

tag	accuracy	f1 score	accuracy for unknown words	accuracy for known words	number of unknown words	number of known words
A (إسم)	80.91 %	9.94 %	87.1 %	80.0 %	31	210
B (رقم)	96.69 %	32.77 %	100.0 %	96.58 %	5	146
C (إسم معرف)	67.9 %	11.55 %	55.56 %	69.44 %	18	144
D (إضافة)	68.32 %	10.15 %	64.71 %	68.75 %	17	144
E (منعوت)	86.0 %	15.41 %	75.0 %	86.3 %	4	146
F (نعت)	87.35 %	13.32 %	47.37 %	92.52 %	19	147
G (حرف جر)	92.31 %	48.0 %	NULL	92.31 %	0	26
H (إسم مجرور)	73.68 %	28.28 %	60.0 %	78.57 %	5	14
I (وحدة قياس)	93.67 %	19.35 %	NULL	93.67 %	0	79
J (واو العطف)	81.48 %	17.96 %	NULL	81.48 %	0	27
K (فعل مبني للمجهول)	58.33 %	18.42 %	33.33 %	66.67 %	3	9
L (المفعول المطلق)	0.0 %	0.0 %	0.0 %	NULL	1	0
M (أداة عطف غير واو العطف)	83.33 %	45.45 %	NULL	83.33 %	0	6
.	100.0 %	100.0 %	NULL	100.0 %	0	812

Table 1: Performances for each tag of our ingredient extractor for fold 2 and for the first layer with $\lambda = 4$ using a first order HMM

tag	accuracy	f1 score	accuracy for unknown words	accuracy for known words	number of unknown words	number of known words
A (إسم)	92.53 %	59.58 %	80.65 %	94.29 %	31	210
B (رقم)	99.34 %	55.56 %	100.0 %	99.32 %	5	146
C (إسم معرف)	88.27 %	58.49 %	77.78 %	89.58 %	18	144
D (إضافة)	82.61 %	61.86 %	47.06 %	86.81 %	17	144
E (منعوت)	96.67 %	86.58 %	75.0 %	97.26 %	4	146
F (نعت)	86.75 %	64.97 %	47.37 %	91.84 %	19	147
G (حرف جر)	100.0 %	100.0 %	NULL	100.0 %	0	26
H (إسم مجرور)	63.16 %	62.75 %	20.0 %	78.57 %	5	14
I (وحدة قياس)	98.73 %	49.68 %	NULL	98.73 %	0	79
J (واو العطف)	81.48 %	29.93 %	NULL	81.48 %	0	27
K (فعل مبني للمجهول)	91.67 %	47.83 %	66.67 %	100.0 %	3	9
L (المفعول المطلق)	100.0 %	100.0 %	100.0 %	NULL	1	0
M (أداة عطف غير واو العطف)	66.67 %	40.0 %	NULL	66.67 %	0	6
.	99.88 %	49.97 %	NULL	99.88 %	0	812

Table 2: Performances for each tag of our ingredient extractor for fold 2 and for the second layer with $\lambda = 4$

	First Layer first order HMM				Second Layer second order HMM			
Tag	accuracy	f1 score	accuracy unknown words	accuracy known words	accuracy	f1 score	accuracy unknown words	accuracy known words
A (إسم)	80.91 %	9.94 %	87.1 %	80.0 %	92.53 %	59.58 %	80.65 %	94.29 %
B (رقم)	96.69 %	32.77 %	100.0 %	96.58 %	99.34 %	55.56 %	100.0 %	99.32 %
C (إسم معرف)	67.9 %	11.55 %	55.56 %	69.44 %	88.27 %	58.49 %	77.78 %	89.58 %
D (إضافة)	68.32 %	10.15 %	64.71 %	68.75 %	82.61 %	61.86 %	47.06 %	86.81 %
E (منعوت)	86.0 %	15.41 %	75.0 %	86.3 %	96.67 %	86.58 %	75.0 %	97.26 %
F (نعت)	87.35 %	13.32 %	47.37 %	92.52 %	86.75 %	64.97 %	47.37 %	91.84 %
G (حرف جر)	92.31 %	48.0 %	NULL	92.31 %	100.0 %	100.0 %	NULL	100.0 %
H (إسم مجرور)	73.68 %	28.28 %	60.0 %	78.57 %	63.16 %	62.75 %	20.0 %	78.57 %
I (وحدة قياس)	93.67 %	19.35 %	NULL	93.67 %	98.73 %	49.68 %	NULL	98.73 %
J (واو العطف)	81.48 %	17.96 %	NULL	81.48 %	81.48 %	29.93 %	NULL	81.48 %
K (فعل مبني للمجهول)	58.33 %	18.42 %	33.33 %	66.67 %	91.67 %	47.83 %	66.67 %	100.0 %
L (المفعول المطلق)	0.0 %	0.0 %	0.0 %	NULL	100.0 %	100.0 %	100.0 %	NULL
M (أداة عطف غير واو العطف)	83.33 %	45.45 %	NULL	83.33 %	66.67 %	40.0 %	NULL	66.67 %
.	100.0 %	100.0 %	NULL	100.0 %	99.88 %	49.97 %	NULL	99.88 %

Table 3: Performances for each tag of our ingredient extractor for fold 2 and for the first and second layer with $\lambda = 4$

	First Layer first order HMM				Second Layer second order HMM			
Fold	accuracy	f1 score	accuracy unknown words	accuracy known words	accuracy	f1 score	accuracy unknown words	accuracy known words
0	90.33 %	70.61 %	50.55 %	92.14 %	95.43 %	66.98 %	61.54 %	96.97 %
1	87.7 %	73.71 %	52.03 %	89.81 %	93.96 %	65.96 %	70.73 %	95.32 %
2	89.07 %	75.34 %	66.99 %	90.26 %	94.54 %	66.97 %	66.02 %	96.07 %
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-
Avg	-	-	-	-	-	-	-	-

Table 4: Performances of our ingredient extractor in predicting ingredients states for fold 2 with $\lambda = 4$