Visibility-based feature extraction from discrete models

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In this paper, we present a new visibility-based feature extraction algorithm from discrete models as dense point clouds resulting from laser scans. Based on the observation that one can characterize local properties of the surface by what can be seen by an imaginary creature on the surface, we propose algorithms that extract features using an intermediate representation of the model as a discrete volume for computational efficiency. We describe an efficient algorithm for computing the visibility map among voxels, based on the properties of a discrete erosion. The visibility information obtained in this first step is then used to extract the model components (faces, edges and vertices) which may be curved and to compute the topological connectivity graph in a very efficient and robust way. The results are discussed through several examples.

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