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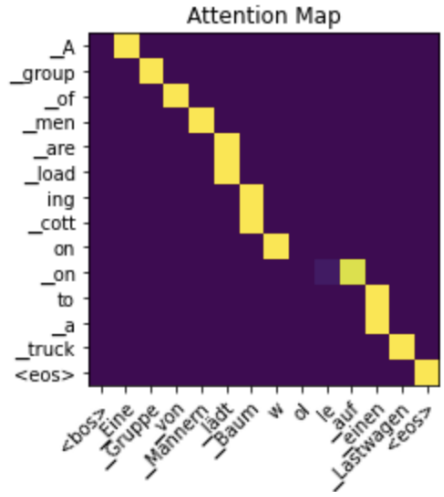
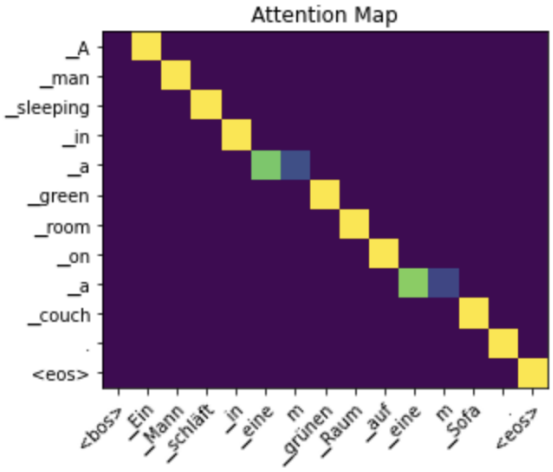
CS288 Project 2 Report

Here are four attention maps that I've generated using my code:

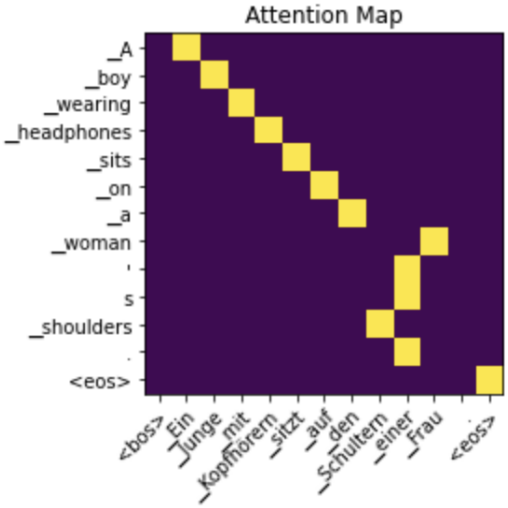
Source Sentence 1: <bos> Eine Gruppe von Männern lädt Baumwolle auf einen Lastwagen <eos>
Target Sentence 1: A group of men are loading cotton onto a truck <eos>
Source Sentence 2: <bos> Ein Mann schläft in einem grünen Raum auf einem Sofa. <eos>
Target Sentence 2: A man sleeping in a green room on a couch. <eos>
Source Sentence 3: <bos> Ein Junge mit Kopfhörern sitzt auf den Schultern einer Frau. <eos>
Target Sentence 3: A boy wearing headphones sits on a woman's shoulders. <eos>
Source Sentence 4: <bos> Zwei Männer bauen eine blaue Eisfischerhütte auf einem zugefrorenen See auf <eos>
Target Sentence 4: Two men setting up a blue ice fishing hut on an iced over lake <eos>



The alignments line up with my intuition because each German word translates successfully to the corresponding English word marked in the attention maps most of the time, and this is also verified through checking Google Translate. The alignments are mainly one-to-one, with the occasional one-to-many and many-to-one alignments (some of which are due to a particular English/German word being split across multiple consecutive tokens, since some consecutive tokens are not separated by spaces and, when combined, form one word). All of this is expected because most of the time a German word maps to the exact English word and translates exactly to it, reflecting the attention sequence-to-sequence model's ability to use its decoder to generate a correct prediction that corresponds to the target sentence. The many one-to-one alignments in the maps imply that my attention model is able to grammatically break down the German sentence word by word and map the words of the German sentence to each respective English word.



One interesting alignment is the alignment of "Eisfischerhütte" to "ice fishing hut" in the fourth attention map. "Eis" maps to "ice", "f" maps to "fishing" and "hut", "ischer" maps to "hut", and "hütte" maps to "hut". The fact that all of those German words can map to the English phrase to some degree successfully demonstrates the attention model's reliability in providing an accurate translation for more complicated phrases of German to English. Additionally, it is interesting that "f" maps to both "fishing and "hut", because "f" might imply "fishing" but doesn't appear to imply "hut" immediately. However "Eisfischerhütte" as a whole does map successfully to "ice fishing hut".



One thing to note is that there is some distortion in the alignments from the main diagonal in the third attention map. In the fourth attention map, there is an absence of alignments for tokens 'eine', 'ge', 'r', 'or', 'en', 'en', 'auf', '<eos>', which implies that the performance of the attention model can become poorer when it has to decode longer, more complex sentences. For the most part, though, with the majority of consistent-looking one-to-one alignments of German words to English words, the model has proven to be robust in providing reliable alignments and thus has demonstrated its translation potential.