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| Paper Title: | Multi-Task Learning for Multiple Language Translation |
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| Research Question | Can a machine translation model simultaneously translate sentences from one source language to multiple target languages? |
| Related Work | Statistical machine translation systems often rely on large-scale parallel and monolingual training corpora to generate translation. However, it suffers from data sparsity as phrase tables are extracted from the limited bilingual corpus. Researchers have done much work to address this problem. A very common work in the SMT is the pivot language approach that uses commonly used language as the bridge to generate source-target translation.  Kalchbrenner and Blunsom, 2013; Sutskever et al., 2014; Bahdanau et al., 2014 have proposed on an emerging new field of machine translation called neural machine translation. Here an RNN encoder-decoder approach is used for the neural machine translation model for multi-task learning.  Hatori et al. (2012) have proposed a jointly trained word segmentation, POS tagging and dependency parsing which can be used in multi-task learning approach. |
| Experiment Design | **Approach:**  The model the authors are working on is a general framework for translating one source language to many target languages. The model is a recurrent neural network-based encoder-decoder model with multiple target tasks, and each task is a specific translation direction.  **Experiments:**   1. Dataset: The Europarl corpus which is a multi-lingual corpus of 21 European languages was used. The source language was English and 4 European languages viz Spanish (Es), French (Fr), Portugues (Pt), and Dutch (Nl) were used. 2. Experimental Settings: They showed two groups of experiment:  * Multi-task learning helps to improve translation performance when enough training corpora of all languages are given. * for languages whose resources are poor, with a few parallel training data, their translation performance also improves. |
| Result | 1. A unified machine learning framework that can used to translate one source language into multiple target languages was designed. 2. Comparing their model to a neural translation model trained for a single language pair, their framework show improvement in the translation quality on each target language when they use a large-scale training corpora. 3. Their model is also able to alleviate the data scarcity problem, using language pairs with the large-scale parallel training corpora.   **S** |