Technical Report

1 HYPERPARAMETER STUDY

Since the trends on MTR-2 Weeks, MTR-3 Weeks, and MTR-4 Weeks datasets are similar to MTR-1 Week, we show results on MTR-1 Week dataset. Specifically, we explore two hyperparameters:

Minimal Group Size g_m. We evaluate with different minimal group sizes, including 3, 4, 5, and 6. Figure 1 (a) shows that the performance improves with an increase in g_m up to a certain point (i.e., 5), after which it achieves the best results. The reason is that a larger group size results in patterns that have more passengers moving together, which is easier to be detected.

Dimensionality d of Hidden State. We investigate the effect of varying the dimensionality of the hidden state, choosing values from 256, 512, 1024, and 2048. Figure 1 (b) shows that beyond a certain point (i.e., 512), increasing d leads to degradation due to the overfitting problem.

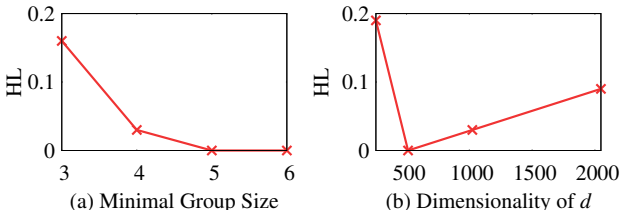

Fig. 1. Hyperparameter study of our model.

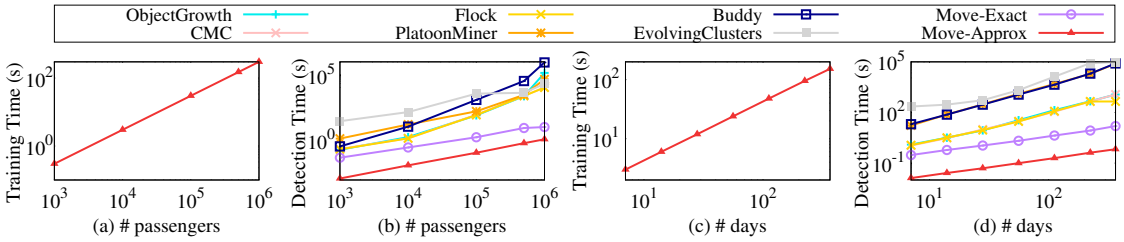

Fig. 2. Scalability on (a-b) the number of passengers; (c-d) the number of days.

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2 SCALABILITY EVALUATION

We use GeForce GTX 1080 Ti 11 GB GPU for evaluation. Note that we report the average running times over five runs for all methods.

2.1 Scalability w.r.t. the number of objects

Figure 2 (a, b) depicts the scalability of our model and other competitors concerning the number of passengers, demonstrating a linear relationship between running time and passenger size.

2.2 Scalability w.r.t. the number of time intervals

Figure 2 (c, d) illustrates the scalability of our model and other competitors concerning the span of the time dimension when enlarging it from 7 days to 365 days by replicating the data multiple times. The trend shows linear scalability, indicating the model's efficiency in handling varying time intervals. Note that we fix the size of passengers as 10,000 here and only change the span of the time dimension.