Multi-Scale Feature Line Detection on 3D Meshes
3D Visual Computing and Robotics Lab, EECS, Peking University
Contact: Tao Luo luotao@cis.pku.edu.cn, Hongbin Zha zha@cis.pku.edu.cn

Introduction

Feature line detection is an essential step in geometry processing, which has numerous applications in shape recognition, mesh simplification, mesh segmentation, non-photorealistic rendering, etc. However, for the triangular meshes reconstructed from raw scanning data, noise is inevitable due to the accuracy of laser scanner, perturbation and variation of reflectance property of the objects. Thus, it is challenging to robustly detect feature lines on these noisy meshes. In this work, we propose a multi-scale approach to detecting feature lines. First, the discrete 3D multi-scale representation is generated. Then, we implement a probabilistic method for local scale selection at each vertex on the mesh. Finally, feature lines are traced with the curvature information at the selected local scales. Our method can eliminate the redundant lines caused by noise while making the offsets of detected lines less than those using mesh smoothing methods. Moreover, 3D line drawings generated using our method can be utilized as an assistance in making archaeological line drawings.

Multi-scale processing on a mesh

3D line drawing for archaeological illustration

References