

### 基于空间语义对象混合学习的复杂图像场景自动分类方法研究

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## Spatial Semantic Objects-based Hybrid Learning Method for Automatic Complicated Scene Classification

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摘要

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**摘要** 场景分类是将多幅图像标记为不同语义类别的过程。该文针对现有方法对复杂图像场景分类性能欠佳的不足,提出一种新的基于空间语义对象混合学习的复杂图像场景分类方法。该方法以多尺度分割得到的图像对象而非整幅图像为主体进行产生式语义建模,统计各类有效特征挖掘对象的类别分布信息,并通过空间金字塔匹配,构建包含层次数据和语义信息的中间向量,弥补语义鸿沟的缺陷,训练中还结合判别式学习提高分类器的可信性。在实验数据集上的结果表明该方法具备较高的学习性能和分类精度,适用于多种类型和复杂内容图像的解译,具有较强的实用价值。

**关键词:** 图像处理 场景分类 语义对象 混合学习 金字塔匹配

**Abstract:** Scene image classification refers to the task of grouping different images into semantic categories. A new spatial semantic objects-based hybrid learning method is proposed to overcome the disadvantages existing in most of the relative methods. This method uses generative model to deal with the objects obtained by multi-scale segmentation instead of whole image, and calculates kinds of visual features to mine the category information of every objects. Then, an intermediate vector is generated using spatial-pyramid matching algorithm, to describe both the layer data and semantic information and narrow down the "semantic gap". The method also combines a discriminative learning procedure to train a more confident classifier. Experimental results demonstrate that the proposed method can achieve high training efficiency and classification accuracy in interpreting manifold and complicated images.

**Keywords:** Image processing Scene classification Semantic object Hybrid learning Pyramid matching

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