

RANSAC平面估计算法在路面物体体积测量中的应用

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摘要：

在利用车载单线式激光扫描仪实施路面三维重建及路面目标物体体积测量的应用中，使用RANSAC平面估计算法获得了路面的零高度平面，提高了路面目标物体体积计算的精度。实际测试表明，对路面上不规则形状坑，采用注水法测量得到的坑体积为2.25立方米，点云经优化前后计算得到的坑体积分别为1.86立方米和2.10立方米，误差分别为17.3%和6.7%，点云优化过程耗时约7秒。因此，本文的路面三维点云优化方法速度快，且三维重建效果及目标物的体积计算精度可满足实际要求。

关键词：体积测量；点云优化；RANSAC算法；路面三维重建

Application of Plane Estimation Algorithm Based on RANSAC in Volume Measurement of Object on Road Surface

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Abstract:

In the application of the road surface 3D reconstruction and object volume measurement by vehicle-borne laser scanner, the zero-height plane of the road can be obtained by the plane estimation algorithm based on RANSAC, and the accuracy of volume measurement of object on road surface is high. Experiment result showed that, the volume of an irregular crater on the road which is measured by water flooding method is 2.25 m³. The volume is 1.86 m³ and 2.10 m³ respectively before and after the points cloud optimization with the error of 17.3% and 6.7%, and the optimization time is around 7s. Therefore, the points cloud optimization method on road surface proposed on this paper has the advantage of high-speed calculation. Meanwhile the volume accuracy and the 3D reconstruction effect could meet the requirement in practice.

Keywords: volume measurement; points cloud optimize; RANSAC algorithm; road surface 3D reconstruction

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