Quiz: Sequence Models & Attention Mechanism

✔ Congratulations! You passed!

Grade received 90%

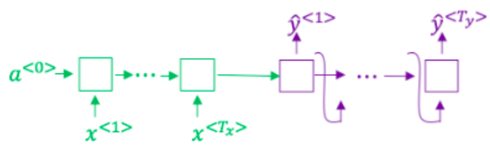
Latest Submission Grade 90%

To pass 80% or higher

Go to next item

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

1 / 1 point



True/False: This model is a "conditional language model" in the sense that the decoder portion (shown in purple) is modeling the probability of the output sentence y given the input sentence x.

- ○ False
- ◉ True

Correct

The encoder-decoder model for machine translation models the probability of the output sentence y conditioned on the input sentence x.

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

1 / 1 point

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

Expand

Correct

As the beam width increases, beam search runs more slowly, uses up more memory, and converges after more steps, but generally finds better solutions.

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

Expand

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,

$P(\hat{y} \mid x) = 1.95*10^{-7}$

$P(y^* \mid x) = 3.42*10^{-9}$

True/False: Trying a different network architecture could help correct this example.

- (●) True
- ( ) False

Expand

Correct
$P(y^* \mid x) < P(\hat{y} \mid x)$ indicates the error should be attributed to the RNN rather than to the search algorithm. If the RNN model is at fault, then a deeper layer of analysis could help to figure out if you should add regularization, get more training data, or try a different network architecture.

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 not focus your attention on improving the search algorithm.

1 / 1 point

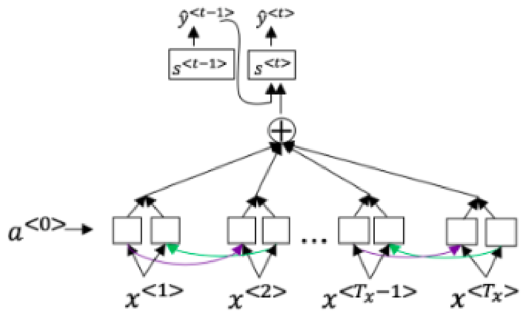
- ( ) True
- (●) False

Expand

Correct
$P(y^* \mid x) > P(\hat{y} \mid x)$ indicates the error should be attributed to the search algorithm rather than to the RNN.

6. Consider the attention model for machine translation.

0 / 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.

- [ ] 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.**)
- [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.**)

! This should not be selected

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

✓ Correct

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

Expand

Incorrect
You didn't select all the correct answers

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

- (•) True
- ( ) False

Expand

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 least advantage when: 1 / 1 point

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

Expand

Correct
The encoder-decoder model works quite well with short sentences. The true advantage for the attention model occurs when the input sentence is large.

9. 1 / 1 point

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?

aaa_aaaaaa________rr_dddddddd_______v_aaaaaa_rrrr________kk

- ○ aa rd var k
- ○ ardvark
- ◉ aardvark
- ○ aaaaaaaaarrddddddddvaaaaaarrrrkk

Expand

Correct
The basic rule for the CTC cost function is to collapse repeated characters not separated by "blank". If a character is repeated, but separated by a “blank”, it is included in the string.

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

- ○ Whether someone has just finished saying the trigger word at time t.
- ○ Whether the trigger word is being said at time t.
- ◉ 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.

Expand

Correct