Context Trails: A dataset to study contextual and route recommendation (Online Appendix for Experiments)

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1 Description of included tables

Tables 1 and 2 extend the information included in the paper by providing the list of references where the corresponding dataset was used or proposed.

Tables 3, 4, and 5 also present results for Petaling Jaya, which were removed from the paper for space constraints.

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Table 1: Datasets used in publications dealing with CARS approaches. K and M denote thousands and millions.

Dataset	Domain	Users	Items	Interactions	Contexts	Used in
Adom	Movie	0.1K	0.2K	1.5K	Companion, Location	[15, 26]
Comoda	Movie	0.1K	1.2K	2.3K	Mood, Social, Time, Weather	[32, 13]
DePaulMovie	Movie	0.1K	0.1K	5K	Companion, Location, Time	[47, 25]
In Car	Music	0.01K	0.2K	4K	Driving style, Mood, Road type, Weather	[1]
Food	Food	0.2K	0.01K	6.4K	Hunger level, Real/virtual	[15, 26, 28, 22]
Foursquare	POI	0.2K-51K	0.3K-500K	0.5K-3.5M	Demographic, Location, Time, Weather	[21, 10, 20, 29]
Frappe	Apps	1K	4K	95K	Location, Time	[28, 36, 22]
HyperCars-Gowalla	POI	24K	40K	1M	Location, Time, Weather	[2]
HyperCars-Yelp	POI	312K	12.6K	1.1M	Location, Time, Weather	[2]
LastFM	Music	0.01K-3K	1.8K-174K	93K-19M	Last interactions, Order, Tag, Time	[11, 27, 41, 7, 38, 6, 34, 12]
MovieLens	Movie	0.7K-140K	1.6K-19K	31K-20M	Age, Time	[45, 50, 16, 9, 38, 43, 6, 13, 14, 50, 12, 43, 7]
STS	POI	0.3K	0.3K	2.5K	Budget, Companion, Goal, Mood, Time, Weather	[3]
TripAdvisor	POI	1.2K-2.6K	1.5K-1.9K	4.7K-9.3K	Trip type	[46, 32]
Weeplaces NY	POI	4.5K	16.1K	864K	Weather	[8]
Yelp	POI	5K-96K	13K-49K	144K-2.3M	Last purchase, Location, Time	[22, 21, 9, 12, 33, 33]
Context Trails	POI	85K	84K	1.3M	Location, Schedule, Time, Weather	

Table 2: Datasets used in publications dealing with POI and route recommendation approaches.

Dataset	Cities	Users	Items	Check-ins	Routes	Used in
Foursquare Global Scale	415	267K	3.7M	33.3M	NA	[40]
GeoLife	1	0.2K	≈17K	28M	17.6K	[48, 35]
Gowalla	50	1.6K-107K	3.5K-1.3M	116K-6.4M	NA	[42, 17, 37, 39, 30, 44]
Semantic Trails 2013	10K	256K	2.8M	18.6M	6.1M	[24]
Semantic Trails 2018	52K	400K	1.9M	11.9M	4M	[24]
Trip builder	3	22.6K	1.3K	133K	55.5K	[5, 4]
VeronaCard	1	(unk)	0.1K	1.2M	250K	[23]
YFCC100M	1-7	0.9-6.5K	0.1K	17K-130K	4K-20K	[18, 19, 31, 49]
Context Trails	3	85K	84K	1.3M	580K	

Table 3: Performance of the recommenders in POI recommendation in terms of ranking accuracy (nDCG), novelty (EPC), and diversity (Gini) at cutoff 5. Best result for each metric in bold (excluding the Skyline).

City	NYC				PTJ				TOK			
Method	**nDCG**	**EPC**	**Gini**	**UC**	**nDCG**	**EPC**	**Gini**	**UC**	**nDCG**	**EPC**	**Gini**	**UC**
Rnd	0.0000	**0.9981**	**0.4772**	**397**	0.0002	**0.9996**	**0.4960**	**5593**	0.0001	**0.9998**	**0.5710**	**26523**
Pop	**0.1096**	0.9385	0.0028	**397**	0.0612	0.9060	0.0002	**5593**	0.2260	0.8418	0.0001	**26523**
UB	0.0133	0.9927	0.1173	75	0.0798	0.9423	0.0074	3473	0.2343	0.8854	0.0024	19059
IB	0.0130	0.9945	0.1474	85	0.0495	0.9733	0.1206	3542	0.1422	0.9325	0.0674	19716
EASEr	0.0105	0.9890	0.0689	95	0.0800	0.9339	0.0037	3563	0.2081	0.8969	0.0014	19759
$RP^3\beta$	0.0106	0.9973	0.1639	95	0.0033	0.9994	0.1808	3563	0.0596	0.9794	0.1150	19759
BPR	0.0485	0.9425	0.0040	95	0.0746	0.9089	0.0003	3563	0.2350	0.8462	0.0001	19759
GeoBPR	0.0530	0.9670	0.0121	95	0.0912	0.9162	0.0004	3563	0.2323	0.8517	0.0001	19759
IRenMF	0.0327	0.9884	0.0949	95	**0.0888**	0.9263	0.0006	3563	**0.2390**	0.8487	0.0001	19759
H-PUM	0.1069	0.9437	0.0137	**397**	0.0686	0.9163	0.0054	**5593**	0.2190	0.8687	0.0170	**26523**
Skyline	0.8949	0.9826	0.0985	350	0.8537	0.9834	0.0766	5427	0.7707	0.9597	0.0623	26327

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Table 4: Performance of the recommenders for route recommendation in terms of ranking accuracy (nDCG), novelty (EPC), and diversity (Gini) at cutoff 5. Best result in bold.

City	Recommender	nDCG	EPC	Gini	UC
NYC	Baseline-T	0.3584	0.9737	0.0078	16
	ClosestNN-T	0.4162	**0.9913**	**0.0385**	16
	MC-T	0.4285	0.9746	0.0138	16
	FMC-T	0.4130	0.9682	0.0070	16
	kNN-T	0.4253	0.9845	0.0131	16
	WG-T	**0.4332**	0.9880	0.0345	16
PTJ	Baseline-T	0.3777	0.9681	0.0092	390
	ClosestNN-T	0.3879	**0.9873**	**0.0386**	390
	MC-T	**0.4219**	0.9682	0.0111	390
	FMC-T	0.3833	0.9784	0.0022	390
	kNN-T	0.4002	0.9768	0.0144	390
	WG-T	0.4185	0.9766	0.0244	390
TOK	Baseline-T	0.3696	0.8555	0.0109	5870
	ClosestNN-T	0.3729	**0.9669**	**0.0392**	5870
	MC-T	**0.4250**	0.6954	0.0066	5870
	FMC-T	0.4110	0.7661	0.0024	5870
	kNN-T	0.4158	0.8683	0.0104	5870
	WG-T	0.4210	0.8076	0.0273	5870

Table 5: Performance of the recommenders in contextual recommendation in terms of ranking accuracy (nDCG@5), when considering time, weather, or both as contexts. Best result for each context underlined, and the overall for each city in bold.

City	Recommender	Time	Weather	Full
NYC	C-Rnd	0.0018	0.0005	0.0005
	C-Pop	**0.0375**	0.0060	0.0050
	C-H-PUM	0.0254	0.0048	0.0045
PTJ	C-Rnd	0.0003	0.0001	0.0004
	C-Pop	0.0146	0.0088	0.0116
	C-H-PUM	**0.0148**	0.0026	0.0115
TOK	C-Rnd	0.0000	0.0000	0.0000
	C-Pop	0.0057	**0.0113**	0.0053
	C-H-PUM	0.0048	0.0033	0.0031

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