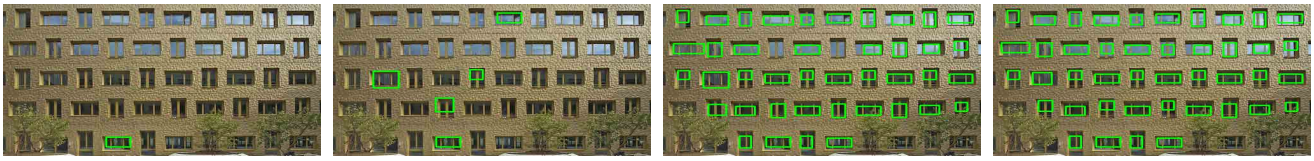
Appendix

Convergence Analysis. Our structure-driven MCMC sampler follows the MBD dynamics thus the convergence is guaranteed theoretically. Practically, the number of iteration steps are determined empirically based on trials-and-errors. Since the structure-driven moves need a few objects to construct grid structure hypotheses, we set the 500 iterations in the beginning with MBD move only. The following 500 iterations are assigned with all five moves. The window object detection in different iterations is shown in Fig. 9. From Fig. 10, it can be seen that our structure-driven MCMC sampler converges faster than MBD algorithm and MBD algorithm with pre-computed birth map.



(a) (b) (c) (d)

Figure 9. Window object configuration optimization: (a) iteration 450; (b) iteration 500; (c) iteration 700; (d) iteration 999.

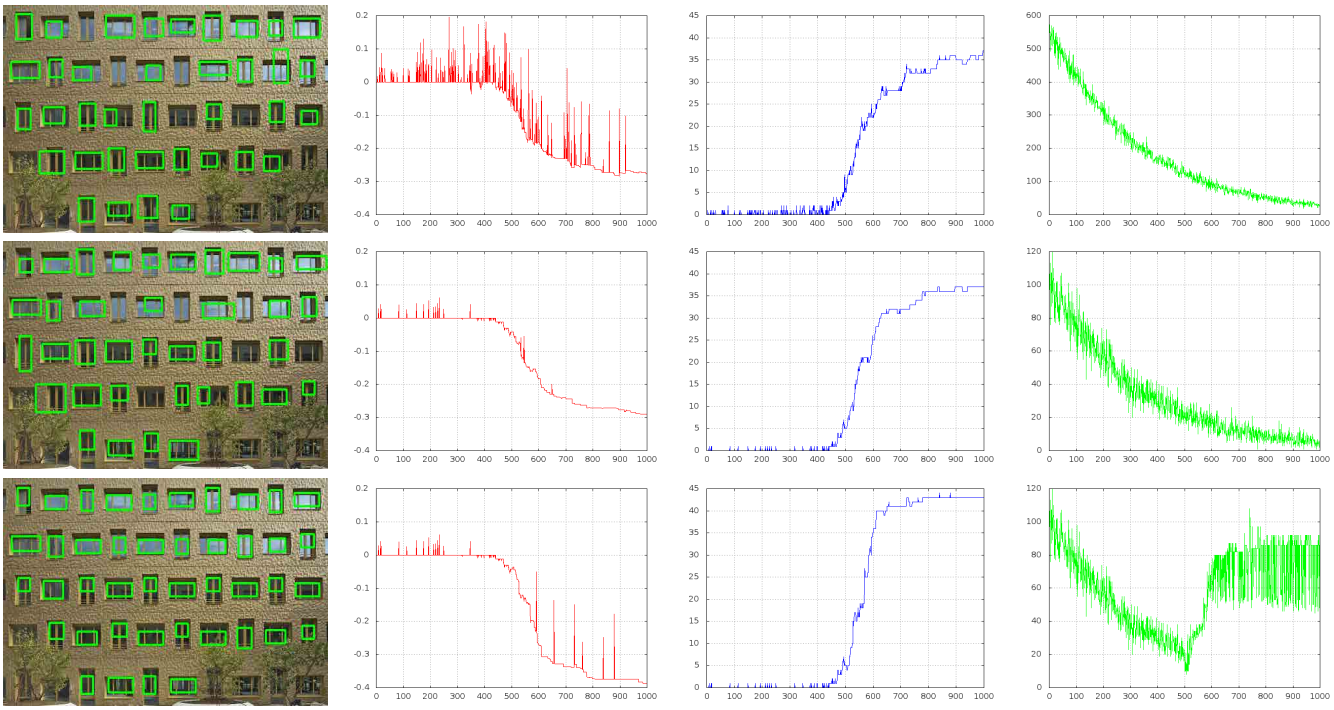


Figure 10. Convergence comparison with other sampling methods: From top to bottom, it shows the performance of MBD, of MBD with static birth map and of our structure-driven MBD; From left to right, it shows the detection result (green rectangles represent detected objects), energy minimization vs iteration (in red), numbers of detected object vs iteration (in blue), numbers of proposed objects vs iteration (in green); Notice that window detection with our methods has less missing detections. In addition, our method achieves the minimum energy, converges quickly and proposes objects more efficiently under the same cooling scheme.