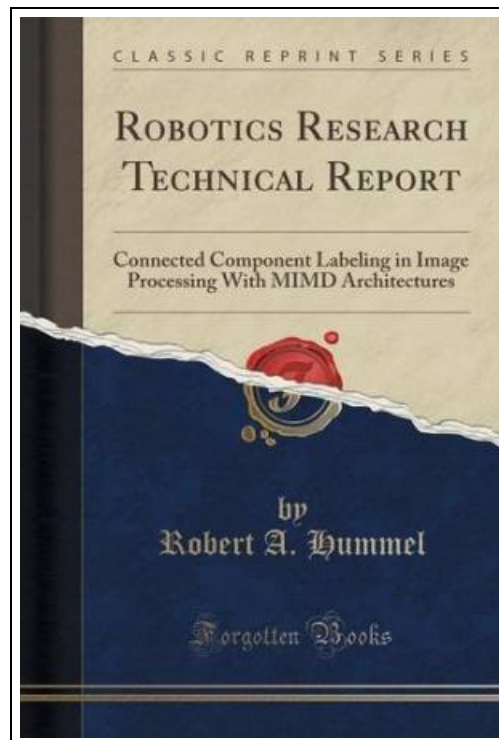


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Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book ***** Print on Demand *****.Excerpt from **Robotics Research Technical Report: Connected Component Labeling in Image Processing With MIMD Architectures** Many higher level image processing algorithms suggest dynamic allocation of multiple processors to image processing subtasks. However, most parallel algorithms in image processing assume an SIMD architecture with processors statically assigned to one or a group of image pixels. For many vision tasks, fixed assignments of processors will inevitably lead to low parallelism. Instead, it seems natural to have an intermediate number of more powerful independent processors, each with access to the shared data, to perform tasks which tend to be more global in nature. In converting SIMD algorithms into efficient code for MIMD machines with relatively fewer processors, it can frequently be determined when processors are active and when they are dormant. By analyzing the dynamic flow of subtasks, we can attempt to assign processors to the portions of the image where non-null tasks would be accomplished in a more processor-rich environment. We study, as an example, the Shiloach/Vishkin connected component algorithm, which is an $O(\log N)$ SIMD algorithm which requires roughly $4N$ processors, where N is the number of pixels. Each pixel points to another pixel in its connected component, forming a pointer graph which is always organized as a forest. Pointers are updated by a leapfrogging step and by a step which hooks trees together. We show how the algorithm may be converted to an MIMD algorithm, and consider issues of task flow and synchronization. We present code for an implementation of the MIMD version of the algorithm, and consider operating times on typical images. We show that similar performance can be using the MIMD approach as with the more...



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