← Sequence tagging with probabilistic models

Quiz, 5 questions

✓ Congratulations! You passed!

Next Item



1/1 point

1.

Which of these models are discriminative, i. e., which of them model the distribution $p(\mathbf{y}|\mathbf{x})$?



Hidden Markov Models

Un-selected is correct



Conditional Random Fields

Correct



Maximum Entropy Markov Models

Correct



1/1 point

2

Let $\mathbf{x} = x_1, \dots, x_n$ be visible words and $\mathbf{y} = y_1, \dots, y_n$ be corresponding hidden tags. Find the correct formula for Maximum Entropy Markov Model:



$$p(\mathbf{x},\mathbf{y}) = \prod_{t=1}^T p(x_t|x_{t-1})p(y_t|y_{t-1})$$



$$p(\mathbf{x},\mathbf{y}) = p(\mathbf{y}|\mathbf{x})p(\mathbf{x}) = \prod_{t=1}^T p(x_t|x_{t-1})p(y_t|x_t)$$



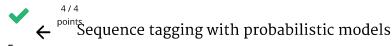
$$p(\mathbf{x},\mathbf{y}) = p(\mathbf{x}|\mathbf{y})p(\mathbf{y}) = \prod_{t=1}^T p(x_t|y_t)p(y_t|y_{t-1})$$



$$p(\mathbf{y}|\mathbf{x}) = \prod_{t=1}^T p(y_t|y_{t-1},x_t)$$

Correct

i iiid tii	e correct statements about Viterbi algorithm.
•	At each sequence ending in this state is computed. This probabilistiq models fithe best tag sequence ending in this state is computed. This probability is estimated using the similar probabilities from the previous step and the current word.
Corre	ect .
	At the t -th time step of Viterbi algorithm we just choose the state y_t such that the value $p(y_t y_{t-1})p(x_t y_t)$ is maximal. We do not take into account best paths computed at the previous steps.
Un-se	elected is correct
	Viterbi algorithm has exponential time complexity.
Un-se	elected is correct
Corre	Viterbi algorithm can find dynamically the most probable sequence of hidden tags in $O(N^2T)$ operations. The brute force search of this solution would take an exponential time on T .
	2/2
4	points
Consid	points er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs:
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Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i>	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: estates be equiprobable.
Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i> Let all t	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: esy borogoves e borogoves mimsy the
Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i> Let all t	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: esy borogoves e borogoves mimsy the chese outputs be also equiprobable.
Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i> Let all t	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. Let the following possible outputs: Let borogoves mimsy the Chese outputs be also equiprobable. Let the sentence "All mimsy were the borogoves" and choose the correct statement.
Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i> Let all t	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: Solution S
Consid Consid N: <i>mim</i> V: <i>were</i> O: <i>All</i> Let all t	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: borogoves borogoves mimsy the
Consid Consid N: mim V: were O: All Let all t Consid	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs: borogoves
Consid Consid N: mim V: were O: All Let all t Consid	er a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. er the following possible outputs:



5. Quiz, 5 questions

As before, consider a Hidden Markov Model with three hidden states: N (noun), V (verb) and O (other). Let all transitions between states be equiprobable. Consider the following possible outputs:

N: mimsy | borogoves

V: were | borogoves

O: All | mimsy | the

Let all these outputs be also equiprobable.

The probability p ($V \mid O$) of a transition from O to V is $\frac{1}{3}$ in this model. Let's reestimate it on the sentence "All mimsy were the borogoves" using one iteration of Baum-Welch algorithm.

Find the new value of this probability and write it with **precision of 3 digits** after the decimal point.

<u>Hint:</u> there are four possible tag sequences: ONVON, ONVOV, OOVON, OOVOV. The first and the second sequences have the same probability, and so do the third and the fourth ones. You need to estimate these probabilities and find the ratio of the expectations for (O -> V) and (O->?) transition counts.

0.375

Correct Response
You got it!

