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arXiv:1604.00788 (cs)

[Submitted on 4 Apr 2016 (v1), last revised 23 Jun 2016 (this version, v2)]

Achieving Open Vocabulary Neural Machine Translation with Hybrid Word-Character Models

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Nearly all previous work on neural machine translation (NMT) has used quite restricted vocabularies, perhaps with a subsequent method to patch in unknown words. This paper presents a novel word-character solution to achieving open vocabulary NMT. We build hybrid systems that translate mostly at the word level and consult the character components for rare words. Our character-level recurrent neural networks compute source word representations and recover unknown target words when needed. The twofold advantage of such a hybrid approach is that it is much faster and easier to train than character-based ones; at the same time, it never produces unknown words as in the case of word-based models. On the WMT'15 English to Czech translation task, this hybrid approach offers an addition boost of +2.1-11.4 BLEU points over models that already handle unknown words. Our best system achieves a new state-of-the-art result with 20.7 BLEU score. We demonstrate that our character models can successfully learn to not only generate well-formed words for Czech, a highly-inflected language with a very complex vocabulary, but also build correct representations for English source words.

Comments: 11pages, 4 figures. ACL 2016 camera-ready version. SOTA WMT'15 English-Czech 20.7 BLEU (+2.1-11.4 points)

Subjects: **Computation and Language (cs.CL)**; Machine Learning (cs.LG)
Cite as: **arXiv:1604.00788 [cs.CL]**
(or **arXiv:1604.00788v2 [cs.CL]** for this version)
https://doi.org/10.48550/arXiv.1604.00788
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Submission history

From: Minh-Thang Luong [view email]
[v1] Mon, 4 Apr 2016 09:30:54 UTC (53 KB)
[v2] Thu, 23 Jun 2016 00:50:19 UTC (60 KB)
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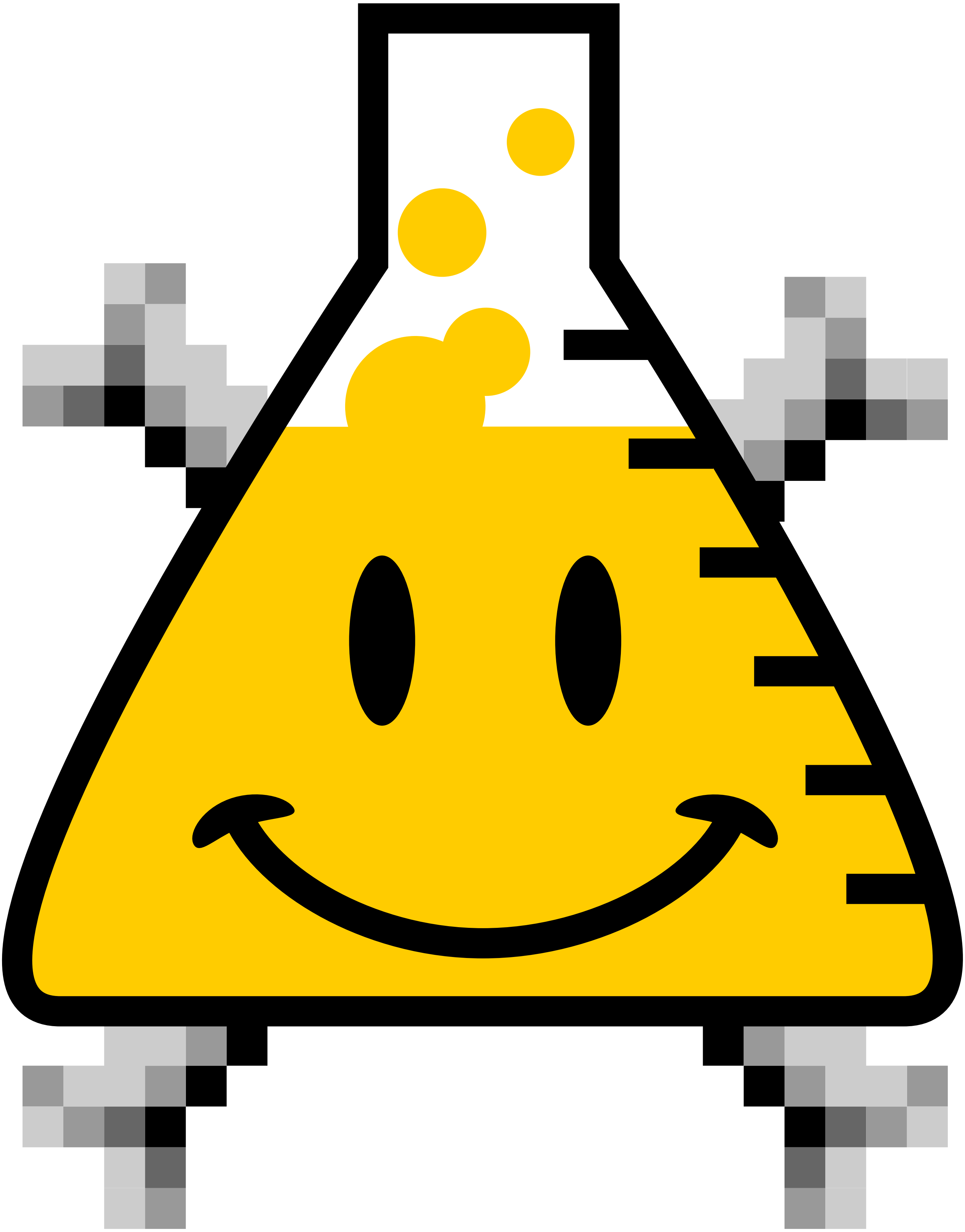

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