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

A3NCF (2018)

Param	Value
number of latent factors	128
vocabulary size	10 000
number of gibbs sampling itaration	100
eta	(1, 1)
lr	0.001
dropout	0.5
optim	SGD
epochs	50
batch	512

ALFM (2018)	
Param	**Value**
number of latent factors	128
number of topics	10
number of aspects	6 (Hotels) 4 (Beer)
vocabulary size	10 000
number of gibbs sampling itaration	1000
eta	(1, 1)
lr	0.001
lambda (u, i, a, b)	0.01
optim	SGD
epochs	50
batch	512

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

	Overall			
	Hotels		**Beer**	
Model	**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
A3NCF (2018)	1.0103	0.7715	0.6085	0.4671
+Aspect modeling	=====	=====	=====	=====
ALFM (2018)	0.8746	0.6781	0.4266	0.3111
ANR (2019)				
Multi-task	=====	=====	=====	=====
U-ARM (2021)				
PEPLER (2023)				
	=====	=====	=====	=====
Baseline	0.7848	0.5563	0.4124	0.3039

	Overall			
AURA (Ours)	**0.7203**	**0.4855**	**0.4050**	**0.2930**

		Overall		Beer		Aspects		Beer	
		Hotels				Hotels			
	Model	RMSE	MAE	RMSE	MAE	RMSE	MAE	RMSE	MAE
(a)	Model 1								
(b)	Model 2								
		=====	=====	=====	=====	=====	=====	=====	=====
(c)	Baseline	0.7848	0.5563	0.4124	0.3039	0.7909 (0.0716)	0.5608 (0.0506)	0.4611 (0.0370)	0.3527 (0.0325)
(d)	**AURA** (self attention shared)	**0.7203**	**0.4855**	0.4050	0.2930	**0.7458 (0.0716)**	0.5206 (0.0503)	**0.4531 (0.0371)**	**0.3437 (0.0325)**
(e)	self attention notshared	0.7299	0.4877	0.4043	0.2956	**0.7449 (0.0688)**	**0.5200 (0.0531)**	**0.4530 (0.0363)**	**0.3437 (0.0319)**
(f)	cross attention shared	0.7812	0.5382	0.4078	0.2980				
(g)	cross attention notshared	0.7760	0.5287	0.4110	0.3003	0.7509 (0.0708)	0.5293 (0.0520)	0.4577 (0.0380)	0.3498 (0.0339)
(h)	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)
(i)	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)
(j)	aspects embeddings shared	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		======	======	======	======	======	======	======	======
	(a)								
	(b)								
		======	======	======	======	======	======	======	======
	(c)	0.7848	0.7909 (0.0716)	0.7256	0.6672	0.7988	0.8618	0.8411	0.8510
	(d)	0.7203	0.7458 (0.0716)	0.6759	0.6241	0.7589	0.8202	0.7978	0.7981
	(e)	0.7299	0.7449 (0.0688)	0.6820	0.6255	0.7545	0.8032	0.7920	0.8124
	(f)	0.7812		0.6745	0.6337	0.7668	0.8222	0.7940	0.8138
	(g)	0.7760	0.7509 (0.0708)	0.6876	0.6211	0.7701	0.8115	0.8019	0.8099
	(h)	0.7638	0.7565 (0.0669)	0.6970	0.6406	0.7606	0.8207	0.8081	0.8121
	(i)	0.7607	0.7482 (0.0704)	0.6790	0.6301	0.7553	0.8163	0.7985	0.8101
	(j)	0.7418	0.7631 (0.0694)	0.7005	0.6423	0.7730	0.8249	0.8092	0.8291
MAE		======	======	======	======	======	======	======	======
	(a)								
	(b)								
		======	======	======	======	======	======	======	======
	(c)	0.5563	0.5608 (0.0506)	0.5098	0.4765	0.5675	0.6050	0.5966	0.6094
	(d)	0.4855	0.5206 (0.0503)	0.4652	0.4368	0.5442	0.5637	0.5520	0.5620
	(e)	0.4877	0.5200 (0.0531)	0.4578	0.4352	0.5385	0.5657	0.5586	0.5643
	(f)	0.5382		0.4692	0.4609	0.5543	0.5813	0.5607	0.5813
	(g)	0.5287	0.5293 (0.0520)	0.4742	0.4354	0.5667	0.5636	0.5644	0.5845

Hotels	Model	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
	(h)	0.5405	0.5390 (0.0436)	0.4948	0.4680	0.5398	0.5725	0.5788	0.5805
	(i)	0.5226	0.5278 (0.0519)	0.4674	0.4476	0.5366	0.5708	0.5614	0.5833
	(j)	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		======	======	======	======	======	======
	(a)						
	(b)						
		======	======	======	======	======	======
	(c)	0.4124	0.4611 (0.0370)	0.4890	0.4198	0.5058	0.4298
	(d)	0.4050	0.4531 (0.0371)	0.4821	0.4115	0.4974	0.4216
	(e)	0.4043	0.4530 (0.0363)	0.4852	0.4119	0.4930	0.4220
	(f)			0.4898	0.4166	0.5000	0.4261
	(g)	0.4110	0.4577 (0.0380)	0.4842	0.4169	0.5058	0.4242
	(h)	0.4028	0.4534 (0.0362)	0.4813	0.4147	0.4971	0.4208
	(i)	0.4079	0.4548 (0.0346)	0.4810	0.4134	0.4963	0.4285
	(j)	0.4054	0.4623 (0.032)	0.4887	0.4320	0.5010	0.4277
MAE		======	======	======	======	======	======
	(a)						
	(b)						
		======	======	======	======	======	======
	(c)	0.3039	0.3527 (0.0325)	0.3794	0.3163	0.3903	0.3248
	(d)	0.2930	0.3437 (0.0325)	0.3720	0.3067	0.3800	0.3164
	(e)	0.2956	0.3437 (0.0319)	0.3746	0.3090	0.3766	0.3147
	(f)			0.3800	0.3150	0.3858	0.3229
	(g)	0.3003	0.3498 (0.0339)	0.3761	0.3130	0.3905	0.3198
	(h)	0.2926	0.3428 (0.0318)	0.3702	0.3077	0.3786	0.3148
	(i)	0.2974	0.3469 (0.0299)	0.3720	0.3083	0.3799	0.3276
	(j)	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)							

α	β	Overall				Aspects			
		Hotels		Beer		Hotels		Beer	
		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)
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

d	Overall				Aspects			
	Hotels		Beer		Hotels		Beer	
	RMSE	MAE	RMSE	MAE	RMSE	MAE	RMSE	MAE
32	0.8433	0.6160	0.4076	0.2970	0.8337 (0.0717)	0.6133 (0.0566)	0.4561 (0.0364)	0.3472 (0.0332)
64	0.8087	0.5820	0.4072	0.2967	0.8063 (0.0791)	0.5851 (0.0593)	0.4561 (0.0357)	0.3468 (0.0322)
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**	0.4060	0.2933	0.6931 (0.0638)	0.4634 0.0414	0.4690 (0.0414)	0.3562 (0.0335)
512	**0.6707**	0.4390*	0.4084	0.2962	**0.6627 (0.0640)**	**0.4419 (0.0461)**	0.4651 (0.0354)	0.3458 (0.0265)

Hotels	d	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
RMSE	32	0.8433	0.8337 (0.0717)	0.7666	0.7104	0.8452	0.9065	0.8829	0.8909
	64	0.8087	0.8063 (0.0791)	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	0.6931 (0.0638)	0.6285	0.5851	0.7080	0.7535	0.7391	0.7441

Hotels	d	Overall	Aspects	Cleanliness	Location	Room	Service	Sleep	Value
	512	**0.6707**	**0.6627 (0.0640)**	**0.6012**	**0.5550**	**0.6677**	**0.7220**	**0.7071**	**0.7234**
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
MAE	32	0.6160	0.6133 (0.0566)	0.5517	0.5201	0.6337	0.6608	0.6442	0.6693
	64	0.5820	0.5851 (0.0593)	0.5342	0.4817	0.5971	0.6288	0.6136	0.6554
	128	0.4855	0.5206 (0.0503)	0.4652	0.4368	0.5442	0.5637	0.5520	0.5620
	256	**0.4263**	0.4634 0.0414	0.4073	0.4047	0.4765	0.4922	0.4952	0.5043
	512	0.4390*	**0.4419 (0.0461)**	**0.3964**	**0.3703**	**0.4401**	**0.4856**	**0.4596**	**0.4996**

Beer	d	Overall	Aspects	Appearance	Aroma	Palate	Taste
RMSE	32	0.4076	0.4561 (0.0364)	0.4848	0.4154	0.4993	0.4250
	64	0.4072	0.4561 (0.0357)	0.4833	0.4165	0.4990	0.4254
	128	**0.4050**	**0.4531 (0.0371)**	**0.4821**	**0.4115**	**0.4974**	**0.4216**
	256	0.4060	0.4690 (0.0414)	0.5036	0.4303	0.5167	0.4254
	512	0.4084	0.4651 (0.0354)	0.4904	0.4314	0.5093	0.4292
=====	=====	=====	=====	=====	=====	=====	=====
MAE	32	0.2970	0.3472 (0.0332)	0.3757	0.3103	0.3845	0.3183
	64	0.2967	0.3468 (0.0322)	0.3749	0.3100	0.3825	0.3196
	128	**0.2930**	**0.3437 (0.0325)**	**0.3720**	**0.3067**	0.3800	0.3164
	256	0.2933	0.3562 (0.0335)	0.3857	0.3280	0.3932	0.3179
	512	0.2962	0.3458 (0.0265)	0.3641	0.3244	**0.3790**	**0.3156**