

tag	accuracy	f1 score	accuracy for unknown words	accuracy for known words	number of unknown words	number of known words
A (إسم)	81.3 %	11.21 %	84.21 %	81.04 %	19	211
B (رقم)	96.79 %	32.79 %	100.0 %	96.7 %	5	182
C (إسم معرف)	65.56 %	13.2 %	66.67 %	65.44 %	15	136
D (إضافة)	66.0 %	11.36 %	53.85 %	67.15 %	13	137
E (منعوت)	82.73 %	11.32 %	62.5 %	83.97 %	8	131
F (نعت)	82.63 %	10.05 %	57.14 %	84.97 %	14	153
G (حرف جر)	93.1 %	32.14 %	50.0 %	96.3 %	2	27
H (إسم مجرور)	67.86 %	13.48 %	33.33 %	72.0 %	3	25
I (وحدة قياس)	90.2 %	13.55 %	100.0 %	90.0 %	2	100
J (واو العطف)	83.33 %	22.73 %	NULL	83.33 %	0	18
K (فعل مبني للمجهول)	37.5 %	13.64 %	50.0 %	35.71 %	2	14
L (المفعول المطلق)	0.0 %	0.0 %	NULL	0.0 %	0	1
M (أداة عطف غير واو العطف)	50.0 %	22.22 %	NULL	50.0 %	0	8
.	100.0 %	100.0 %	NULL	100.0 %	0	786

Table 1: Performances for each tag of our ingredient extractor for fold 3 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)	93.48 %	60.52 %	94.74 %	93.36 %	19	211
B (رقم)	98.93 %	33.24 %	100.0 %	98.9 %	5	182
C (إسم معرف)	92.05 %	45.88 %	60.0 %	95.59 %	15	136
D (إضافة)	86.67 %	85.89 %	30.77 %	91.97 %	13	137
E (منعوت)	91.37 %	45.36 %	50.0 %	93.89 %	8	131
F (نعت)	83.23 %	42.42 %	35.71 %	87.58 %	14	153
G (حرف جر)	100.0 %	100.0 %	100.0 %	100.0 %	2	27
H (إسم مجرور)	82.14 %	58.14 %	66.67 %	84.0 %	3	25
I (وحدة قياس)	98.04 %	33.0 %	100.0 %	98.0 %	2	100
J (واو العطف)	88.89 %	47.06 %	NULL	88.89 %	0	18
K (فعل مبني للمجهول)	87.5 %	31.11 %	100.0 %	85.71 %	2	14
L (المفعول المطلق)	0.0 %	0.0 %	NULL	0.0 %	0	1
M (أداة عطف غير واو العطف)	87.5 %	46.67 %	NULL	87.5 %	0	8
.	100.0 %	100.0 %	NULL	100.0 %	0	786

Table 2: Performances for each tag of our ingredient extractor for fold 3 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)	81.3 %	11.21 %	84.21 %	81.04 %	93.48 %	60.52 %	94.74 %	93.36 %
B (رقم)	96.79 %	32.79 %	100.0 %	96.7 %	98.93 %	33.24 %	100.0 %	98.9 %
C (إسم معرف)	65.56 %	13.2 %	66.67 %	65.44 %	92.05 %	45.88 %	60.0 %	95.59 %
D (إضافة)	66.0 %	11.36 %	53.85 %	67.15 %	86.67 %	85.89 %	30.77 %	91.97 %
E (منعوت)	82.73 %	11.32 %	62.5 %	83.97 %	91.37 %	45.36 %	50.0 %	93.89 %
F (نعت)	82.63 %	10.05 %	57.14 %	84.97 %	83.23 %	42.42 %	35.71 %	87.58 %
G (حرف جر)	93.1 %	32.14 %	50.0 %	96.3 %	100.0 %	100.0 %	100.0 %	100.0 %
H (إسم مجرور)	67.86 %	13.48 %	33.33 %	72.0 %	82.14 %	58.14 %	66.67 %	84.0 %
I (وحدة قياس)	90.2 %	13.55 %	100.0 %	90.0 %	98.04 %	33.0 %	100.0 %	98.0 %
J (واو العطف)	83.33 %	22.73 %	NULL	83.33 %	88.89 %	47.06 %	NULL	88.89 %
K (فعل مبني للمجهول)	37.5 %	13.64 %	50.0 %	35.71 %	87.5 %	31.11 %	100.0 %	85.71 %
L (المفعول المطلق)	0.0 %	0.0 %	NULL	0.0 %	0.0 %	0.0 %	NULL	0.0 %
M (أداة عطف غير واو العطف)	50.0 %	22.22 %	NULL	50.0 %	87.5 %	46.67 %	NULL	87.5 %
.	100.0 %	100.0 %	NULL	100.0 %	100.0 %	100.0 %	NULL	100.0 %

Table 3: Performances for each tag of our ingredient extractor for fold 3 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	87.87 %	72.36 %	67.47 %	88.75 %	94.93 %	66.93 %	63.86 %	96.27 %
4	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-
Avg	-	-	-	-	-	-	-	-

Table 4: Performances of our ingredient extractor in predicting ingredients states for fold 3 with $\lambda = 4$