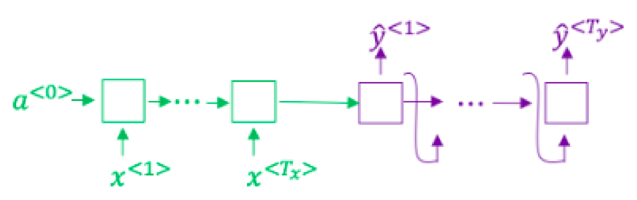
1 point

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 x.

- True
- False

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1 point

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

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

---

1 point

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

- True
- False

---

1 point

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?

- 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.
- 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.
- 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.

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1 point

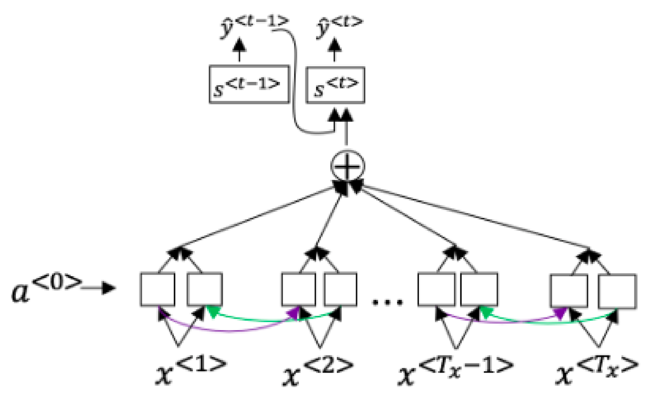
5. Continuing the example from Q4, suppose you work on your algorithm for a few more weeks, and now find that for the vast majority of examples on which your algorithm makes a mistake, $P(y^* \mid x) > P(\hat{y} \mid x)$. This suggest you should focus your attention on improving the search algorithm.

- True.
- False.

---

1 point

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.

- 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.)
- $\sum_{t'} \alpha^{<t,t'>} = 1$ (Note the summation is over t'.)

---

1 point

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 evalute this network, we haven't computed $s^{<t>}$ yet.

- True
- False

---

1 point

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:

- The input sequence length T_x is large.
- The input sequence length T_x is small.

---

1 point

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

- cokbok
- cookbook
- cook book
- coookkbooooooookkk

---

1 point

10. In trigger word detection, $x^{<t>}$ is:

- Features of the audio (such as spectrogram features) 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.
- Whether someone has just finished saying the trigger word at time t.

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