

Context-Aware Machine Translation with Explicit Contextual Information

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Abstract:

Despite significant improvements in translation quality, machine translation (MT) systems still underperform when making context-dependent translation decisions, particularly in the settings of context-aware machine translation and translation into gender-marking languages. In context-aware MT, one of the main reasons is that they fail to utilize the correct features from context when the context is too long or their models are overly complex. This can lead to the explain-away effect, wherein the models only consider features easier to explain predictions, resulting in inaccurate translations. To address this issue, we propose a model that explains the decisions made for translation by predicting coreference features in the input. We construct a model for input coreference by exploiting contextual features from both the input and translation output representations on top of an existing MT model. We evaluate and analyze our method in the WMT document-level translation task of English–German dataset, the English–Russian dataset, and the multilingual TED talk dataset, demonstrating an improvement of over 1.0 BLEU score when compared with other context-aware models.

In the setting of translation into gender-marking languages, translation models often fail to utilize contextual evidence relevant to gender and instead rely on implicit gender preferences acquired during pretraining, resulting in incorrect gender translations. To address this issue, we propose a framework that explicitly incorporates gender information into the translation process. The proposed approach first infers entity gender from contextual cues using large language models and then incorporates the inferred gender information into translation prompts. We evaluate our method across five large language models and four language pairs,

demonstrating that explicit gender information consistently improves translation quality and gender translation accuracy in zero-shot machine translation.

Together, these contributions provide practical solutions to enhance the effective utilization of contextual information in machine translation.