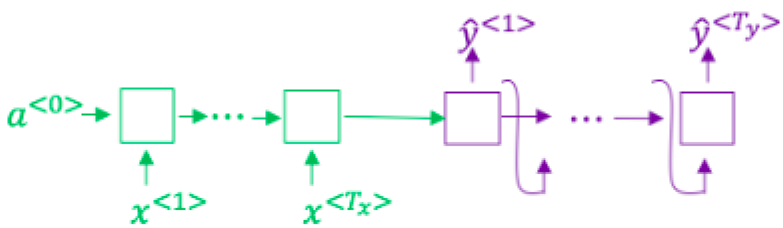
Sequence Models & Attention Mechanism

LATEST SUBMISSION GRADE

100%

1.
Question 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.

1 / 1 point

- (•) False
- ( ) True

Correct

2.
Question 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 generally find better solutions (i.e. do a better job maximizing $P(y \mid x)$)

Correct

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

Correct

☐

Beam search will converge after fewer steps.

☑

Beam search will run more slowly.

Correct

3.

Question 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

○

False

◉

True

Correct

4.

Question 4

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

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

According to your model,

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

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

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

1 / 1 point

○

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

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

Correct

5.

Question 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)$P(y^*|x) > P(\hat{y}|x)$. This suggests you should focus your attention on improving the search algorithm.

1 / 1 point

False.

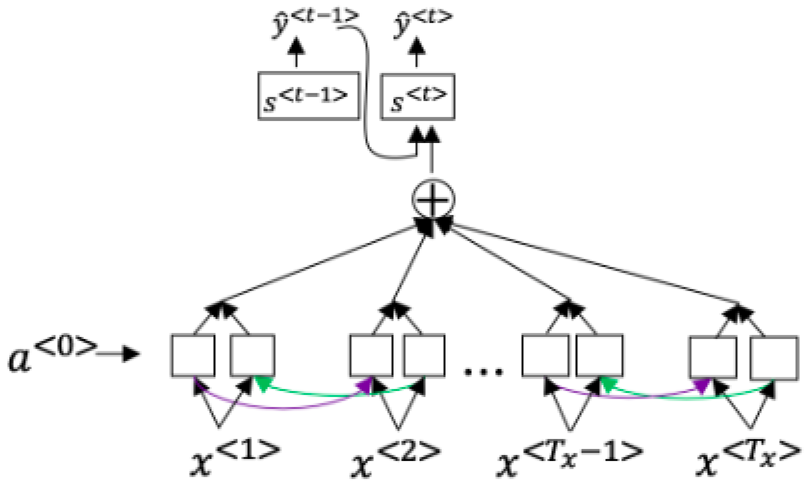
True.

Correct

6.

Question 6

Consider the attention model for machine translation.



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

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

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

1 / 1 point

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

Correct

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

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

Correct

- [ ]

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

7.
Question 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.

1 / 1 point

True

False

Correct

8.
Question 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 small.

The input sequence length T_x is large.

Correct

9.
Question 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

1 / 1 point

coookkbooooooookkk

◉

cookbook

○

cokbok

○

cook book

Correct

10.

Question 10

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

1 / 1 point

○

Whether someone has just finished saying the trigger word at time tt.

○

The tt-th input word, represented as either a one-hot vector or a word embedding.

○

Whether the trigger word is being said at time tt.

◉

Features of the audio (such as spectrogram features) at time tt.

Correct