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Depth Map Repairing for Building Reconstruction

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Structure-from-motion along with multi-view stereo techniques jointly allow for the inexpensive scanning of 3D objects (e.g. buildings) using just a collection of images taken from commodity cameras. Despite major advances in these fields, a major limitation of dense reconstruction algorithms is that correct depth/normal values are not recovered on specular surfaces (e.g. windows) and parts lacking image features (e.g. flat, textureless parts of the facade). Since these reflective properties are inherent to the surface being acquired, images from different viewpoints hardly contribute to solve this problem. In this paper we present a simple method for detecting, classifying and filling non-valid data regions in depth maps produced by dense stereo algorithms. Triangles meshes reconstructed from our repaired depth maps exhibit much higher quality than those produced by state-of-the-art reconstruction algorithms like Screened Poisson-based techniques.

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