Week 2: Quiz

Started: Nov 6 at 7:55pm

Quiz Instructions

Introduction and Noisy Channel Model

Question 1 1 pts

Given that we have a sequence of foreign words $f = f_1$, f_2 , f_3 ... f_n and different i sequences of possible translated words $e^i = e^i{}_1$, $e^i{}_2$, $e^i{}_3$... $e^i{}_n$ can we get the probability of the best e sequence being a translation of f according to the generative Noisy Channel Model?

$$p(e|f) = \arg \max_{i} p(e_{i}|f) =$$

$$\arg \max_{i} \prod_{a \in A} p(e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}, a_{1}, a_{2}, ..., a_{n}|f_{1}, f_{2}, ..., f_{n})$$

$$p(e|f) = \arg \max_{i} p(e_{i}|f) =$$

$$\arg \max_{i} \sum_{a \in A} p(e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}, a_{1}, a_{2}, ..., a_{n}|f_{1}, f_{2}, ..., f_{n})$$

$$p(e|f) = \arg \max_{i} p(f|e_{i})p(e_{i}) =$$

$$\arg \max_{i} \sum_{a \in A} p(f_{1}, f_{2}, ..., f_{n}, a_{1}, a_{2}, ..., a_{n} | e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}) \cdot p(e_{1}^{i}, e_{1}^{i}, ..., e_{n}^{i})$$

$$p(e|f) = \arg\max_{i} p(f|e_{i})p(e_{i}) =$$

$$\arg\max_{i} \prod_{a \in A} p(f_{1}, f_{2}, ..., f_{n}, a_{1}, a_{2}, ..., a_{n}|e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}) \cdot p(e_{1}^{i}, e_{1}^{i}, ..., e_{n}^{i})$$

$$p(e|f) = \arg\max_{i} p(e_{i}|f)p(f) =$$

$$\arg\max_{i} \sum_{a \in A} p(e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}, a_{1}, a_{2}, ..., a_{n} | f_{1}, f_{2}, ..., f_{n}) \cdot p(f_{1}, f_{2}, ..., f_{n})$$

$$p(e|f) = \arg \max_{i} p(e_{i}|f)p(f) =$$

$$\arg \max_{i} \prod_{a \in A} p(e_{1}^{i}, e_{2}^{i}, ..., e_{n}^{i}, a_{1}, a_{2}, ..., a_{n}|f_{1}, f_{2}, ..., f_{n}) \cdot p(f_{1}, f_{2}, ..., f_{n})$$

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1 \$\displaystyle{\psi}\$ Lexical Translation

IBM Model 1

Question 3 1 pts

If we consider Spanish as foreign language and English as end language, and given the following extracts of Model 1 table:

learnin	g	machine	е	translatio	on		is	CO	ol
f	t(f e)	f	t(f e)	f	t(f e)	f	t(f e)	f	t(f e)
aprendizaje	0.54	máquina	0.27	traducción	0.77	es	0.33	fría	0.18
enseñanza	0.07	automática	0.13	traducir	0.03	se	0.16	enfriar	0.09
aprender	0.04	maquinaria	0.11	traducciones	0.03	tiene	0.09	fresca	0.03
formación	0.04	automáticas	0.05	versión	0.01	está	0.08	bien	0.03
educación	0.03	aparato	0.04	traducido	0.01	hay	0.02	calma	0.03

What is the p(learning machine translation is cool | aprender automática traducción está bien) provided that p(learning machine translation is cool)=0.60? Give the result at log10 representation rounded to two digits.

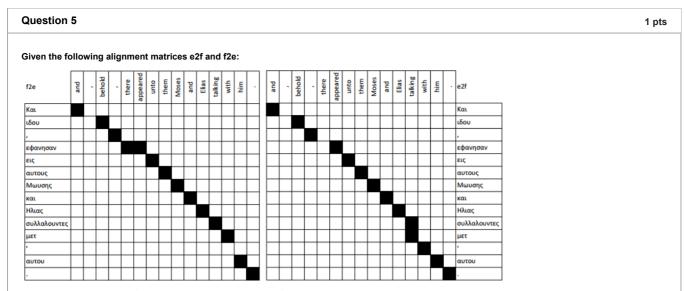
That is, if the probability was 0.0365 then you should compute log10(0.0356)= -1.437707136 and round the result to -1.44.

-6.1001

IBM Model 2 and HMM

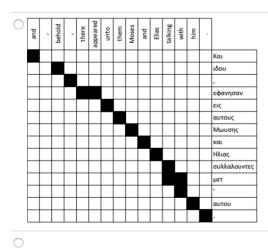
Question 4		1 pts
Please, mark for each one of the	e following statements whether are True or False:	
False	HMM Model provides an alternative methodology to perform absolute alignment position modeling and it is based	l on
conditionally independent decision	s	
True	IBM Model 2 provides an alternative methodology to perform absolute alignment position modeling and it is based on	
conditionally independent decisions		
True	IBM Model 2 can be substituted by HMM model as they intend to capture the same effect	
False	HMM Model provides an alternative model based on relative alignment modeling based on conditionally dependent dec	sisions
False	Dynamic Programming means that the alignment decisions are conditionally independent	
False	IBM Model 2 involves Dynamic Programming; therefore it implies more complex inference	
True	HMM involves Dynamic Programming; therefore it implies more complex inference	

Symmetrization

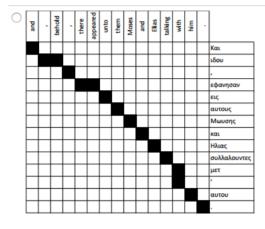


What would be the result of symmetrizing with AND heuristic?

	and	pehold	١.	there	appeared	unto	them	Moses	and	Elias	talking	with	him
Και													
ιδου													П
,													
εφανησαν													
εις													
αυτους													
Μωυσης													
και													
Ηλιας													
συλλαλουντες													
μετ													
•													
αυτου													
													Г



	and	pehold	there	appeared	unto	them	Moses	and	Elias	talking	with	him	
Και						П			П				Г
ιδου													
,													
εφανησαν													
εις													
αυτους									П				Г
Μωυσης			Г										Г
και													
Ηλιας													
συλλαλουντες			Г										
μετ													
•													
αυτου													



Phrase Extraction (phrases invalid)

Question 6 1 pts Considering the following symmetrization from previous question: talking there unto Elias with and ij εφανησαν εις αυτους Μωυσης Ηλιας συλλαλουντες μετ αυτου Which of the following phrases are inconsistent? \Box εφανησαν – there appeared □ εφανησαν − there $\hfill \square$ εφανησαν εις – there appeared unto

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□ Ηλιας συλλαλουντες μετ – talking	
□ Και ιδου – and , behold	
□ Kαι – and ,	
□ Και ιδου –, behold	