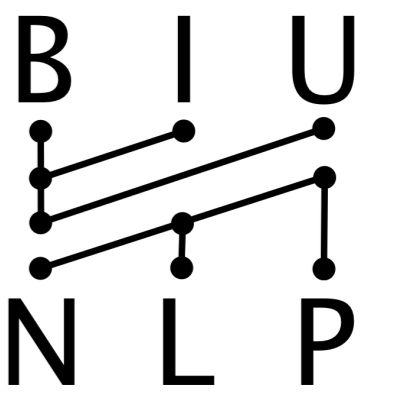


# Integrating Deep Linguistic Features in Factuality Prediction over Unified Datasets



- (1) Large factuality corpus via unification of available annotations
- (2) Extending a factuality predictor to obtain state of the art results
- (3) Corpus, software, and online demo available at:



<https://github.com/gabrielStanovsky/unified-factuality>

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## Detecting Factuality

### Task Definition

Determining commitment towards a proposition:

- “It is not surprising that *it works*” +
- “She will check whether *it worked*” ?
- “The fact is that *it didn’t work*” -

### Motivation

- *Knowledge base population*: Admit factual propositions.
- *Question answering*: Find supporting claims.

### Existing Solutions

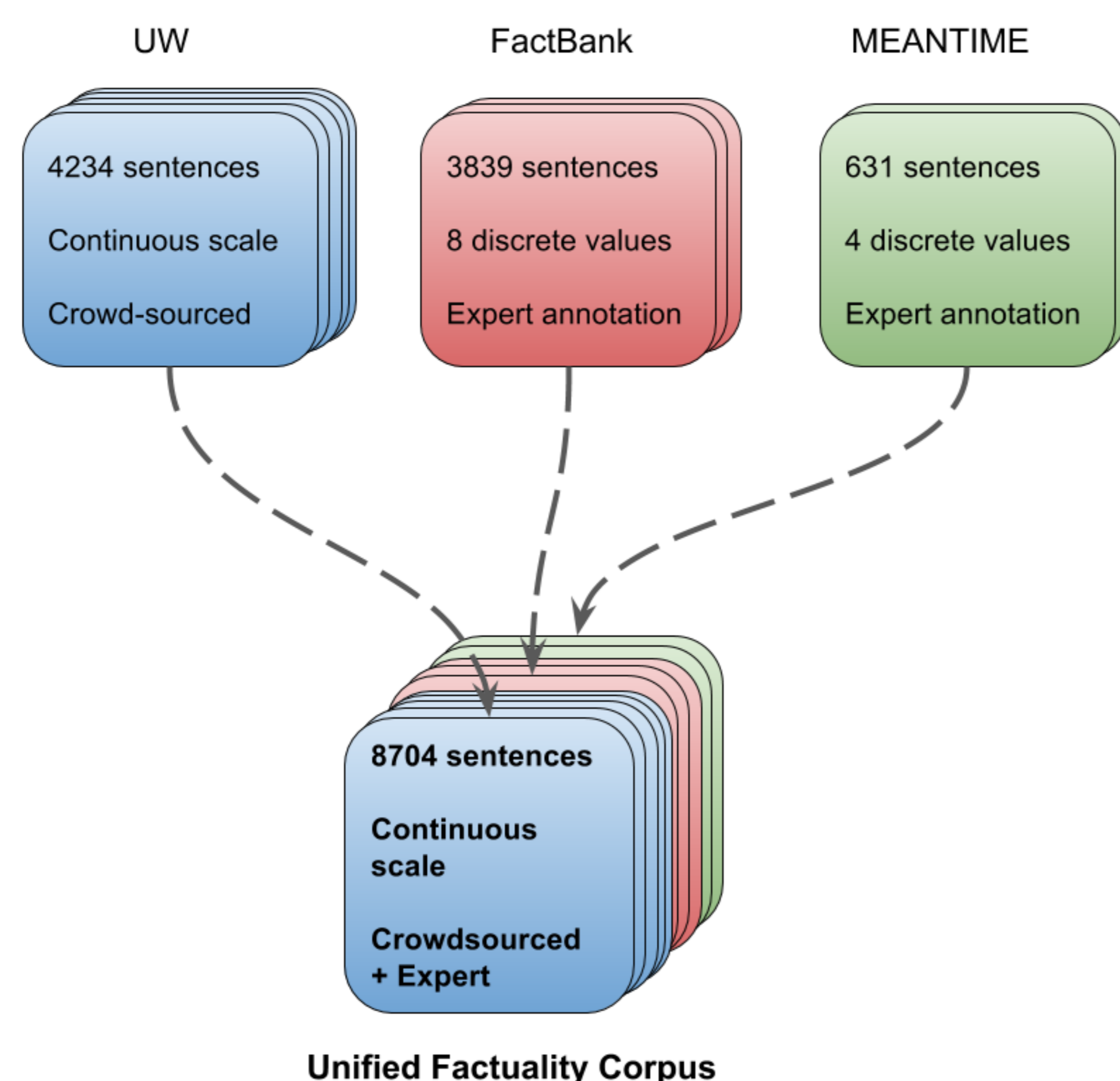
- Annotate, train and test on their *own factuality definition*.
- Inhibits progress in one dataset to carry over to other efforts.

## Unified Factuality

### Representing factuality annotations on the same scale

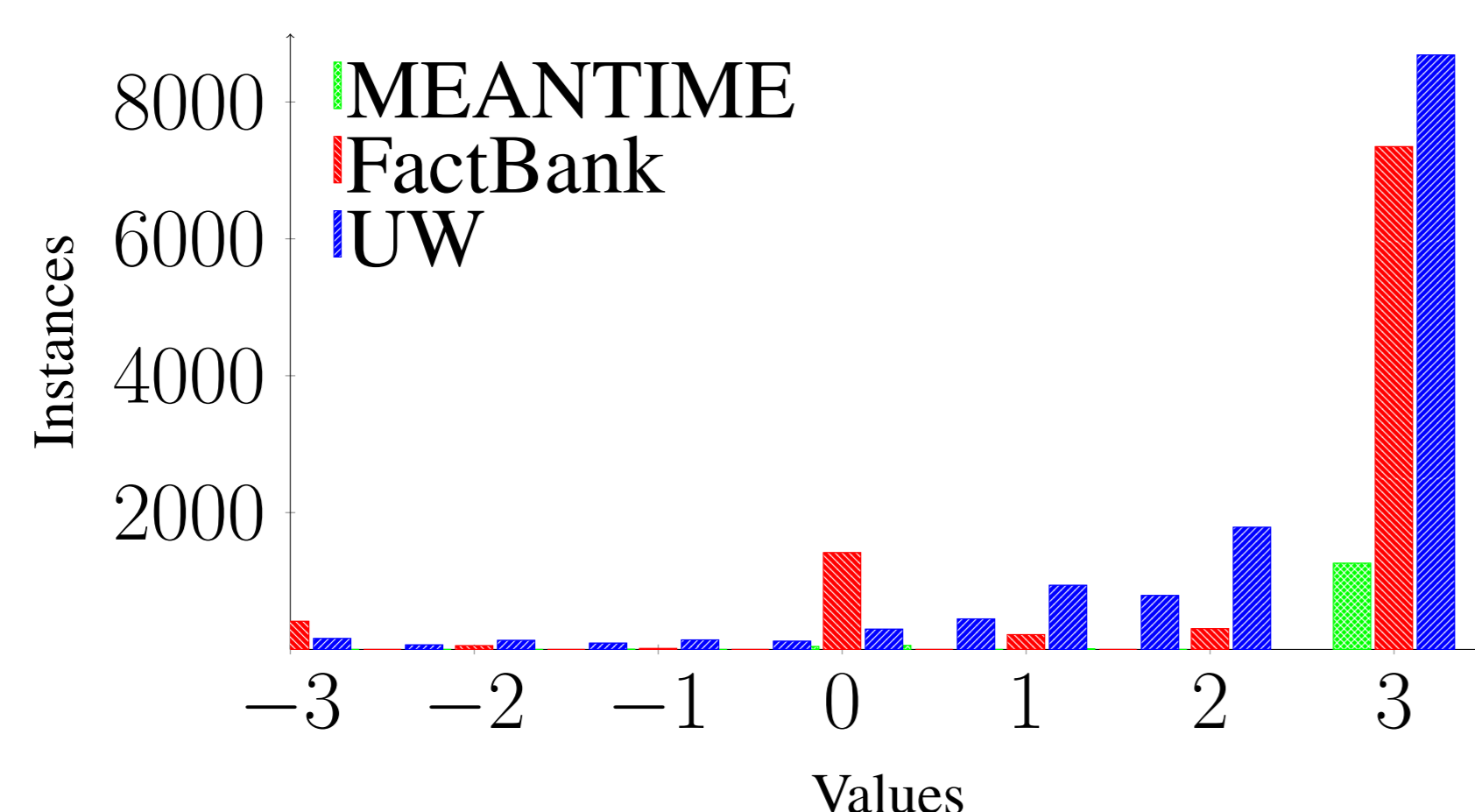
#### Lossless Conversion

Unified representation to map the discrete values of FactBank[5] and MEANTIME[4] onto the continuous UW[2] [-3, +3] range in a rule-based manner.



#### Biased Distribution

All corpora are skewed towards the factual end of the scale. We hypothesize that this is an inherent trait of the news domain.



## Prediction

### Leveraging unified factuality annotations for prediction

#### Extension of TruthTeller[3]

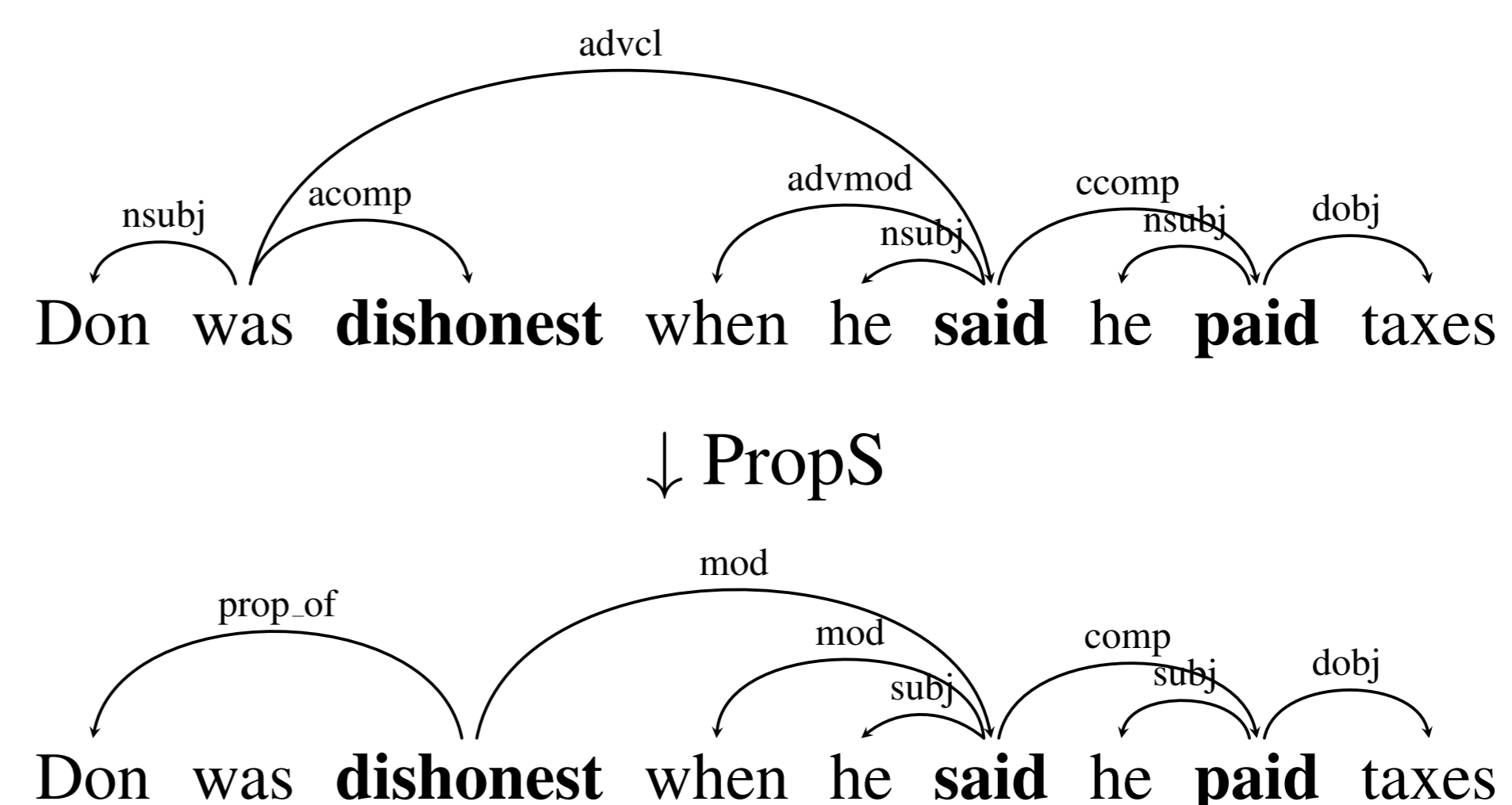
A lexicon based top-down approach on dependency trees, employing Karttunen’s implicative signatures.

#### Extended Lexicon

Semi-automatic mapping from the classes presented in [1]. This extended TruthTeller’s lexicon by roughly 40%.

#### PropS

Syntactic reordering to broaden TruthTeller to non-verbal predicates.



#### Performance

- SVM trained with TruthTeller’s features from the unified training set yields a significant improvement on the larger FactBank and UW.
- The all-factual approach is a simple yet strong baseline, given the inherent bias in the data.

Dataset	FactBank		UW		MEANTIME	
	MAE	<i>r</i>	MAE	<i>r</i>	MAE	<i>r</i>
<b>All-factual</b>	.80	0	.78	0	<b>.31</b>	0
<b>UW feat.<sup>†</sup></b>	.81	.66	.51	<b>.71</b>	.56	.33
<b>AMR</b>	.66	.66	.64	.58	.44	.30
<b>Rule-based</b>	.75	.62	.72	.63	.35	.23
<b>Supervised</b>	<b>.59</b>	<b>.71</b>	<b>.42</b>	.66	.34	<b>.47</b>

## References

- [1] Judith Eckle-Kohler. Verbs taking clausal and non-finite arguments as signals of modality – revisiting the issue of meaning grounded in syntax. In *ACL 2016*.
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- [5] Roser Saurí and James Pustejovsky. Factbank: a corpus annotated with event factuality. *Language resources and evaluation 2009*.