Back

Sequence Models & Attention Mechanism

Graded Quiz • 50 min

Due Aug 14, 11:59 PM IST

Congratulations! You passed!

Grade received 80% **Latest Submission Grade** 80% **To pass** 80% or higher

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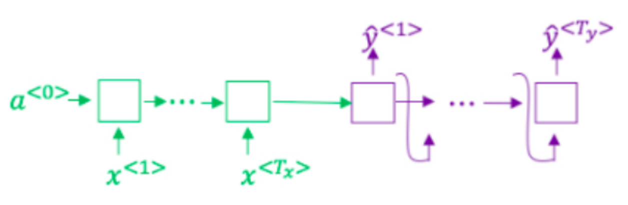
1. Consider using this encoder-decoder model for machine translation. **1 / 1 point**



True/False: This model is a “conditional language model” in the sense that the decoder portion (shown in green) is modeling the probability of the input sentence x.

- ○ True
- ◉ False

Expand

Correct
The encoder-decoder model for machine translation models the probability of the output sentence y conditioned on the input sentence x. The encoder portion is shown in green, while the decoder portion is shown in purple.

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. True/False: In machine translation, if we carry out beam search using sentence normalization, the algorithm will tend to output overly short translations. **0 / 1 point**

- ◉ True
- ○ False

Expand

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

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.

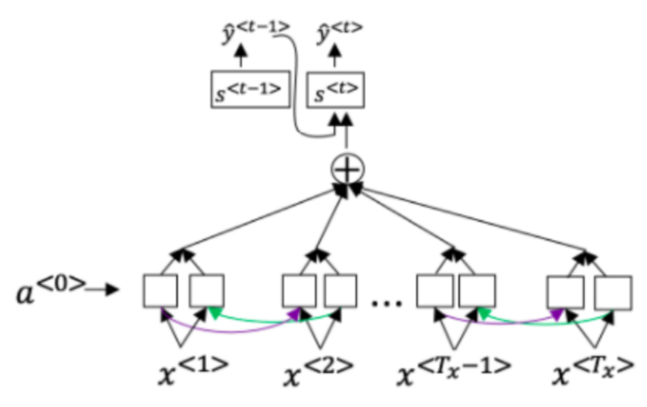
5. Continuing the example from Q4, suppose you work on your algorithm for a few more weeks, and now find that for the vast majority of examples on which your algorithm makes a mistake, $P(y^* \mid x) > P(\hat{y} \mid x)$. This suggests you should focus your attention on improving the RNN. **1 / 1 point**

- ○ 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.

- ☐ $\sum_{t'} \alpha^{<t,t'>} = 0$. (Note the summation is over t'.)
- ☐ $\alpha^{<t,t'>}$ is equal to the amount of attention $y^{<t>}$ should pay to $\alpha^{<t'>}$
- ☑ $\sum_{t'} \alpha^{<t,t'>} = 1$. (Note the summation is over t'.)

  Correct
  We expect

  $\alpha^{<t,t'>}$

  to be larger for activation values that are highly relevant to the value the network should output for

  $y^{<t>}$

  .
- ☑ We expect $$\alpha^{<t,t'>}$$ to be generally larger for values of $$\alpha^{<t'>}$$ that are highly relevant to the value the

  to be generally larger for values of

  $a^{<t'>}$

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**

Which of the following does $s^{<t>}$ depend on? Select all that apply.

- ☑ $\alpha^{<t,t'>}$

  Correct
  $s^{<t>}$ depends on $\alpha^{<t,t'>}$ which in turn depends on $e^{<t,t'>}$.
- ☐ s^t is independent of $\alpha^{<t,t'>}$ and $e^{<t,t'>}$.
- ☐ $s^{<t+1>}$
- ☑ $e^{<t,t'>}$

  Correct
  $s^{<t>}$ depends on $\alpha^{<t,t'>}$ which in turn depends on $e^{<t,t'>}$.

Expand

Correct
Great, you got all the right answers.

8. The attention model performs the same as the encoder-decoder model, no matter the sentence length. **1 / 1 point**

- ○ True
- ◉ False

Expand

Correct
The performance of the encoder-decoder model declines as the amount of words increases. The attention model has the greatest advantage when the input sequence length T_x 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?

kk_eee____ee_p__eeeeeeee______rrrrr

- ○ kkeeeeepeeeeeeeeerrrrr
- ○ keper
- ○ ke epe r
- ◉ keeper

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, $x^{<t>}$ represents the trigger word x being stated for the t-th time **1 / 1 point**

- ○ True
- ◉ False

Expand

Correct
$x^{<t>}$ represents the features of the audio at time t.