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Xi'an
P. R. China

Reviews For Paper

Paper ID 432

Title Lightweight 3D Reconstruction of Urban Buildings From Range Data

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Masked Reviewer ID: Reviewer 1

Review:

Question	
Overall Rating	Weakly accept
Importance / Relevance	Of sufficient interest
Novelty	Moderately original
Technical Correctness	Probably correct, did not check completely
Experimental Validation	Lacking in some respect
Clarity of Presentation	Reads very well
Confidence	Confident
Detailed Comments. For the sake of the authors and the quality of the reviewing process, please explain your ratings in the space provided.	This paper presents a method for creating 3D models of building facades directly from raw range-scan data. Rather than creating a triangulated model with a standard method, the authors operate on 2D slices through the range data, trying to find a small number of keyslices that, when interpolated through extrusion (or tapering), well-approximate the data. I like the idea behind this paper -- it presents a very simple, fast approach with tunable parameters for adjusting the amount of detail in the reconstructed model, and I think that recommends it. There are some disadvantages to this approach, however, and I could have used more examples to get an idea of the range of cases where it works, and where it might fail. For instance, it may require lots of keyslices if only a small part of the building is complex (such as the stairs in the example scan of an interior), whereas having different keyslices for different parts of the model may be better. The use of 2D slices parallel to the ground also may not make use of all domain knowledge available for this setting (e.g., a building with inset windows on several floors may be represented with a single plane with a few holes, whereas this approach would require multiple key slices per floor). But the simplicity of the approach also confers some advantages. One part of the algorithm I didn't understand was how the vectorization

	algorithm handles building contours which have multiple connected components (e.g. the 8 cylinders sticking out of the top of the building in Fig. 1(b)).

Masked Reviewer ID: Reviewer 2

Review:

Question	
Overall Rating	Weakly reject
Importance / Relevance	Of limited interest
Novelty	Minor originality
Technical Correctness	Probably correct, did not check completely
Experimental Validation	Insufficient validation
Clarity of Presentation	Is clear enough
Confidence	Confident
Detailed Comments. For the sake of the authors and the quality of the reviewing process, please explain your ratings in the space provided.	This paper proposes a method for generating 3D surface models from range data. The method first divide the 3D data into 2D slice data, and cluster them into key slices. Then these key slices are used for generating concise 3D model. The proposed method can be applied to objects which can be described by extrusion and tapering of 2D section data. However, it seems that the method generate large errors if it is applied to natural objects such as trees. Thus the method is limited. Unfortunately, I cannot see the advantage of the proposed method, since there is no comparison with a large amount of existing methods for generating 3D models from rage data. Most of the existing methods can be applied to general 3D data, while the proposed method can only be applied for manmade objects. The computational costs and the errors in the 3D models generated from the proposed method should be compared with those of the existing methods for generating 3D models from range data.

Masked Reviewer ID: Reviewer 3

Review:

Question	
Overall Rating	Definitely accept
Importance / Relevance	Of sufficient interest

Novelty	Very original
Technical Correctness	Probably correct, did not check completely
Experimental Validation	Sufficient experimental validation or a theoretical paper
Clarity of Presentation	Reads very well
Confidence	Confident
Detailed Comments. For the sake of the authors and the quality of the reviewing process, please explain your ratings in the space provided.	This paper presents a method for 3D reconstruction of buildings from 3D point cloud data obtained by a range scanner. The key idea is to exploit the constraint that buildings can be described by a small number of "keyslice" cross-sections plus extrusion and taper operations that connect these slices. The paper is well written and gives a clear, well-motivated description of the algorithm. There are two key threshold parameters, td and tr, that are critical to the algorithm and while the authors acknowledge their importance, they do not adequately address the issues of how to set these parameters, either statically say using a tuning set, or dynamically. More discussion on how to set these thresholds is needed. The experimental results shown are good, though the visualization of the keyslices in Figure 4a is not very easy to see. Table 1 is a nice summary of the tradeoffs with the value of parameter td. Overall, an excellent paper that will have practical importance as well.