FORMALITY STYLE TRANSFORMATION (FST)

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Overview

We experimented with the RNN models and the CoEdit model from Grammarly, transforming an input sentence to a more formal style.By applying various metrics to our models' implementation, we measured the change in formality. Metrics used: a statistical metric of perceived formality, BLEU, TER(p), PINC.

What is formality style transfer?

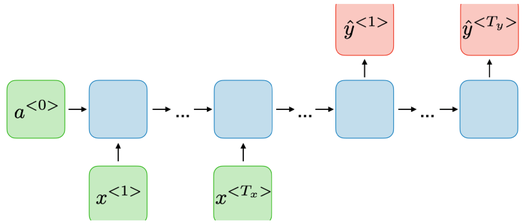
- **Formality style transfer:** A text conversion process switching between informal and formal.
- **The Role of Technology in Learning**: Automatic Formality Style Transfer.
- **Advancements of NLP in Formality Transformation**: Cutting-edge methods (Neural Machine Translation).

Why is it important?

- **Academia:** Maintain formality of academic materials.
- **Business and Service:** Enhance professionalism.
- **Language Learning:** Support improvement of formal writing style.

Many-to-many RNN model

PyTorch



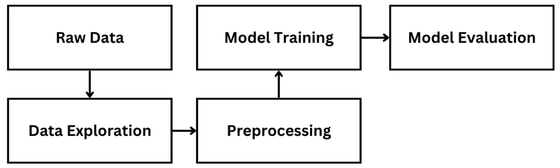
Evaluation:

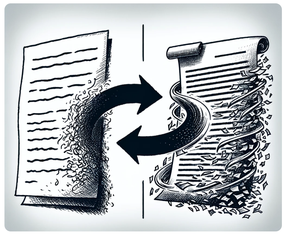
Metric / Set	BLEU Higher=Better	TER+ (TERp) Lower=Better	TER Lower=Better	PINC(n=2) Lower=Better
Validation	0.057	0.943	5.78	0.653
Test	0.061	0.938	5.56	0.639

Dataset: GYAFC (Grammarly's Yahoo Answers Formality Corpus)

- Formality prediction dataset.
- Diverse sources, diverse styles.
- Two main domains:
  Family & Relationships and **Entertainement & Music**.
- One-to-one mapping in the train set.
- Validation set and Test set: four references for each .

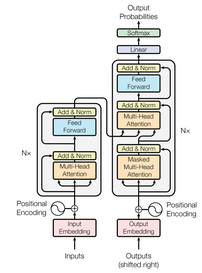
Overall process





CoEdit large

grammarly



Example Input	Example Output
Fix the grammar: When I grow up, I start to understand what he said is quite right.	When I grew up, I started to understand what he said was quite right.
Make this text coherent: Their flight is weak. They run quickly through the tree canopy.	Their flight is weak, but they run quickly through the tree canopy.
Rewrite to make this easier to understand: A storm surge is what forecasters consider a hurricane's most treacherous aspect.	A storm surge is considered a hurricane's most dangerous aspect.
Paraphrase this: They wouldnt want u stepping in.	They would not desire your interference.
Write this more formally: omg i love that song im listening to it right now	I love that song and I am listening to it at this moment.
Write in a more neutral way: The authors' exposé on nutrition studies.	The authors' statements on nutrition studies.

Evaluation:

Pretrained

		BLEU-1 ↑	BLEU-2 ↑	BLEU-3 ↑	BLEU-4 ↑	SacreBLEU ↑	TER ↓	TERp ↓	PINC ↑	Formality ↑
Raw	Val	82.74	74.09	66.66	59.85	59.91	0.3339	0.0845	0.5746	-0.0565
	Test	82.01	73.63	66.38	59.72	59.77	0.33	0.0908	**0.5718**	**-0.0517**
Rule-based preprocess	Val	**83.09**	**74.45**	**66.97**	**60.08**	**60.14**	**0.3316**	**0.0837**	**0.5776**	**-0.0495**
	Test	**82.12**	**73.79**	**66.56**	**58.93**	**59.97**	**0.3289**	**0.09**	0.5692	-0.0523

Finetuned test

BLEU-1 ↑	BLEU-2 ↑	BLEU-3 ↑	BLEU-4 ↑	SacreBLEU ↑	TER ↓	TERp ↓	PINC ↑	Formality ↑
2.33	0.67	0	0	0	4.6043	0.0042	0.9985	0.1616

Metrics for Style Transfer Evaluation

- **Formality:** Scoring formality of n-grams in sentences
- **Bilingual Evaluation Understudy (BLEU):** n-gram matching precision and similarity.
- **Translation Edit Rate (TER):** Measuring edit frequency.
- **Translation Edit Rate Plus (TERp):** Extension of TER, Correlations among stems, synonyms, chosen phases.
- **Paraphrase In N-gram Changes (PINC):** Measures paraphrasing by comparing the ratio of new n-grams to reference n-grams.

Conclusions

- **Our RNN and LSTM-based model:**
  - BiLSTM model.
  - Yielded tragic outcome.
- **CoEdit-large model**:
  - Pretrained CoEdit-large: better results compared to our LSTM-based.
  - Finetuned CoEdit-large: severely deteriorated the result.
- **Future Work - Fluency and Meaning Preservation Metrics:**
  - Explicit Fluency and Meaning preservation evaluation.
  - Optimize grammatical correctness and semantic content retention.

References

- "Dear Sir or Madam, May I Introduce the GYAFC Dataset: Corpus, Benchmarks and Metrics for Formality Style Transfer" (Paper)
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- Vipul Raheja, Dhruv Kumar, Ryan Koo, and Dongyeop Kang. 2023. CoEdIT: Text Editing by Task-Specific Instruction Tuning. In Findings of the Association for Computational Linguistics: EMNLP 2023, pages 5274–5291, Singapore. Association for Computational Linguistics.