

tag	accuracy	f1 score	accuracy for unknown words	accuracy for known words	number of unknown words	number of known words
A (إسم)	80.83 %	9.93 %	87.1 %	79.9 %	31	209
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)	85.43 %	15.36 %	75.0 %	85.71 %	4	147
F (نعت)	86.83 %	13.28 %	47.37 %	91.89 %	19	148
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	811

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)	92.5 %	59.57 %	80.65 %	94.26 %	31	209
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)	96.69 %	86.58 %	75.0 %	97.28 %	4	147
F (نعت)	86.83 %	65.0 %	47.37 %	91.89 %	19	148
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
.	99.63 %	49.91 %	NULL	99.63 %	0	811

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)	80.83 %	9.93 %	87.1 %	79.9 %	92.5 %	59.57 %	80.65 %	94.26 %
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)	85.43 %	15.36 %	75.0 %	85.71 %	96.69 %	86.58 %	75.0 %	97.28 %
F (نعت)	86.83 %	13.28 %	47.37 %	91.89 %	86.83 %	65.0 %	47.37 %	91.89 %
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 %	99.63 %	49.91 %	NULL	99.63 %

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	87.65 %	73.73 %	52.03 %	89.76 %	93.92 %	65.93 %	70.73 %	95.28 %
2	88.97 %	75.28 %	66.99 %	90.16 %	94.44 %	66.9 %	66.02 %	95.97 %
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-
Avg	-	-	-	-	-	-	-	-

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