Supplemental Material to TKDE-2020-01-0058 Context-Aware Path Ranking in Road Networks

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1 Edit Distance Based Ranking Scores

In addition to weighted Jaccard Similarity, we use edit distance to derive a ranking score between a candidate path and a ground truth path. We conduct additional experiments on edit distance based ranking scores, where we compare *PathRank* with different regression baselines in Table 1. We observe that when using edit distance to derive ranking scores, *PathRank* also outperforms all baselines. The results are consistent with the results from *PathRank* using weighted Jaccard similarity (see Table 9 in the paper). Thus, we conclude that no matter which ranking score is used, the proposed *PathRank* achieves the best accuracy and thus is a generic path ranking framework.

TABLE 1: Comparison with Regression Baselines, Edit Distance

	Method	MAE	MARE	τ	ρ
BF	**LR**	0.1058	0.5503	0.7103	0.7427
	Lasso	0.1454	0.7565	0.6548	0.6964
	SVR	0.1021	0.5311	0.6631	0.6927
	DT	0.1081	0.5629	0.7184	0.7604
	DTA	0.1128	0.5869	0.7247	0.7637
AF	**LR**	0.1374	0.7148	0.2960	0.2943
	Lasso	0.1199	0.9970	0.5887	0.6261
	SVR	0.0676	0.3517	0.7577	0.7891
	DT	0.1356	0.7055	0.5727	0.5970
	DTA	0.1601	0.8328	0.4940	0.5207
Deep Learning	**LSTM**	0.1199	0.6239	0.7291	0.7526
	PRC	**0.0481**	**0.2504**	**0.8585**	**0.8786**

2 Comparison with the Ranking Part of Top-k Path Selection Algorithms

The ranking part of a top-k path selection algorithm is often a simple ranking function on a specific travel cost. More specifically, top-k shortest path selection algorithm uses a ranking function on distances, top-k fastest path selection algorithm uses a ranking function on travel times, and top-k most fuel efficient path selection algorithm uses a ranking function on fuel consumption.

We conduct additional experiments to compare the ranking part of a top-k path selection algorithm with *PathRank*.

The input is a set of paths that are returned by each of the following top-k path selection algorithms.

1) top-k shortest path selection algorithm;
2) top-k fastest path selection algorithm;
3) top-k most fuel efficient path selection algorithm;
4) top-k diversified shortest path selection algorithm;
5) top-k diversified fastest path selection algorithm;
6) top-k diversified most fuel efficient path selection algorithm.

For inputs 1) and 4), we compare *PathRank* with the ranking part of the top-k path selection algorithms, which is a ranking function on distance (DI). For inputs 2) and 5), we compare *PathRank* with the ranking part of the top-k path selection algorithms, which is a ranking function on travel time (TT). For inputs 3) and 6), we compare *PathRank* with the ranking part of the top-k path selection algorithms, which is a ranking function on fuel consumption (FC).

The results in Table 2 show that *PathRank* outperforms the ranking part of a top-k path selection algorithm in all settings.

TABLE 2: Comparison with The Ranking Part of Top-k Path Selection Algorithms

Input		Ranking	τ	ρ
Top-k	Shortest Paths 1)	*DI*	0.7127	0.7555
		PRC	0.7551	0.7838
	Fastest Paths 2)	*TT*	0.6491	0.6988
		PRC	0.7488	0.7825
	Fuel Efficient Paths 3)	*FC*	0.6234	0.6939
		PRC	0.7229	0.7538
Top-k Diversified	Shortest Paths 4)	*DI*	0.6732	0.7303
		PRC	0.7997	0.8331
	Fastest Paths 5)	*TT*	0.6922	0.7410
		PRC	0.8167	0.8452
	Fuel Efficient Paths 6)	*FC*	0.6517	0.7028
		PRC	0.7964	0.8271