

# 一种 Hough 变换与蚁群优化的云图像边缘检测算法

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**摘要:** 针对云图像边缘检测算法中由于噪声的存在导致边缘定位精确度降低, 边缘信息丢失和虚假边缘等问题, 提出了一种 Hough 变换 (Hough Transform, HT) 耦合蚁群优化 (Ant Colony Optimization, ACO) 云图像边缘检测算法. 先将需处理图像进行 HT, 消除噪声和线段间隔对图像边缘的影响; 其次, 对图像像素梯度和像素圆形邻域统计均值的差值进行计算, 定义二者之间的权重函数, 并作为蚁群的信息素和启发信息; 最后, 利用蚁群优化算法, 引导蚁群搜索图像边缘, 从而完成云图像边缘提取. 实验表明: 与当前边缘检测算法比较, 此方法能够有效降低噪声影响, 获得的边缘完整、细节丰富, 边缘优质系数高, 算法效率高.

**关键词:** Hough 变换; 云计算; 边缘提取; 蚁群优化; 边缘信息; 像素梯度; 统计均值

## The Image Edge Extraction Algorithm Based on Hough

### Transform Coupling Ant Colony Optimization

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**Abstract:** In order to solve the image edge detection algorithm, the edge information is affected by the noise, causing the image edge positioning accuracy is low, Edge information loss and false edges and other issues, proposed a image edge extraction algorithm based on Hough transform (HT) coupling ant colony optimization (ACO). Firstly, introducing the Hough transform to the input image, eliminating the effect of noise and line segment. Secondly, the difference between the pixel gradient of the image and the statistical average of the circular neighborhood is calculated, and the weight function between the two is constructed, and the pheromone and the heuristic information are used as the ant colony. Finally, the ant colony optimization algorithm is used to guide the ant colony to search the edge of the image, so as to finish the image edge extraction. The simulation results show that compared with the current edge detection algorithm, the edge location accuracy and the edge details are abundant, which can effectively restrain the noise, and has better robustness.

**Key words:** Hough transforms; Cloud; edge extraction; ant colony optimization; edge information; pixel gradient; statistical average

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