

# A New 3D Model Retrieval Approach Based on the Elevation Descriptor

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## Abstract

The advances in 3D data acquisition techniques, graphics hardware, and 3D data modeling and visualizing techniques have led to the proliferation of 3D models. This has made the searching for specific 3D models a vital issue. Techniques for effective and efficient content-based retrieval of 3D models have therefore become an essential research topic. In this paper, a novel feature, called elevation descriptor, is proposed for 3D model retrieval. The elevation descriptor is invariant to translation and scaling of 3D models and it is robust for rotation. First, six elevations are obtained to describe the altitude information of a 3D model from six different views. Each elevation is represented by a gray-level image which is decomposed into several concentric circles. The elevation descriptor is obtained by taking the difference between the altitude sums of two successive concentric circles. An efficient similarity matching method is used to find the best match for an input model. Experimental results show that the proposed method is superior to other descriptors, including spherical harmonics, the MPEG-7 3D shape spectrum descriptor, and D2.

Keyword : 3D Model retrieval; Elevation descriptor