

学术探讨

一种DCT变换的三维网格物体盲水印方法

李淑敬¹, 李林国²

1.中国地质大学(武汉) 计算机学院,武汉 430074

2.江南大学 信息工程学院,江苏 无锡 214122

收稿日期 修回日期 网络版发布日期 2007-9-9 接受日期

摘要 提出了一种基于DCT变换的3D网格物体鲁棒性盲水印方案。首先将3D物体模型转换到仿射不变空间,抽取三维物体重心到顶点的距离生成一个一维的离散信号,将该离散信号进行DCT变换,改变其系数以嵌入水印。然后经过逆DCT变换生成带水印的3D物体模型。在仿射不变空间下,实现了3D物体模型对平移、旋转、比例变换的鲁棒性,采用DCT变换使3D模型具有很强的水印不可见性,而且具有一定的噪声鲁棒性。试验结果也表明该方法不仅对于旋转、平移、比例变换具有很强的鲁棒性,而且具有良好的水印不可见性。

关键词 [数字水印](#) [仿射不变空间](#) [主元分析](#) [DCT](#)

分类号

Blind 3D mesh objects watermarking schemes based on DCT

LI Shu-jing¹, LI Lin-guo²

1.School of Computer,China University of Geosciences,Wuhan 430074,China

2.School of Information Engineering,Southern Yangtze University,Wuxi,Jiangsu 214122,China

Abstract

A novel DCT method for blind robust 3D mesh object watermarking applications was proposed.First,a transformation of the model to an affine invariant space was finished prior to watermark embedding.We produced a 1D signal through calculating the distance from the object center to the vertices,and performed a DCT on it,then embedded the watermark by changing the DCT frequency coefficients,then the 3D object with watermark was produced by reverse DCT.In affine invariant space,the 3D object was not affected by geometric transformations,such as translation,rotation and scaling,and realized good visual masking by using the DCT transform,there was also a little robustness to the additive noise.Experiments show that the method is both robust against geometric transformations and good at visual masking.

Key words [digital watermark](#) [affine invariant space](#) [principal component analysis](#) [DCT](#)

DOI:

通讯作者 李淑敬 [E-mail: lishujing_lishujing@yahoo.com](mailto:lishujing_lishujing@yahoo.com)

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(1163KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ 本刊中 [包含“数字水印”的相关文章](#)

▶ 本文作者相关文章

· [李淑敬](#)

· [李林国](#)