Sequence models & Attention mechanism
Graded Quiz • 30 min

Due Jan 11, 1:59 AM CST

QUIZ • 30 MIN

Sequence models & Attention mechanism

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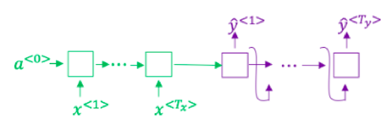
1. Consider using this encoder-decoder model for machine translation. **1 / 1 point**



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

✓ **Correct**

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. **1 / 1 point**

- [x] Beam search will run more slowly.

✓ **Correct**

- [x] Beam search will use up more memory.

✓ **Correct**

- [x] Beam search will generally find better solutions (i.e. do a better job maximizing $P(y \mid x)$)

✓ **Correct**

- [ ] Beam search will converge after fewer steps.

3. In machine translation, if we carry out beam search without using sentence normalization, the algorithm will tend to output overly short translations. **1 / 1 point**

- (•) True
- ( ) False

✓ **Correct**

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 $P(y \mid x)$. **1 / 1 point**

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.

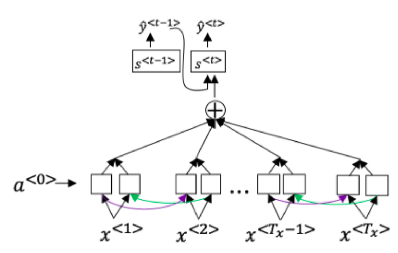
✓ **Correct**

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. **1 / 1 point**

- (•) True.
- ( ) False.

✓ **Correct**

6. Consider the attention model for machine translation. **1 / 1 point**



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] 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.)

✓ **Correct**

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

✓ **Correct**

7. The network learns where to "pay attention" by learning the values $e^{<t,t'>}$, which are computed using a small neural network: **1 / 1 point**

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

✓ **Correct**

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: **1 / 1 point**

- (•) The input sequence length T_x is large.
- ( ) The input sequence length T_x is small.

✓ **Correct**

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? **1 / 1 point**

__c_oo_o_kk___b_ooooo__oo__kkk

- ( ) cokbok
- (•) cookbook
- ( ) cook book
- ( ) coookkbooooooookkk

✓ **Correct**

10. In trigger word detection, $x^{<t>}$ is: **1 / 1 point**

- (•) 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.

✓ **Correct**