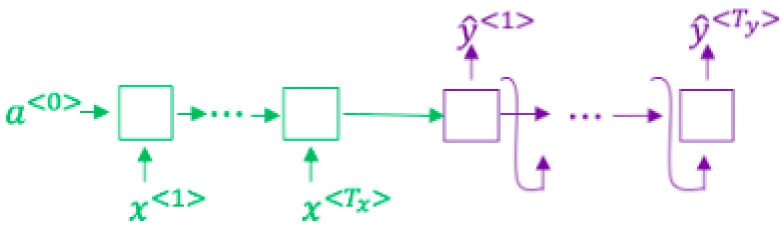
C5W3-Quiz-Seq.M-Attention-Mech.

1. Consider using this encoder-decoder model for machine translation.



This model is a “conditional language model” in the sense that the encoder portion (shown in green) is modeling the probability of the input sentence xx.

- [ ] **True**
- [x] ~~**False**~~

2. In beam search, if you increase the beam width BB, which of the following would you expect to be true? Check all that apply.

- [x] ~~**Beam search will run more slowly.**~~
- [ ] **Beam search will converge after fewer steps.**
- [x] ~~**Beam search will use up more memory.**~~
- [x] ~~**Beam search will generally find better solutions (i.e. do a better job maximizing $P(y \mid x)$)**~~

3. In machine translation, if we carry out beam search without using sentence normalization, the algorithm will tend to output overly short translations.

- [x] ~~**True**~~
- [ ] **False**

4. Suppose you are building a speech recognition system, which uses an RNN model to map from audio clip x to a text transcript y. Your algorithm uses beam search to try to find the value of y that maximizes $P(y \mid x)$.

On a dev set example, given an input audio clip, your algorithm outputs the transcript $\hat{y}$ = “I’m building an A Eye system in Silly con Valley.”, whereas a human gives a much superior transcript $y*$ = “I’m building an AI system in Silicon Valley.”

According to your model,

$P(\hat{y} \mid x) = 1.09 * 10^{-7}$

$P(y* \mid x) = 7.21 * 10^{-8}$

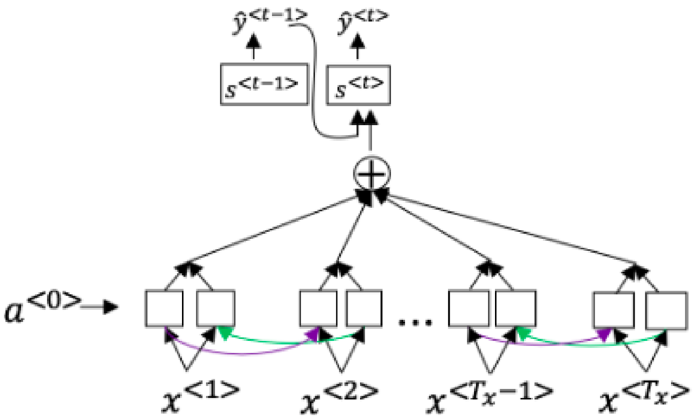
Would you expect increasing the beam width B to help correct this example?

- [x] ~~No, because $P(y* \mid x) \leq P(\hat{y} \mid x)$ indicates the error should be attributed to the RNN rather than to the search algorithm.~~
- [ ] **Yes, because $P(y* \mid x) \leq P(\hat{y} \mid x)$ indicates the error should be attributed to the search algorithm rather than to the RNN.**
- [ ] **No, because $P(y* \mid x) \leq P(\hat{y} \mid x)$ indicates the error should be attributed to the search algorithm rather than to the RNN.**
- [ ] **Yes, because $P(y* \mid x) \leq P(\hat{y} \mid x)$ indicates the error should be attributed to the RNN rather than to the search algorithm.**

5. Continuing the example from Q4, suppose you work on your algorithm for a few more weeks, and now find that for the vast majority of examples on which your algorithm makes a mistake, $P(y* \mid x) > P(\hat{y} \mid x)$. This suggests you should focus your attention on improving the search algorithm.

- [x] ~~True.~~
- [ ] **False.**

6. Consider the attention model for machine translation.



Further, here is the formula for $\alpha^{<t,t'>}$.

$$\alpha^{<t,t'>} = \frac{\exp(e^{<t,t'>})}{\sum_{t'=1}^{T_x} \exp(e^{<t,t'>})}$$

Which of the following statements about $\alpha^{<t,t'>}$ are true? Check all that apply.

- [x] ~~$\sum_{t'} \alpha^{<t,t'>}=1$ (Note the summation is over t'.)~~
- [x] ~~We expect $\alpha^{<t,t'>}$ to be generally larger for values of $a^{<t'>}$ that are highly relevant to the value the network should output for $y^{<t>}$. (Note the indices in the superscripts.)~~
- [ ] **We expect $\alpha^{<t,t'>}$ to be generally larger for values of $a^{<t>}$ that are highly relevant to the value the network should output for $y^{<t'>}$. (Note the indices in the superscripts.)**
- [ ] **$\sum_{t} \alpha^{<t,t'>}=1$ (Note the summation is over t.)**

7. The network learns where to “pay attention” by learning the values $e^{<t,t'>}$, which are computed using a small neural network:

   We can't replace $s^{<t-1>}$ with $s^{<t>}$ as an input to this neural network. This is because $s^{<t>}$ depends on $\alpha^{<t,t'>}$ which in turn depends on $e^{<t,t'>}$; so at the time we need to evaluate this network, we haven’t computed $s^{<t>}$ yet.

   - [ ] **False**
   - [x] ~~True~~

8. Compared to the encoder-decoder model shown in Question 1 of this quiz (which does not use an attention mechanism), we expect the attention model to have the greatest advantage when:

   - [x] ~~The input sequence length Tx is large.~~
   - [ ] **The input sequence length T*x* is small.**

9. Under the CTC model, identical repeated characters not separated by the "blank" character (_) are collapsed. Under the CTC model, what does the following string collapse to?

   __c_oo_o_kk___b_ooooo__oo__kkk

   - [ ] **cooookkbooooooookkk**
   - [x] ~~cookbook~~
   - [ ] **cook book**
   - [ ] **cokbok**

10. In trigger word detection, *x*<*t*> is:

    - [ ] **Whether someone has just finished saying the trigger word at time *t*.**
    - [ ] **The *t*-th input word, represented as either a one-hot vector or a word embedding.**
    - [ ] **Whether the trigger word is being said at time *t*.**
    - [x] ~~Features of the audio (such as spectrogram features) at time *t*.~~