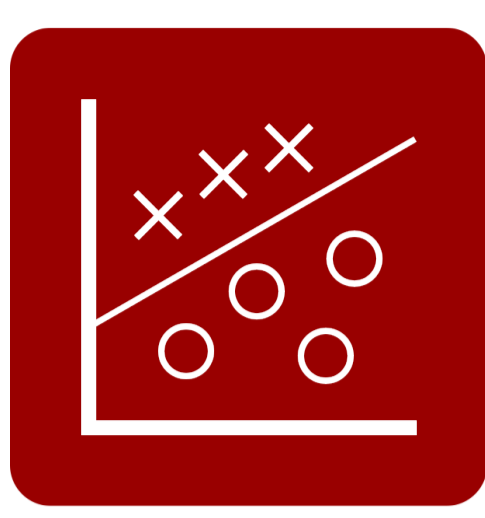


# Introducing shift-reduce inspired neural processor for explainable sentiment analysis



Group of Horribly Optimistic Statisticians

## Towards Explainable and Scalable Aspect-based Sentiment Analysis: A Linear-Time Transition-Based Framework

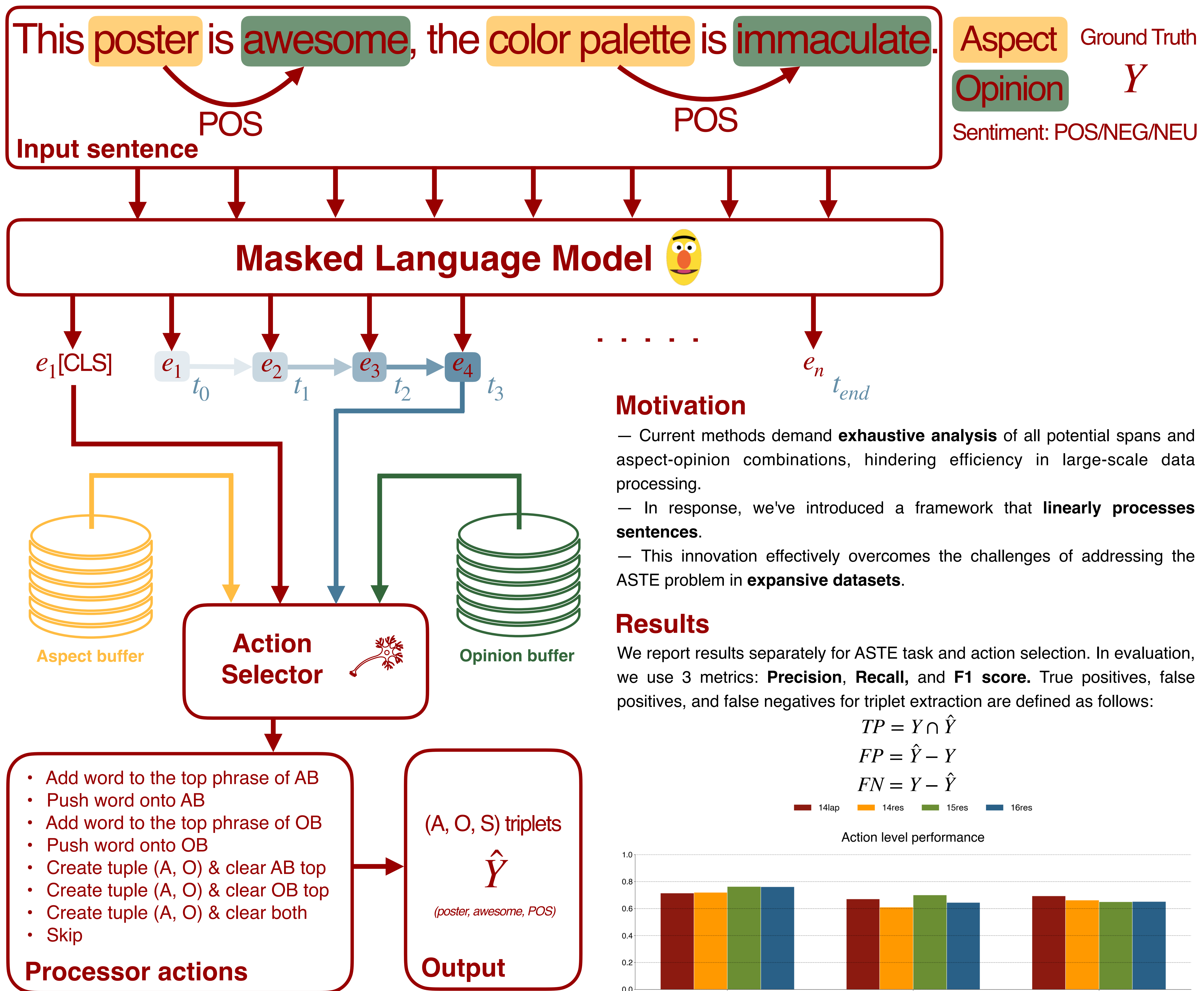
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### Problem

**Aspect Sentiment Triplet Extraction (ASTE)** is one of the most challenging problems in sentiment analysis. The task is to extract sentiment-related triplets from a given sentence, containing: **aspects** ('What'), their **sentiment** ('How'), and the specific **opinion** ('Why'). In this framework, 'What' serves to pinpoint the subject or entity under discussion, 'How' assigns the sentiment (e.g. positive, negative, neutral), and 'Why' identifies the specific phrases that can be interpreted as the source of the sentiment.



### Motivation

- Current methods demand **exhaustive analysis** of all potential spans and aspect-opinion combinations, hindering efficiency in large-scale data processing.
- In response, we've introduced a framework that **linearly processes sentences**.
- This innovation effectively overcomes the challenges of addressing the ASTE problem in **expansive datasets**.

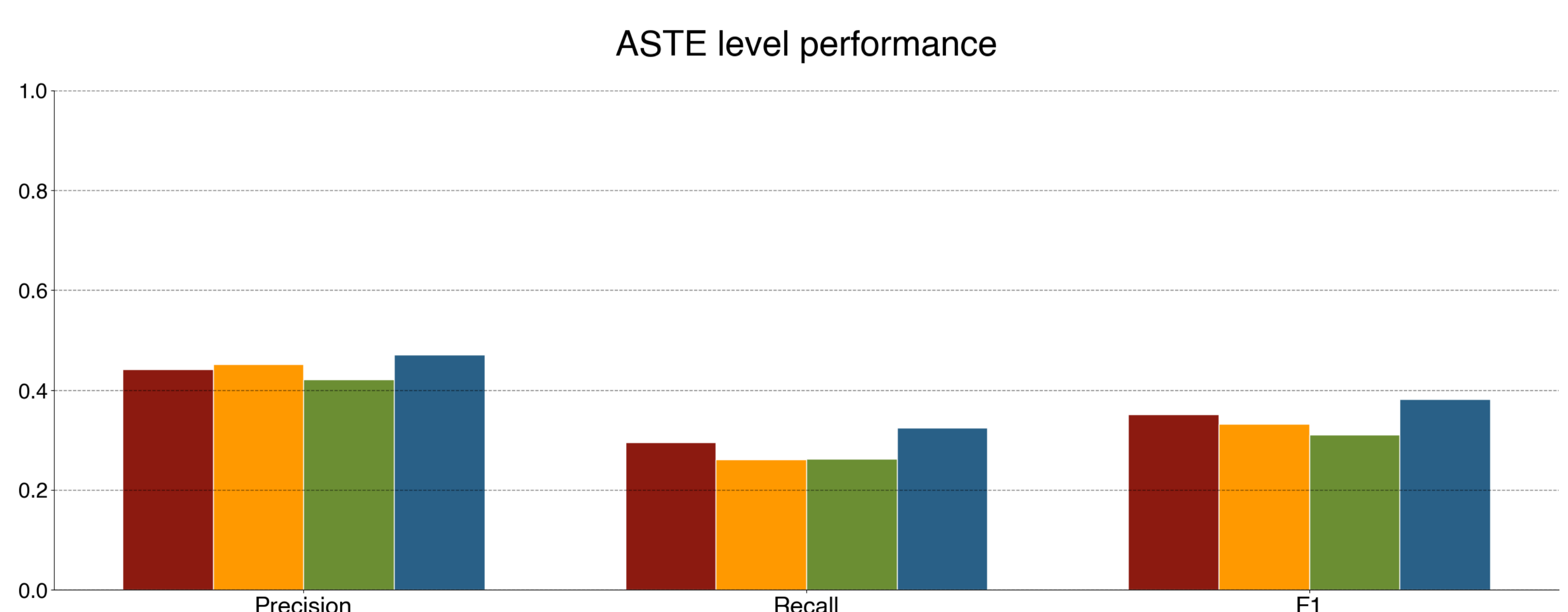
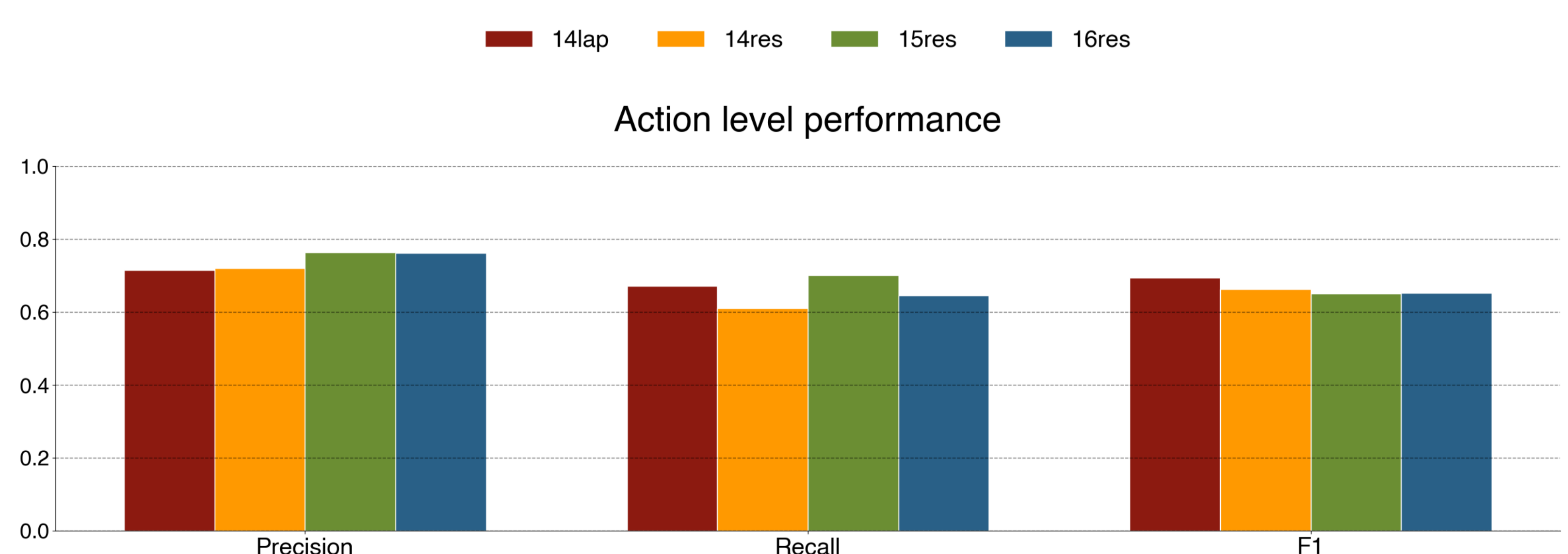
### Results

We report results separately for ASTE task and action selection. In evaluation, we use 3 metrics: **Precision**, **Recall**, and **F1 score**. True positives, false positives, and false negatives for triplet extraction are defined as follows:

$$TP = Y \cap \hat{Y}$$

$$FP = \hat{Y} - Y$$

$$FN = Y - \hat{Y}$$



### Future work

Further work on this type of sentence processing may include utilizing **reinforcement learning** and **state tree construction** for an enhancement of the current processor state dataset that we worked on.

### References & acknowledgements

We thank Ignacy Stępką for implementing the first processor POC.

- Peng et al., Knowing what, how and why: a near complete solution for aspect-based sentiment analysis. Proc. AAAI Conf. Artif. Intell. 34(05), 8600–8607 (2020)