工程与应用

# 基于Laplacian Eigenmap的图像变化检测虚警优化技术

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摘要　　对点目标的图像变化检测,现有的变化检测技术结果往往存在着虚警过大的问题。通过深入分析多个传统的变化检测方法的特点,利用各方法的互补性,提出了利用Laplacian Eigenmap对多个方法检测结果进行降维分类的优化技术。首先把各个方法对某个像素的检测结果用向量的形式进行表示,然后利用Laplacian Eigenmap对整个图像的数据流形在低维空间展开,最后利用模糊分类进行分类。该技术有两个优势：（1）在保证现有较高检测率的同时,大大降低了结果的虚警率；（2）它极大地降低了在传统方法中由于人为阈值取舍带来的偏差风险。但该技术的不足之处是增加了计算量。

关键词　　图像变化检测　 虚警优化　 Laplacian特征映射　 降维

分类号

# Optimization of false alarm rate in image change detection based on Laplacian Eigenmap

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**Abstract**

According to the high false alarm rate in the image change detection for point targets,an optimization method based on Laplacian Eigenmap is proposed in this paper.We firstly express all the results of one pixel in the image by many ICD methods as a vector,and then spread the manifold which is formed by such vectors in the high dimensional space into the low dimensional space by Laplacian Eigenmap.At last these data are classified into two classes by the Gustafson Kessel,the changed points and those not.Its advantage lies in two aspects.First,it can reduce the false alarm apparently while keeps the detection rate in a high level.Second,it can also decrease the uncertainty of the result due to the unreliable decision of the threshold value.However,such optimization increases the computational complexity.

**Key words**　 image change detection　 optimization of false alarm rate　 Laplacian Eigenmap dimensionality reduction

DOI:

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