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Reviews

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Forgotten Books, United States, 2015. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****. Excerpt from Robotics Research Technical Report: Design of Fast Connected Components Hardware The intensive use of the connected components algorithm in image analysis and robot vision calls for a very fast implementation of such algorithm suitable for real-time applications. This paper presents a hardware design implementing the algorithm due to Schwartz, Sharir, and Siegel). A prototype board, without using special VLSI chips, had been constructed in Robotics Research Lab of Courant Institute. It can compute the connected components of a 512 x 512 binary image in few video frame times (about 300 ms). A real-time version (video speed) in VLSI is proposed. The labeling of connected components of a binary image is a fundamental problem in image analysis. An early method was developed by Rosenfeld and Pfaltz in 1966; it uses a pair of arrays, one containing the current region label and the other containing its smallest equivalent label. This algorithm processes the image from top to bottom to compute label equivalences, storing the result in the arrays. A second pass reassigns each label to its smallest equivalent label. Lumia, Shapiro, and Zuniga improved the previous method by using a very short equivalence table, which needs to cover only one line. Schwartz, Sharir, and Siegel present a method which uses bracket marking to associate equivalent groups. This method enables one to compute the component numbers for each pixel on the fly, by using an relative small auxiliary bracket table. More interestingly, this algorithm uses only simple form of pushdown-stacks, making high-speed hardware realization possible. In addition to the above mentioned sequential algorithms, Shiloach and Vishkin present a logarithmic-time connected components algorithm known for massively parallel computing systems (e.g.1 processor per pixel)...



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