

Title: Exploring Benefits of Transfer Learning
in Neural Machine Translation

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Abstract:

Neural machine translation is known to require large numbers of parallel training sentences, which generally prevent it from excelling on low-resource language pairs. This thesis explores the use of cross-lingual transfer learning on neural networks as a way of solving the problem with the lack of resources. We propose several transfer learning approaches to reuse a model pretrained on a high-resource language pair. We pay particular attention to the simplicity of the techniques. We study two scenarios: (a) when we reuse the high-resource model without any prior modifications to its training process and (b) when we can prepare the first-stage high-resource model for transfer learning in advance. For the former scenario, we present a proof-of-concept method by reusing a model trained by other researchers. In the latter scenario, we present a method which reaches even larger improvements in translation performance. Apart from proposed techniques, we focus on an in-depth analysis of transfer learning techniques and try to shed some light on transfer learning improvements. We show how our techniques address specific problems of low-resource languages and are suitable even in high-resource transfer learning. We evaluate the potential drawbacks and behavior by studying transfer learning in various situations, for example, under artificially damaged training corpora, or with fixed various model parts.