Feedback — Maxent Model and Named Entity Recognition

Help

You submitted this quiz on **Fri 6 Apr 2012 12:20 PM PDT**. You got a score of **5.00** out of **5.00**.

Question 1

We surveyed cancer types from 569 patients in a cancer hospital and found the gender distribution of patients who have and don't have hodgkins lymphoma. What is the joint probability P(female, lymphoma) and conditional probability P(female|lymphoma)?

	Lymphoma	No Lymphoma
Male	59	230
Female	10	270

Your Answer		Score	Explanation
0.104, 0.855			
0.018, 0.036			
0.018, 0.145	✔	1.00	Correct!
0.036, 0.145			
Total		1.00 / 1.00	

Question Explanation

$P(female, lymphoma) = \frac{10}{569} = 0.018$

$P(female|lymphoma) = \frac{10}{59+10} = 0.145$

Question 2

In the maxent model, we've learned that P(c|d,λ) = expΣλ$_i$f$_i$(c,d)/ΣexpΣλ$_i$f$_i$(c',d). This equation is

also in the lecture slide #25. Given the 3 classes and the 3 features, compute the following probabilities. w_i = "Goéric"

- P(PERSON | by Goéric) =
- P(LOCATION | by Goéric) =
- P(DRUG | by Goéric) =

Weight	Feature
1.5	$f_1(c, d) = [c = \text{LOCATION} \& w_{i-1} = \text{in} \& \text{isCapitalized}(w_i)]$
-0.5	$f_2(c, d) = [c = \text{LOCATION} \& \text{hasAccentedLatinChar}(w_i)]$
0.7	$f_3(c, d) = [c = \text{DRUG} \& \text{ends}(w_i, c)]$

Your Answer		Score	Explanation
◉ 0.28, 0.17, 0.56	✔	1.00	Correct!
○ 0.09, 0.06, 0.85			
○ 0.17, 0.47, 0.35			
○ 0.35, 0.21, 0.43			
Total		1.00 / 1.00	

Question Explanation

- P(PERSON | by Goéric) = $e^0 / (e^0 + e^{-0.5} + e^{0.7}) = 0.28$
- P(LOCATION | by Goéric) = $e^{-0.5} / (e^0 + e^{-0.5} + e^{0.7}) = 0.17$
- P(DRUG | by Goéric) = $e^{0.7} / (e^0 + e^{-0.5} + e^{0.7}) = 0.56$

Question 3

We have defined three classes {PERSON, LOCATION, other} and five features like the following. We have also hand-labeled a sentence to train a NER classifier. Each word is labeled in the format of {word}/{class} (e.g. Obama/PER). Compute the sum of the empirical expectations of all features for the following sentence. The empirical expectation of a feature is $\Sigma_{(c,d) \in observed(C,D)} f_i(c, d)$

President/O Obama/PER met/O with/O former/O President/O George/PER H.W./PER Bush/PER and/O former/O Florida/LOC Gov./O Jeb/PER Bush/PER in/O the/O Oval/LOC Office/LOC on/O Friday,/O joining/O in/O a/O bipartisan/O gathering/O in/O an/O election/O year./O

Features

$f_1(c, d)$ = [c = LOCATION & isCapitalized(w_i)]

$f_2(c, d)$ = [c = LOCATION & classOf(w_{i-1}) = LOCATION]

$f_3(c, d)$ = [c = PERSON & w_{i-1} = "Gov."]

$f_4(c, d)$ = [c = PERSON & w_{i-1} = "President"]

$f_5(c, d)$ = [c = PERSON & isCapitalized(w_i)]

You entered:

13

Your Answer		Score	Explanation
13	✔	1.00	Correct!
Total		1.00 / 1.00	

Question Explanation

See the slide #14-17

$$empiricalE(f_1) = 3$$

$$empiricalE(f_2) = 1$$

$$empiricalE(f_3) = 1$$

$$empiricalE(f_4) = 2$$

$$empiricalE(f_5) = 6$$

Question 4

We've built an NER system and ran it on a tiny dataset. Based on the following result, compute the F1 score of the system. (round to the 3 decimal places, e.g. 0.123)

	GOLD PERSON	GOLD other
SYSTEM GUESS PERSON	20	10
SYSTEM GUESS other	11	14

You entered:

0.656

Your Answer		Score	Explanation
0.656	✔	1.00	Correct!
Total		1.00 / 1.00	

Question Explanation

Precision: % of selected items that are correct
Recall: % of correct items that are selected
F_1: 2PR/(P+R)

Precision: 20 / 30 = 0.667
Recall: 20 / 31 = 0.645
F_1: (2 * 0.667 * 0.645) / (0.667 + 0.645) = 0.656

Question 5

Suppose we build a maxent classifier over 5 classes {PERSON, ORGANIZATION, LOCATION, PRODUCT, OTHER}. Suppose further that for a particular data item, one feature matches for the class PERSON with its lambda weight as $\ln 4$. No other features match that particular data item for any other class. What will be the probability of the class PERSON on this data item at classification time? (numerical response rounded to the nearest tenths, e.g. 0.1 or 0.9)

You entered:

0.5

Your Answer		Score	Explanation
0.5	✔	1.00	Correct!
Total		1.00 / 1.00	

Question Explanation

For the particular data item, the vote for the class PERSON is ln4 and the votes for the other classes are 0. Thus, the probability of the class PERSON on this data item is like the following:

$$\frac{e^{ln4}}{e^{ln4}+e^0+e^0+e^0+e^0} = \frac{4}{4+1+1+1+1} = 0.5$$