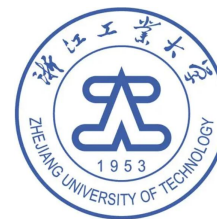


SPOT-Trip: Dual-Preference Driven Out-of-Town Trip Recommendation

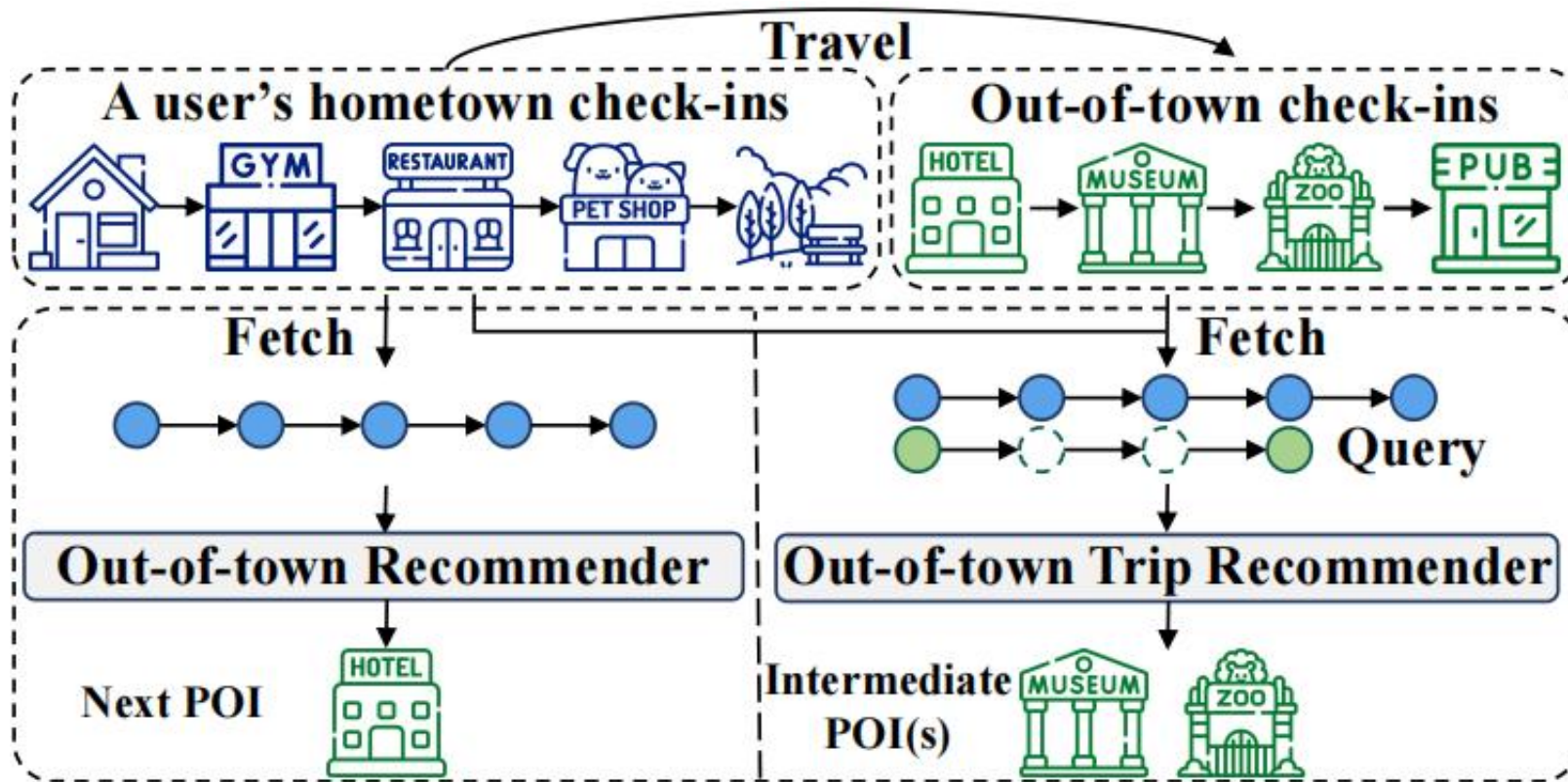
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Motivation



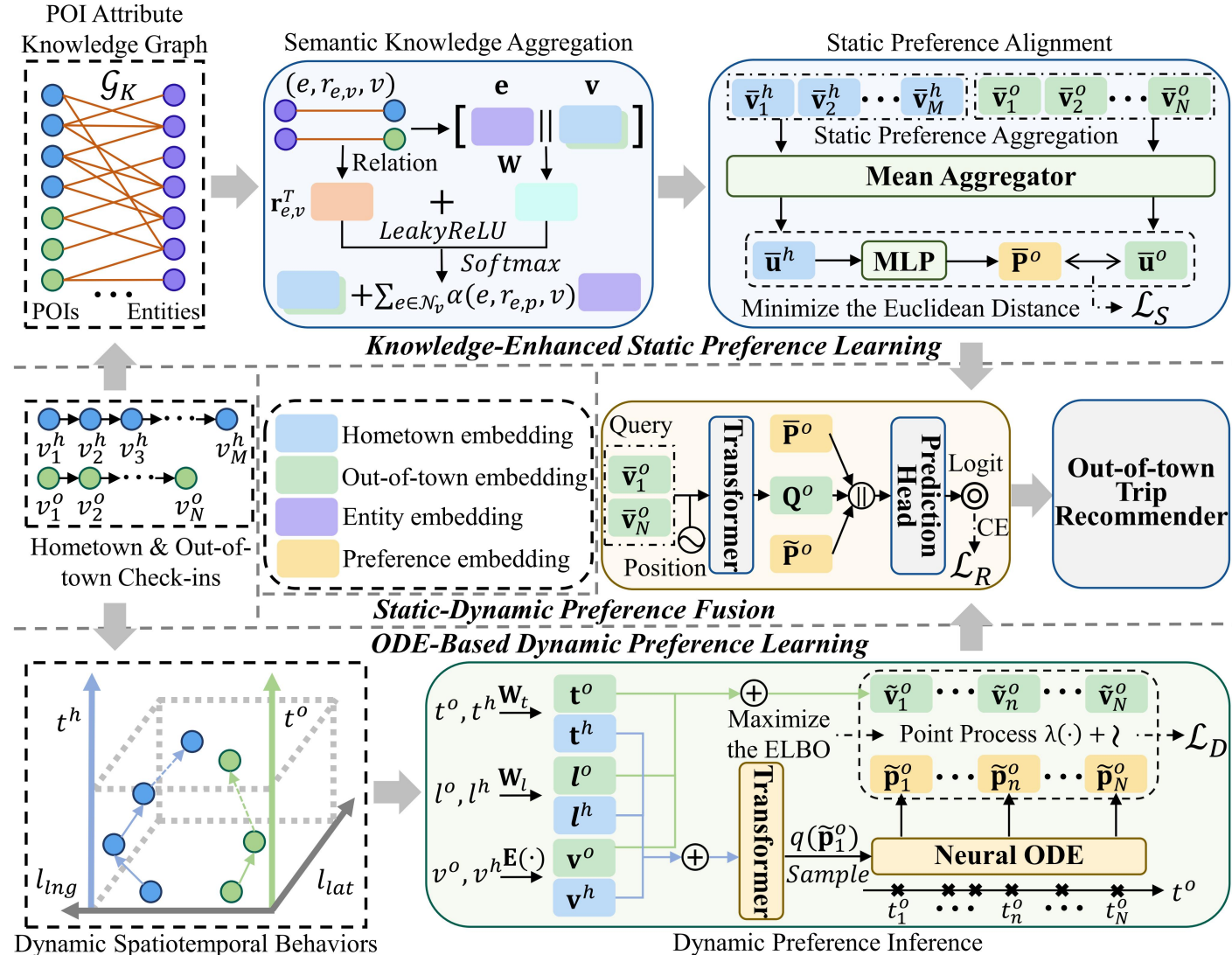
Out-of-town trip recommendation aims to generate a sequence of Points of Interest (POIs) for users traveling from their hometowns to previously unvisited regions based on personalized itineraries, e.g., origin, destination, and trip duration.

Challenge

- **Data Sparsity.** Users often have few or even no historical check-in records in out-of-town regions.
- **Complex User Preferences.** Intuitively, the user preferences can be categorized into two complementary components: static (or invariant) and dynamic preferences.

Method

We propose a Static-dynamic Preference aware Out-of-Town Trip recommendation framework, SPOT-Trip.



Experiment

Table 1: The overall comparison between SPOT-Trip and baselines, where the best performance is marked in bold while the second-best results are underlined. * denotes improvements that are statistically significant, where we use two-sided t-test with p -value < 0.05 [31].

Method	Foursquare				Yelp			
	$F_1(\uparrow)$	$PairsF_1(\uparrow)$	$Full-F_1(\uparrow)$	$Full-PairsF_1(\uparrow)$	$F_1(\uparrow)$	$PairsF_1(\uparrow)$	$Full-F_1(\uparrow)$	$Full-PairsF_1(\uparrow)$
PersTour [26]	0.0258	0.0016	0.4421	0.1572	0.0251	0.0066	0.5059	0.2074
Popularity [6]	0.0261	0.0013	0.4423	0.1565	0.0257	0.0056	0.5065	0.2058
POIRank [6]	0.0253	0.0019	0.4416	0.1582	0.0264	0.0079	0.5068	0.2093
GraphTrip [14]	0.0295	0.0048	0.4498	0.1620	0.0289	0.0126	0.5107	0.2184
MatTrip [54]	0.0311	0.0037	0.4530	0.1656	0.0301	0.0119	0.5117	0.2191
AR-Trip [39]	0.0304	0.0045	0.4512	0.1673	0.0307	0.0153	0.5115	0.2204
Base	0.0339	0.0069	0.4571	0.1698	0.0315	0.0149	0.5097	0.2215
Base + KDDC [32]	<u>0.0375</u>	0.0079	<u>0.4606</u>	0.1822	<u>0.0341</u>	0.0156	<u>0.5126</u>	<u>0.2256</u>
Base + CNN-ODE [21]	0.0367	<u>0.0094</u>	0.4578	<u>0.1843</u>	0.0326	<u>0.0168</u>	0.5124	0.2237
Base + PPROC [21]	0.0330	0.0071	0.4550	0.1687	0.0334	0.0159	0.5110	0.2218
SPOT-Trip	0.0400*	0.0109*	0.4723*	0.1960*	0.0399*	0.0190*	0.5261*	0.2347*
Improvement	+6.67%	+15.96%	+2.54%	+6.34%	+17.01%	+13.90%	+2.63%	+4.03%

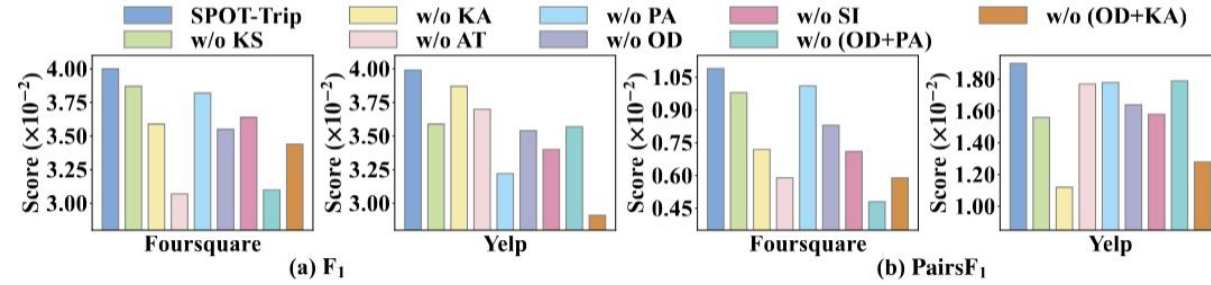


Figure 6: Performance of SPOT-Trip and its variants on two datasets.

Table 2: The effect of data sparsity. We sample different fractions of the training data.

Dataset	Method	Hometown Data during Training							
		40%		60%		80%		100%	
		$F_1(\uparrow)$	$PairsF_1(\uparrow)$	$F_1(\uparrow)$	$PairsF_1(\uparrow)$	$F_1(\uparrow)$	$PairsF_1(\uparrow)$	$F_1(\uparrow)$	$PairsF_1(\uparrow)$
Foursquare	Base + KDDC	0.0325	0.0038	0.0348	0.0058	0.0364	0.0069	0.0375	0.0079
	Base + CNN-ODE	0.0314	0.0046	0.0336	0.0052	0.0352	0.0074	0.0367	0.0094
	SPOT-Trip	0.0347	0.0073	0.0369	0.0085	0.0401	0.0091	0.0400	0.0109
Yelp	Base + KDDC	0.0321	0.0140	0.0331	0.0149	0.0338	0.0151	0.0341	0.0156
	Base + CNN-ODE	0.0313	0.0154	0.0327	0.0156	0.0333	0.0161	0.0326	0.0168
	SPOT-Trip	0.0327	0.0162	0.0343	0.0178	0.0384	0.0216	0.0399	0.0190

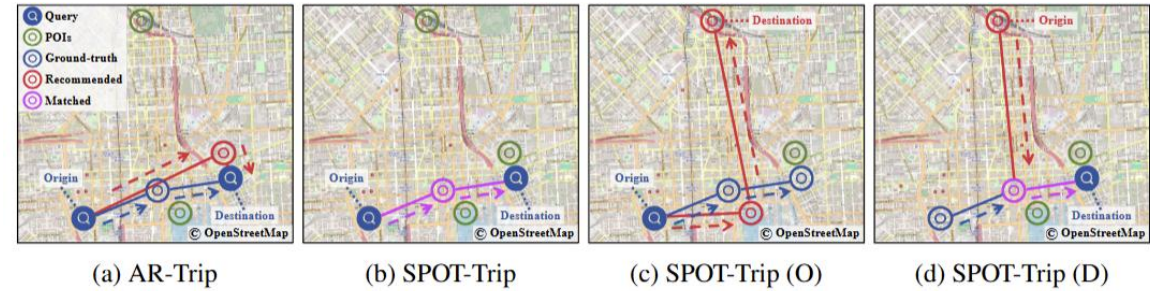


Figure 5: Visualizations of recommendation results for the user 2964 on Foursquare. (O) denotes a query with a single origin, while (D) denotes a query with a single destination.

Thank you for listening!

Paper



Code

