

APPENDIX A

EVALUATIONS OF CMPP PROCESSING

The supplementary experiments consist of the experiments of the whole querying processing for BLD-2 (i.e., Figs. 19–27 and Figs. 31–35), and the experiments of η 's effect for BLD-1 (i.e., Figs. 28–30).

TABLE 6: Query parameter settings.

Parameter	Value
r (meter)	20, 40, 60, 80
θ	2, 4, 6, 8
Validity (second)	60, 120, 180, 240
η	0.5, 0.6, 0.7, 0.8

Query Instance. We generate query instances in the same way with that in the paper.

Performance Metrics. We use the same performance metrics as that in the paper.

Query Parameters. Besides the query parameters (i.e., r , θ , and Validity) in the paper, we supply the experimental results of η 's effect.

Effect of Query Range r . The query response time, F1-score, and memory usage for BLD-2 are reported in Fig. 19, Fig. 20, and Fig. 21, respectively. They follow similar tendencies as that in BLD-1 (cf. Section 6.3.1 in the paper) and detailed interpretation could be found there.

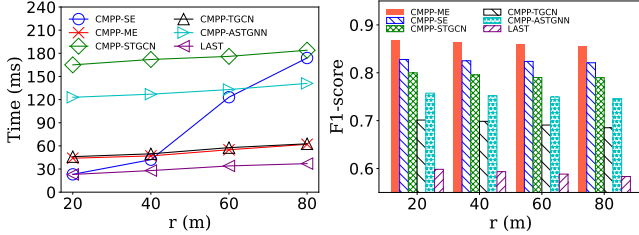


Fig. 19: Time vs r (BLD-2). Fig. 20: F1-score vs r (BLD-2).

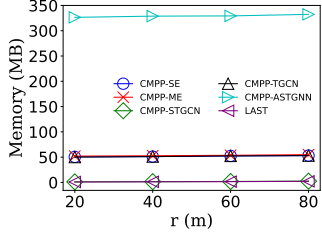


Fig. 21: Memory vs r (BLD-2).

Effect of Population Threshold θ . The query response time, F1-score, and memory usage for BLD-2 are shown in Fig. 22, Fig. 23, and Fig. 24 respectively. The tendencies are similar to that in BLD-1 and the explanations can be found in Section 6.3.2 in the paper.

Effect of Confidence Threshold η . The query response time, F1-score, and memory usage for BLD-2 are shown in Fig. 25, Fig. 26, and Fig. 27 respectively. Besides, the similar results for BLD-1 are complemented and reported in Fig. 28, Fig. 29, and Fig. 30 respectively. Similar to θ , η as a parameter to define a populated partition, has no effect on the query efficiency and effectiveness.

Effect of Validity. The query response time, F1-score, and memory usage for BLD-2 are shown in Fig. 31, Figure 32, and Fig. 33 respectively. The tendencies are similar to that of BLD-1 and detailed explanations are available in Section 6.3.3 in the paper.

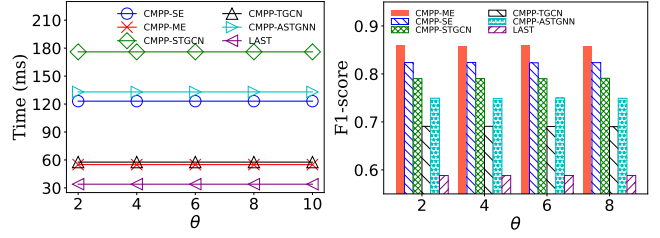


Fig. 22: Time vs θ (BLD-2). Fig. 23: F1-score vs θ (BLD-2).

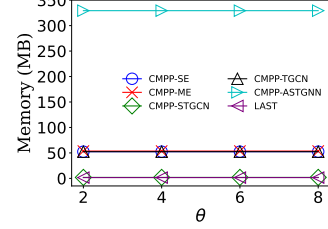


Fig. 24: Memory vs θ (BLD-2).

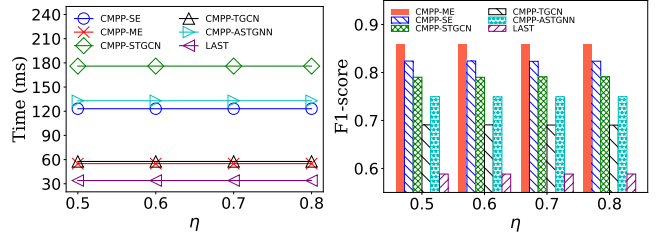


Fig. 25: Time vs η (BLD-2). Fig. 26: F1-score vs η (BLD-2).

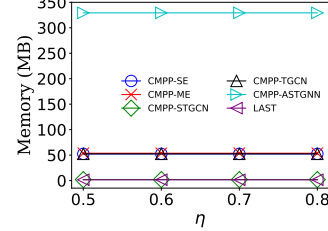


Fig. 27: Memory vs η (BLD-2).

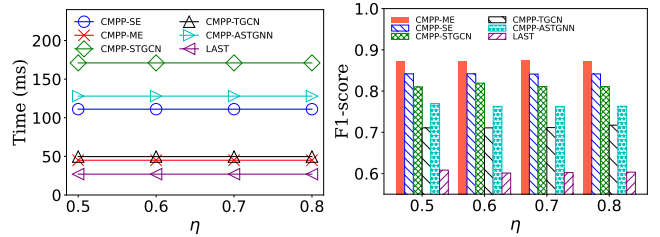


Fig. 28: Time vs η (BLD-1).

Fig. 29: F1-score vs η (BLD-1).

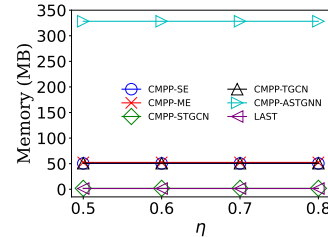


Fig. 30: Memory vs η (BLD-1).

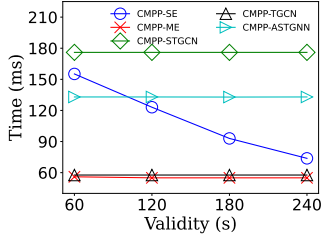


Fig. 31: Time vs Validity (BLD-2).

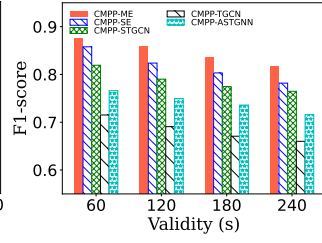


Fig. 32: F1-score vs Validity (BLD-2).

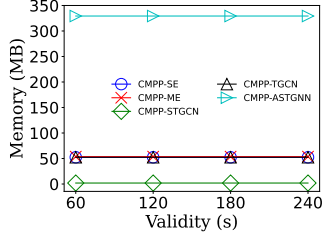


Fig. 33: Memory vs Validity (BLD-2).

Effect of Caching Mechanism. The query response time and F1-score are reported in Fig. 34 and Fig. 35 respectively. Please refer to Section 6.3.4 in the paper for interpretations.

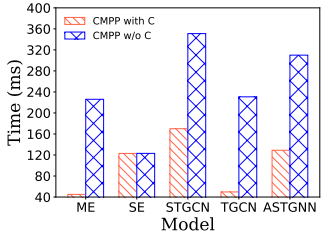


Fig. 34: Time vs model (BLD-2).

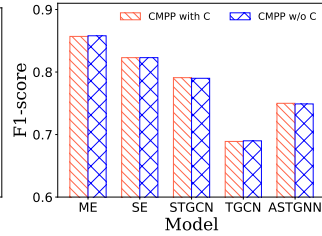


Fig. 35: F1-score vs model (BLD-2).

Summary. Overall, the results in BLD-2 are similar to that in BLD-1 and this further demonstrates the effectiveness and efficiency of CMPP query processing framework. Besides, similar to θ , varying η has almost no effect on the results of query processing. More detailed information are available in Section 6.3 in the paper.