CS288 Natural Language Processing
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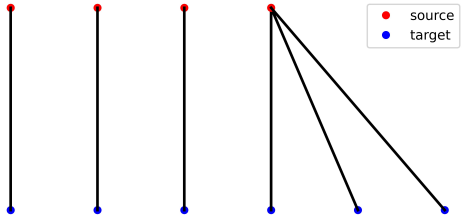
Due on 02/22/23 11:00 pm PST

Report - Homework #2

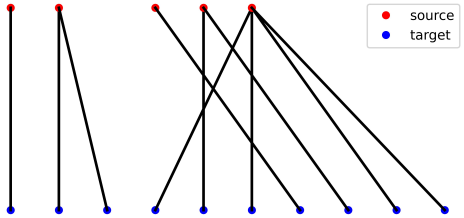
1 Alignment with IBM Model 1

The IBM alignment model performs well on sentence ['diese', 'mnner', 'machen', 'kampfsport'], ['these', 'men', 'are', 'practicing', 'martial', 'arts'], as shown in (a).

It fails catastrophically in the following example ['zwei', 'bauarbeiter', 'sitzen', 'auf', 'einem', 'stahlbalken'], ['two', 'construction', 'workers', 'take', 'a', 'seat', 'on', 'a', 'steel', 'beam'] as shown in (b), which I think is because it predicts alignment word by word without seeing the context or phrase. So it would be easily confused when casting ['take', 'a', 'seat'] to ['sitzen'] and ['steel', 'beam'] to ['stahlbalken'].



(a) Good Alignment



(b) Bad Alignment

2 Training Language Models

The attention maps line up almost perfectly with my intuition! Most of them are one-to-one alignments, but there are also many-to-one alignments when several words or subwords in the source language together express a meaning. A example would be [_Baum, w, ol, le] aligned with [_cott, on] in the first table.

Attention maps and alignments in Part A are both matching word to word according to their meanings, while attention maps are soft alignments allowing many words in the source language to correspond with a single target word.