Exactly Sparse Memory Efficient SLAM using the Multi-Block Alternating Direction Method of Multipliers: Supplementary Material

Siddharth Choudhary, Luca Carlone, Henrik I. Christensen, Frank Dellaert

In the supplementary material, we present additional results on large synthetic grid graphs. We consider a Manhattan world with poses arranged as a regular grid. Each node in the grid is connected to all of its four neighbors. We ran all approaches on a single thread on a desktop using Ubuntu 14.04 with Intel(R) Core(TM) i7-3770 CPU running at 3.40GHz.

Figure 1 shows the results on $48 \times 48$ grid ($n = 2401$, $m = 4074$) which is divided into subgraphs of size $12 \times 12$. Figure 2 shows the results on $150 \times 150$ grid ($n = 22801$, $m = 45300$) which is divided into subgraphs of size $30 \times 30$. Additionally the figures show the subgraph estimates after 20 and 100 iterations of ADMM-adapt algorithm and the time taken per iteration (in seconds).

Figure 3 shows the results on $210 \times 210$ grid ($n = 44521$, $m = 88620$), figure 4 shows the results on $270 \times 270$ grid ($n = 73441$, $m = 146340$) and figure 5 shows the results on $361 \times 361$ grid ($n = 130321$, $m = 259920$) which are divided into subgraphs of size $30 \times 30$.

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†S. Choudhary, L. Carlone, H. I. Christensen, and F. Dellaert are with the College of Computing, Georgia Institute of Technology, Atlanta, GA, USA, {siddharth.choudhary,luca.carlone}@gatech.edu, {hic,frank}@cc.gatech.edu.
Figure 3: (a) $\chi^2$ error comparing the proposed approach (ADMM-adapt) against the final error of a centralized solver, (b) time taken per iteration (in sec) for the graph of size $210 \times 210$ ($n = 44521$, $m = 88620$) which is divided into subgraphs of size $30 \times 30$.

Figure 4: $\chi^2$ error comparing the proposed approach (ADMM-adapt) against the final error of a centralized solver, (b) time taken per iteration (in sec) for the graph of size $270 \times 270$ ($n = 73441$, $m = 146340$) which is divided into subgraphs of size $30 \times 30$.

Figure 5: $\chi^2$ error comparing the proposed approach (ADMM-adapt) against the final error of a centralized solver, (b) time taken per iteration (in sec) for the graph of size $360 \times 360$ ($n = 130321$, $m = 259920$) which is divided into subgraphs of size $30 \times 30$. 