Assignment 5: Sequence to Sequence Models

Homework assignments will be done individually: each student must hand in their own answers. Use of partial or entire solutions obtained from others or online is strictly prohibited. Electronic submission on Canvas is mandatory.

Machine Translation (100 points)

A Sequence to Sequence network, or seq2seq network, is a model consisting of two separate RNNs called the encoder and decoder. The encoder reads an input sequence one item at a time, and outputs a vector at each step. The final output of the encoder is kept as the context vector. The decoder uses this context vector to produce a sequence of outputs one step at a time.
The attention mechanism introduced by Bahdanau et al. gives the decoder a way to "pay attention" to parts of the input, rather than relying on a single vector. For every step the decoder can select a different part of the input sentence to consider.

- Download a pair of languages here. (French-English or German-English is preferred.)
- (60 pts) Implement an encoder RNN class, a decoder RNN class, and an attention Decoder RNN class.
- (10 pts) Divide the data into training and testing or use cross-validation. Train the model on the training data. Print the training loss every 200 iterations.
- (10 pts) Select a set of sentences from the testing data, and print the translation results from the model (compare to the ground truth).
- (20 pts) Compute the BLEU score for the testing data set.