Towards Automatic Large-Scale 3D Building Reconstruction: Primitive Decomposition and Assembly

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Abstract In this paper we propose a pipeline for highly automatic building reconstruction based on 3D point clouds. 3D building models are of great interest for many applications including city planning, navigation, emergency response and tourism and their reconstruction has been intensively studied. It is, however, still a challenge to minimize manual intervention and to achieve highly automated processing in practical applications. The main reason lies in the variability and complexity of urban scenes. We believe that one possible key to tackle this is a reliable primitive-based decomposition of urban scenes as well as their constituent buildings. It links scene interpretation with model reconstruction and, thus, naturally completes an automatic reconstruction pipeline. We propose an effective scheme for the decomposition of the whole scene straight into individual building components, i.e., primitives. The primitives are reconstructed via statistical generative modeling and assembled into individual watertight building models. An experiment has been performed on a dataset of a complete central European village demonstrating the potential of the proposed approach.