Models

MF (2009)	
Param	**Value**
d	128
lr	0.001
lambda reg	0.001
epochs	50
batch	256

MLP (2017)	
Param	**Value**
d	128
layers	[256 128 64 32]
activation	ReLU
reg	0.0
lr	0.001
optim	Adam
epochs	50
batch	256

NeuMF/	NCF (2017)
Param	**Value**
mf d	32
mlps d	[256 128 64 32]
activation	ReLU
reg	0.0
lr	0.001
optim	Adam
epochs	50
batch	256

AURA	
Param	**Value**
d	128
lr	0.001
activation	ReLU
dropout	0.1
aggregation	attention
cross/self	self
shared	attention
not shared	aspects embeddings
	aspects ratings
alpha	1 / (N_aspects + 1)
beta	N_aspects / (N_aspects + 1)

Prédiction de note globale

Model	Overall				Aspects			
	Hotels		Beer		Hotels		Beer	
	RMSE	MAE	RMSE	MAE	RMSE	MAE	RMSE	MAE
Rating only	=====	=====	=====	=====	=====	=====	=====	=====
MF (2009)	0.8409	0.6463	0.4114	0.3008	-	-	-	-
MLP (2017)	0.8332	0.5656	0.4648	0.3244	-	-	-	-
NeuMF (2017)	0.8408	0.5702	0.4731	0.3295	-	-	-	-
+Aspect modeling	=====	=====	=====	=====	=====	=====	=====	=====
A3NCF (2018)								
ANR (2019)								
Multi-task	=====	=====	=====	=====	=====	=====	=====	=====
PEPLER (2023)					-	-	-	-
U-ARM (2021)								
	=====	=====	=====	=====	=====	=====	=====	=====
AURA (Ours)	**0.7203**	**0.4855**	0.4050	0.2930	**0.7458 (0.0716)**	0.5206 (0.0503)	**0.4531 (0.0371)**	**0.3437 (0.0325)**
w/o shared attention	0.7299	0.4877	0.4043	0.2956	**0.7449 (0.0688)**	**0.5200 (0.0531)**	**0.4530 (0.0363)**	**0.3437 (0.0319)**
w/ cross attention	0.7760	0.5287	0.4110	0.3003	0.7509 (0.0708)	0.5293 (0.0520)	0.4577 (0.0380)	0.3498 (0.0339)
w/ pooling	0.7638	0.5405	**0.4028**	**0.2926**	0.7565 (0.0669)	0.5390 (0.0436)	0.4534 (0.0362)	0.3428 (0.0318)
w/ skip connection	0.7607	0.5226	0.4079	0.2974	0.7482 (0.0704)	0.5278 (0.0519)	0.4548 (0.0346)	0.3469 (0.0299)
w/ shared aspects embeddings	0.7418	0.5166	0.4054	0.2974	0.7631 (0.0694)	0.5415 (0.0484)	0.4623 (0.032)	0.3554 (0.0261)

Prédiction des notes des aspects

Hotels	Model	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
RMSE	Baseline								
	Model 1								
	Model 2								
	AURA	0.7203	0.7458 (0.0716)	0.6759	0.6241	0.7589	0.8202	0.7978	0.7981
	w/o shared attention	0.7299	0.7449 (0.0688)	0.6820	0.6255	0.7545	0.8032	0.7920	0.8124
	w/ cross attention	0.7760	0.7509 (0.0708)	0.6876	0.6211	0.7701	0.8115	0.8019	0.8099
	w/ pooling	0.7638	0.7565 (0.0669)	0.6970	0.6406	0.7606	0.8207	0.8081	0.8121
	w/ skip connection	0.7607	0.7482 (0.0704)	0.6790	0.6301	0.7553	0.8163	0.7985	0.8101
	w/ shared aspects embeddings	0.7418	0.7631 (0.0694)	0.7005	0.6423	0.7730	0.8249	0.8092	0.8291
MAE	Baseline								
	Model 1								
	Model 2								
	AURA	0.4855	0.5206 (0.0503)	0.4652	0.4368	0.5442	0.5637	0.5520	0.5620
	w/o shared attention	0.4877	0.5200 (0.0531)	0.4578	0.4352	0.5385	0.5657	0.5586	0.5643
	w/ cross attention	0.5287	0.5293 (0.0520)	0.4742	0.4354	0.5667	0.5636	0.5644	0.5845
	w/ pooling	0.5405	0.5390 (0.0436)	0.4948	0.4680	0.5398	0.5725	0.5788	0.5805

Hotels	Model	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
	w/ skip connection	0.5226	0.5278 (0.0519)	0.4674	0.4476	0.5366	0.5708	0.5614	0.5833
	w/ shared aspects embeddings	0.5166	0.5415 (0.0484)	0.4896	0.4618	0.5534	0.5764	0.5799	0.5884

Beer	Model	Overall	Aspects	Appearance	Aroma	Palate	Taste
RMSE	Baseline						
	Model 1						
	Model 2						
	AURA	0.4050	0.4531 (0.0371)	0.4821	0.4115	0.4974	0.4216
	w/o shared attention	0.4043	0.4530 (0.0363)	0.4852	0.4119	0.4930	0.4220
	w/ cross attention	0.4110	0.4577 (0.0380)	0.4842	0.4169	0.5058	0.4242
	w/ pooling	0.4028	0.4534 (0.0362)	0.4813	0.4147	0.4971	0.4208
	w/ skip connection	0.4079	0.4548 (0.0346)	0.4810	0.4134	0.4963	0.4285
	w/ shared aspects embeddings	0.4054	0.4623 (0.032)	0.4887	0.4320	0.5010	0.4277
MAE	Baseline						
	Model 1						
	Model 2						
	AURA	0.2930	0.3437 (0.0325)	0.3720	0.3067	0.3800	0.3164
	w/o shared attention	0.2956	0.3437 (0.0319)	0.3746	0.3090	0.3766	0.3147
	w/ cross attention	0.3003	0.3498 (0.0339)	0.3761	0.3130	0.3905	0.3198
	w/ pooling	0.2926	0.3428 (0.0318)	0.3702	0.3077	0.3786	0.3148
	w/ skip connection	0.2974	0.3469 (0.0299)	0.3720	0.3083	0.3799	0.3276
	w/ shared aspects embeddings	0.2974	0.3554 (0.0261)	0.3781	0.3319	0.3846	0.3270

Génération de revue

Model	BLEU	ROUGE	METEOR	BERT	P	R	F1
Hotel	=====	=====	=====	=====	=====	=====	=====
Att2Seq							
ExpansionNet							
U-ARM							
PEPLER							
AURA (Ours)							
Beer	=====	=====	=====	=====	=====	=====	=====
Att2Seq							
ExpansionNet							
U-ARM							
PEPLER							
AURA (Ours)							

Hyper-paramètres - Ratings prediction

		Overall				Aspects			
		Hotels		Beer		Hotels		Beer	
α	β	RMSE	MAE	RMSE	MAE	RMSE	MAE	RMSE	MAE
$\frac{1}{\|A\|+1}$	$\frac{\|A\|}{\|A\|+1}$	0.7203	0.4855	0.4050	0.2930	**0.7458 (0.0716)**	**0.5206 (0.0503)**	0.4531 (0.0371)	0.3437 (0.0325)

		Overall				Aspects			
0.3	0.7	0.6955	0.4560	0.4030*	0.2921	0.7518 (0.0723)	0.5283 (0.0491)	**0.4520 (0.0359)**	**0.3432 (0.0318)**
0.5	0.5	0.6873	0.4356	**0.4028**	0.2930	0.7674 (0.0728)	0.5506 (0.0529)	0.4529 (0.0357)	0.3444 (0.0323)
0.7	0.3	**0.6750**	**0.4252**	0.4032*	**0.2906**	0.7877 (0.0715)	0.5779 (0.0555)	0.4559 (0.0369)	0.3477 (0.0329)

Hotels	α	β	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
RMSE	$\frac{1}{7}$	$\frac{6}{7}$	0.7203	**0.7458 (0.0716)**	0.6759	0.6241	0.7589	0.8202	0.7978	0.7981
	0.3	0.7	0.6955	0.7518 (0.0723)	0.6789	0.6292	0.7706	0.8231	0.8090	0.7998
	0.5	0.5	0.6873	0.7674 (0.0728)	0.6919	0.6465	0.7805	0.8364	0.8235	0.8257
	0.7	0.3	**0.6750**	0.7877 (0.0715)	0.7202	0.6632	0.8053	0.8524	0.8344	0.8507
MAE	$\frac{1}{7}$	$\frac{6}{7}$	0.4855	**0.5206 (0.0503)**	0.4652	0.4368	0.5442	0.5637	0.5520	0.5620
	0.3	0.7	0.4560	0.5283 (0.0491)	0.4744	0.4458	0.5583	0.5622	0.5576	0.5715
	0.5	0.5	0.4356	0.5506 (0.0529)	0.4866	0.4674	0.5743	0.5884	0.5848	0.6020
	0.7	0.3	**0.4252**	0.5779 (0.0555)	0.5189	0.4852	0.6020	0.6106	0.6134	0.6370

Beer	α	β	Overall	Aspects	Appearance	Aroma	Palate	Taste
RMSE	$\frac{1}{5}$	$\frac{4}{5}$	0.4050	0.4531 (0.0371)	0.4821	0.4115	0.4974	0.4216
	0.3	0.7	0.4030	**0.4520 (0.0359)**	0.4808	0.4118	0.4940	0.4213
	0.5	0.5	**0.4028**	0.4529 (0.0357)	0.4810	0.4124	0.4952	0.4231
	0.7	0.3	0.4032	0.4559 (0.0369)	0.4886	0.4157	0.4965	0.4227
MAE	$\frac{1}{5}$	$\frac{4}{5}$	0.2930	0.3437 (0.0325)	0.3720	0.3067	0.3800	0.3164
	0.3	0.7	0.2921	**0.3432 (0.0318)**	0.3711	0.3090	0.3784	0.3141
	0.5	0.5	0.2930	0.3444 (0.0323)	0.3729	0.3077	0.3800	0.3170
	0.7	0.3	**0.2906**	0.3477 (0.0329)	0.3793	0.3122	0.3818	0.3175

Embedding dimension

	Overall				Aspects			
	Hotels		Beer		Hotels		Beer	
d	RMSE	MAE	RMSE	MAE	RMSE	MAE	RMSE	MAE
32	0.8433	0.6160	0.4076	0.2970				
64	0.8087	0.5820	0.4072	0.2967				
128	0.7203	0.4855	0.4050	0.2930	0.7458 (0.0716)	0.5206 (0.0503)	0.4531 (0.0371)	0.3437 (0.0325)
256	0.6710	0.4263						
512								
1024								

Hotels	d	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
RMSE	32	0.8433		0.7666	0.7104	0.8452	0.9065	0.8829	0.8909
	64	0.8087		0.7359	0.6690	0.8169	0.8853	0.8513	0.8792
	128	0.7203	0.7458 (0.0716)	0.6759	0.6241	0.7589	0.8202	0.7978	0.7981
	256	0.6710		0.6285	0.5851	0.7080	0.7535	0.7391	0.7441
	512								
	1024								
MAE	32	0.6160		0.5517	0.5201	0.6337	0.6608	0.6442	0.6693
	64	0.5820		0.5342	0.4817	0.5971	0.6288	0.6136	0.6554

Hotels	d	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
	128	0.4855	0.5206 (0.0503)	0.4652	0.4368	0.5442	0.5637	0.5520	0.5620
	256	0.4263		0.4073	0.4047	0.4765	0.4922	0.4952	0.5043
	512								
	1024								

Beer	d	Overall	Aspects	Appearance	Aroma	Palate	Taste
RMSE	32	0.4076		0.4848	0.4154	0.4993	0.4250
	64	0.4072		0.4833	0.4165	0.4990	0.4254
	128	0.4050	0.4531 (0.0371)	0.4821	0.4115	0.4974	0.4216
	256						
	512						
	1024						
MAE	32	0.2970		0.3757	0.3103	0.3845	0.3183
	64	0.2967		0.3749	0.3100	0.3825	0.3196
	128	0.2930	0.3437 (0.0325)	0.3720	0.3067	0.3800	0.3164
	256						
	512						
	1024						