图形、图像、模式识别

保留几何特征的散乱点云简化方法

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摘要　　针对散乱点云简化时经常丢失过多的几何特征，提出一种保留几何特征的简化方法。首先采用均匀栅格法划分点云空间；然后分别以点云中的数据点为球心构建包围球，并在包围球中查找数据点的K邻域；随后构造一个非负函数用于度量重建曲面在各点处的曲率，进而提取并保留点云中的特征点；最后根据法向量的内积阈值对包围球中的非特征点进行适度简化。实验结果表明该方法不仅能够充分保留点云中的几何特征，而且具有速度快的特点。

关键词　　散乱点云　简化　几何特征　包围球　K邻域
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Simplification of scattered point cloud with geometric feature reservation

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Abstract

　Geometric feature always being lost excessively in the simplification process of scattered point cloud，a simplification method with geometric feature reservation is proposed.At first，points in point cloud are distributed into uniform grids.Then，bounding spheres are constructed for each point whose K-nearest neighbors are searched in the relevant bounding sphere. Afterward，a specified function is defined to measure the curvature of each point so that feature points can be extracted and reserved.Finally，non-feature points in bounding spheres are simplified according to the threshold of normal vectors' inner product.The experiments prove that the method proposed is efficient and can reserve the geometric feature of point cloud sufficiently.

Key words　scattered point cloud　simplification　geometric feature　bounding sphere　K-nearest neighbors

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