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图形、图像、模式识别

应用BP神经网络对自然图像分类

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摘要 针对图像的低层视觉特征和高层语义特征之间的鸿沟，利用一个多输出的BP神经网络，分析低层视觉特征，提取图像的主要颜色、灰度共生矩阵和7个不变矩向量作为网络的输入，用语义期望值作为网络的输出，并用加入动量因子和自适应学习率的BP算法来训练该网络。训练完成后，该网络能够对自然图像进行多种语义分类，从而建立起了从低层视觉特征到语义特征之间的映射。改进的BP算法提高了训练的速度和可靠性，实验证明，该方法取得了较好的检索查全率和准确率。

关键词 语义鸿沟 BP神经网络 多输出 改进的BP算法 图像分类

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Classification of natural image based on BP neural network

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Abstract

This paper establishes a multi-output BP neural network.It aims at to overcome the considerable gap between image low-level features and high-level semantic features.This method analyzes low-level features and extractes the images main color，gray level co-occurvence matrix and monent invariant vector.Use the vector as the network's imput and the expections as its output，the system trains the network with improved BP algorithm.The arithmetic joines the monentun factor and learning rate adaption，when the training is over，this network can classify natural images.So it has established the mapping between the low-level features and high-level semantic features.In addition，the improved arithmetic has increased the rate and the stability.The experiment proves that it has obtained the high accuracy.

Key words semantic gap BP neural network multi-output improved BP algorithm image classification

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