

Lecture 11. Recurrent Neural

Course > Unit 3 Neural networks (2.5 weeks) > Networks 2

> 1. Markov Models

1. Markov Models Markov Models



is simply the corresponding count normalized such that across different choices of W prime, the entries in the table sum to 1.

So with sum over possible values of the word that can come after W.

And this is the maximum likelihood estimate that you could derive as the solution, as the automizing solution to the previous criteria.

14:58 / 14:58

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cc cc

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Video

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Markov Symbols

1/1 point (graded)

To specify a Markov language model, what additional symbols do we need to add to our set of possible symbols? (Choose all that apply.)

- a start symbol
- an end symbol

 ✓
- a symbol for unknown words
- a symbol for complicated words



Solution:

As shown in the lecture video, we need start and end symbols in order to specify the bounds of our sentence. We also need a symbol for unknown words as there might be words in the sentence not represented in our Markov Model. Lastly, our Markov model treats words the same regardless of complexity. We're simply representing a table of transition probabilities, so there's no need to create extra symbols for complex words.

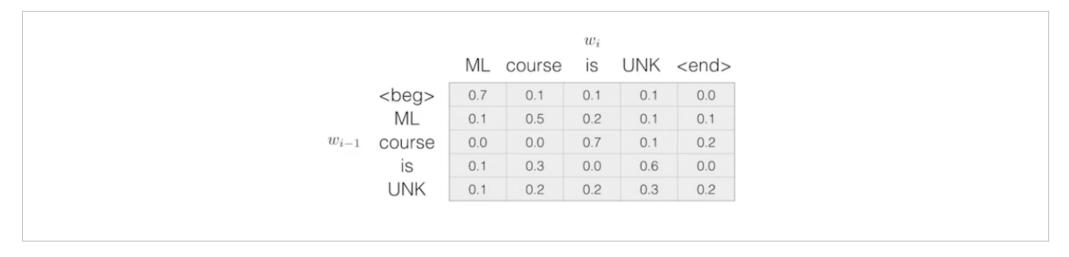
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You have used 1 of 2 attempts

• Answers are displayed within the problem

Transition Probabilities

1/2 points (graded)



Using a first order Markov model specified above, what is the probability of generating the following sentence <beg> ML course UNK <end>?

0.007

0.01

0.003

0.005

Which of the following sentences are possible to generate? (Choose all those apply.)

<beg> course ML is UNK <end>

<beg><end>

course is ML <end>

<beg>ML course <end>



Solution:

For the first question,

$$P(ML| < beg >) imes P(course|ML) imes P(UNK|course) imes P(< end > |UNK) = 0.7 imes 0.5 imes 0.1 imes 0.2 = 0.007$$

. For the second question, all valid sentences must start with <beg>. The probability of the second word being <end> is zero. In addition, the probability of ML occurring after course is also zero. The correct answer is the only choice with nonzero transition probabilities at each step.

Submit

You have used 2 of 2 attempts

• Answers are displayed within the problem

Maximum Likelihood

1/1 point (graded)

Humanities courses are cool.	
But some courses are boring.	
Using a bigram model, what is the maximum likelihood estimate for the probability that the next word is 'cool', given word is 'are'?	that the previous
0 1	
$\bigcirc \frac{1}{3}$	
\bigcirc $\frac{1}{4}$	
Solution: "are" occurs three times in the training corpus, and is followed by "cool" two out of those three times.	
Submit You have used 1 of 2 attempts	
Answers are displayed within the problem	
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Suppose our training examples are the following three sentences.

ML courses are cool.