计算机工程与应用 2009 45 (12): 174-177 ISSN: 1002-8331 CN: 11-2127/TP

图形、图像、模式识别

Unit-Linking PCNN和图像熵的彩色图像分割与边缘检测

谭颖芳, 周冬明, 赵东风, 聂仁灿

云南大学 信息学院 通信工程系，昆明 650091

收稿日期 2008-3-4 修回日期 2008-5-16 网络版发布日期 2009-4-20 接受日期

摘要 在RGB空间中，将最大香农熵准则和最小交叉熵准则两种评价准则与大概率合并和小概率合并两种合并策略相结合，提出基于Unit-Linking PCNN的四种彩色图像分割方案，并在各分量分割结果基础上利用Unit-Linking PCNN实施边缘检测，合并得到彩色图像的边缘检测结果。分析了各评价准则和合并策略的优劣，比较了各分割方案条件下的图像分割和边缘检测效果。与HSV空间中得到的相关结果进行分析比较，该文分割和边缘检测结果体现了图像的更多的细节，说明了在RGB空间中进行彩色图像分割和边缘检测的合理性。与相关文献结果相比，该方法的模型参数对图像分割结果的影响较不敏感。计算机仿真结果表明，该方法具有较好的彩色图像分割和边缘检测效果，具有较强适用性。

关键词 脉冲耦合神经网络 Unit-Linking PCNN 彩色图像分割 彩色图像边缘检测 图像熵

分类号

Color image segmentation and edge detection using Unit-Linking PCNN and image entropy

TAN Ying-fang,ZHOU Dong-ming,ZHAO Dong-feng,NIE Ren-can

Department of Communication Engineering，Information College，Yunnan University，Kunming 650091，China

Abstract

Using Unit-Linking PCNN，maximum Shannon entropy rule，minimum cross-entropy rule，high probability combination strategy and low probability combination strategy in RGB space of color image，the paper suggests four segmentation schemes of color image under different rules and strategies.Based on the result of each segmentation weight，edges detection is implemented using Unit-Linking PCNN，and incorporated，then the edge of color image is obtained.The advantages and disadvantages of diversified rules and strategies are analyzed.The purposes of image segmentation and edge detection under the conditions of diversified segmentation schemes are compared.Compared with correlative results made in HSV color space，the image segmentation and edge detection proposed in this paper show more image details，it shows that implementing color image segmentation and edge detection in RGB color space is even more in reason.The models parameters of the proposed method are less sensitive to the results of image segmentation than PCNN models parameters in the existing references.Computer simulation results show that the proposed methods have both preferable results of color image segmentation and edge detection and fine applicability.

Key words Pulse Coupled Neutral Network（PCNN） Unit-Linking PCNN color image segmentation color image edge detection image entropy

DOI: 10.3778/j.issn.1002-8331.2009.12.056

通讯作者 谭颖芳 dmzhou@ynu.edu.cn