COMET-22:
Unbabel-IST 2022 Submission for the Metrics Shared Task

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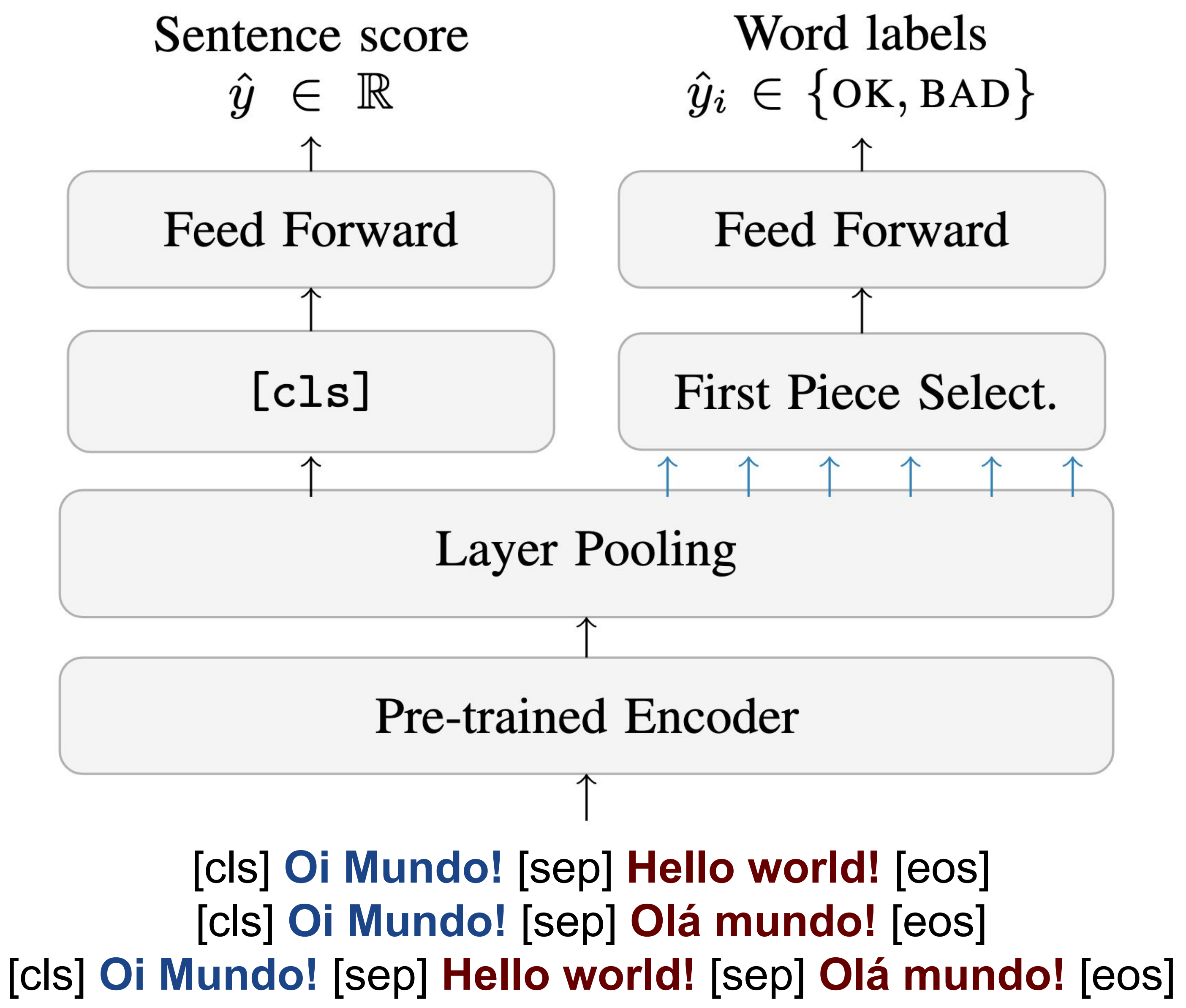
Our submission is an **ensemble between two evaluation models:**

- COMET estimator trained on DA's (similar to the model from Rei et al. 2020)
- New Multitask Model trained on MQM data.

Our **new architecture was specifically designed to learn from MQM data** by taking advantage of MQM error spans along with the final sentence score.

Together these models show **improved correlations** compared to state-of-the-art metrics from last year as well as **increased robustness** to critical errors.

Extending COMET for Sequence Tagging



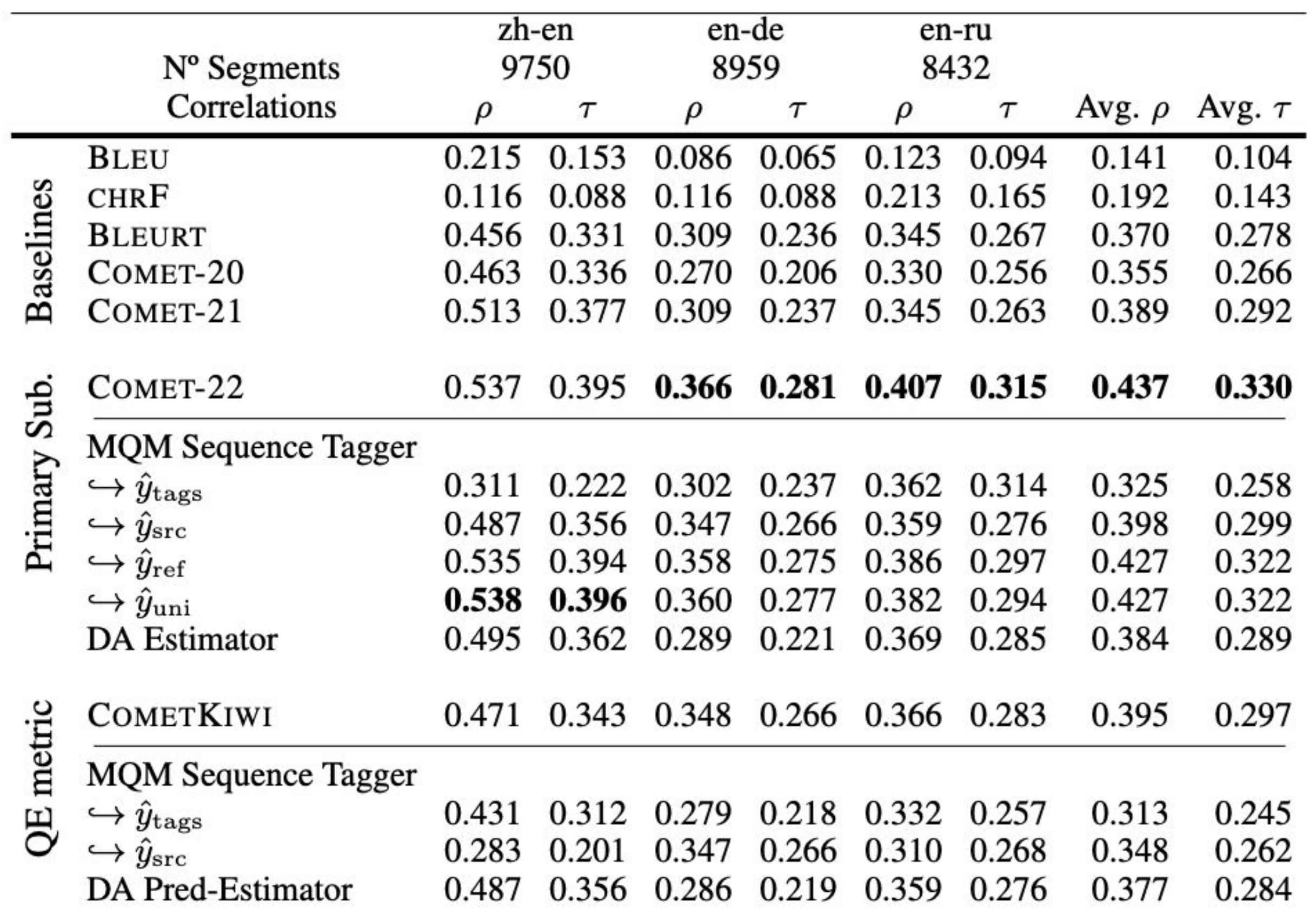
[cls] **Oi Mundo!** [sep] **Hello world!** [eos]
[cls] **Oi Mundo!** [sep] **Olá mundo!** [eos]
[cls] **Oi Mundo!** [sep] **Hello world!** [sep] **Olá mundo!** [eos]

Our new multitask model is inspired by OpenKiwi (Kepler et al. 2019) and UniTE (Wan et al. 2022) and performs both regression and sequence tagging.

From this model we produce 4 scores:
1) Reference score
2) Source score
3) Unified score
4) Tagging score

Since the model is trained with and without references we can also use it for QE-as-a-metric by restricting the access to the reference translation during inference.

Segment-level Correlations



	Nº Segments	zh-en 9750		en-de 8959		en-ru 8432			
	Correlations	ρ	τ	ρ	τ	ρ	τ	Avg. ρ	Avg. τ
Baselines	BLEU	0.215	0.153	0.086	0.065	0.123	0.094	0.141	0.104
	CHRF	0.116	0.088	0.116	0.088	0.213	0.165	0.192	0.143
	BLEURT	0.456	0.331	0.309	0.236	0.345	0.267	0.370	0.278
	COMET-20	0.463	0.336	0.270	0.206	0.330	0.256	0.355	0.266
	COMET-21	0.513	0.377	0.309	0.237	0.345	0.263	0.389	0.292
Primary Sub.	COMET-22	0.537	0.395	**0.366**	**0.281**	**0.407**	**0.315**	**0.437**	**0.330**
	MQM Sequence Tagger								
	$\hookrightarrow \hat{y}_{\text{tags}}$	0.311	0.222	0.302	0.237	0.362	0.314	0.325	0.258
	$\hookrightarrow \hat{y}_{\text{src}}$	0.487	0.356	0.347	0.266	0.359	0.276	0.398	0.299
	$\hookrightarrow \hat{y}_{\text{ref}}$	0.535	0.394	0.358	0.275	0.386	0.297	0.427	0.322
	$\hookrightarrow \hat{y}_{\text{uni}}$	**0.538**	**0.396**	0.360	0.277	0.382	0.294	0.427	0.322
	DA Estimator	0.495	0.362	0.289	0.221	0.369	0.285	0.384	0.289
QE metric	COMETKIWI	0.471	0.343	0.348	0.266	0.366	0.283	0.395	0.297
	MQM Sequence Tagger								
	$\hookrightarrow \hat{y}_{\text{tags}}$	0.431	0.312	0.279	0.218	0.332	0.257	0.313	0.245
	$\hookrightarrow \hat{y}_{\text{src}}$	0.283	0.201	0.347	0.266	0.310	0.268	0.348	0.262
	DA Pred-Estimator	0.487	0.356	0.286	0.219	0.359	0.276	0.377	0.284

Table 1: Segment-level Spearman R (ρ) and Kendall-Tau (τ) correlations for zh-en, en-de and en-ru 2021 MQM annotations for the News Domain.

Robustness to Critical Errors

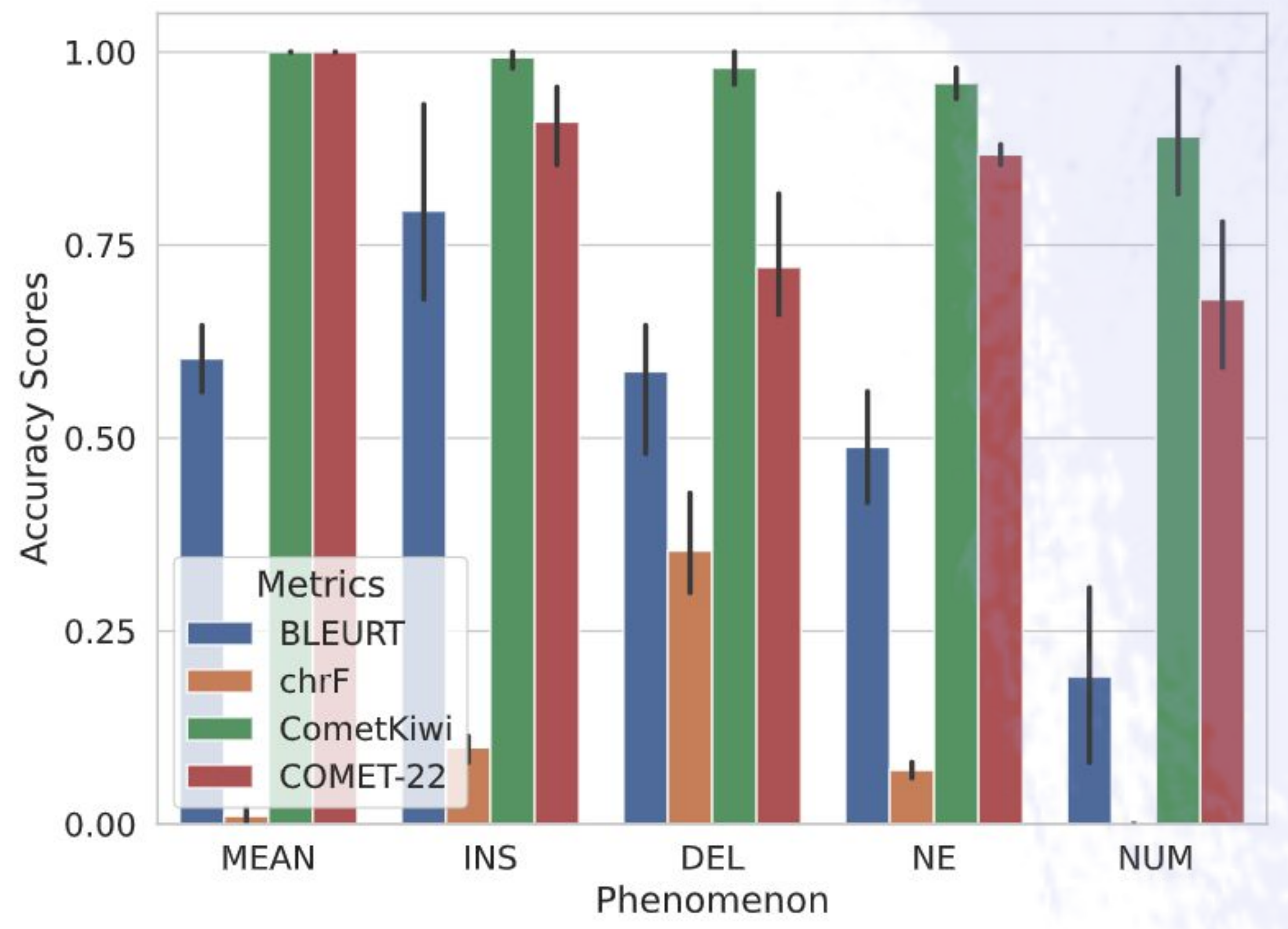


Figure 1: Accuracy Scores on the SMAUG Challenge Set for the baseline and submitted metrics.

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References:
Unbabel's Participation in the WMT20 Metrics Shared Task (Rei et al., WMT 2020)
OpenKiwi: An Open Source Framework for Quality Estimation (Kepler et al., ACL 2019)
UniTE: Unified Translation Evaluation (Wan et al., ACL 2022)

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