

## 基于 FPGA 的二值图片连通区域标记算法

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**摘 要:** 提出一种基于 FPGA 的二值图片连通区域标记算法, 每次提取 9 个像素信息, 充分利用 FPGA 的并行处理能力, 在一个时钟周期内完成 9 个像素的处理, 在对图像进行遍历的同时进行快速标记. 最后搭成简单测试电路. 在 PC 上将二值图片通过 USB 传输给 FPGA, 然后 FPGA 将图片进行标记, 标记完成后将标记的图片和所用的时间返回 PC. 将实验结果与现有几种图像处理方式进行比较, 发现 FPGA 在处理图片能力与软件处理方式能力相当时, 主频、功耗远低于软件处理设备, 且成本低, 可以作为专用图像处理设备.

**关键词:** 计算机视觉; FPGA; 二值图片; 连通区域; 区域标记

## FPGA-Based Binary Connected Component Detection and Labeling Algorithm

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**Abstract:** A FPGA-based binary connected component detection and labeling algorithm is proposed, which Extracting 9 pixel information at one time, it makes full use of the parallel processing ability of FPGA, Complete 9 pixel processing in one clock cycle and quickly marks the image while scans. Finally, build a simple test circuit, transmit the two values image to FPGA from PC, and then FPGA will mark the image. When the mark is finished, FPGA will return the marked image and the time it is used to PC. Comparing the experimental results with the existing image processing methods, it is found that the FPGA can be used as a special image processing equipment for it's low cost and main frequency, power consumption is much lower than Software processing equipment when the speed that FPGA processes images is equivalent with Software processing method.

**Key words:** computer vision; FPGA; two value image; connected region; regional marker

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