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FOREWORD

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The contributions of this volume were presented as invited papers or regular papers for the *International Workshop on Parallel Image Analysis* held at College Park, Maryland, USA, June 7–9, 1994. This publication contains a selection of papers by prominent professionals and experts mainly from France, India, Italy, Japan and the USA. The contributions can be roughly divided into three parts:

Parallel Image Analysis

The first paper, "Data allocation strategies for parallel image processing algorithms" by V. Marion-Poty and S. Miguet presents several data allocation strategies used for the parallel implementation of basic imaging operators. The second paper, "Facilitating high-performance image analysis on reduced hypercube (RH) parallel computers" by S. G. Ziavras and M. A. Sideras shows that parallel computers comprising reduced hypercube interconnection networks are definitely good choices for all levels of image analysis. The third paper, "Time-optimal digital geometry algorithms on meshes with multiple broadcasting" by V. Bokka, H. Gurla, S. Olariu, J. L. Schwing and I. Stojmenović shows that a number of digital geometry problems can be solved elegantly on meshes with multiple broadcasting by using a time-optimal solution to the leftmost one problem as a basic subroutine. The fourth paper, "A time-optimal multiple-query nearest-neighbor algorithm on meshes with multiple broadcasting" by I. Stoica presents a time-optimal algorithm that solves the multiple-query nearest-neighbor problem in $O(n^{1/6}m^{1/3})$ time on a mesh with multiple broadcasting of size $\sqrt{n} \times \sqrt{n}$. The last paper in this section, "A linear algorithm for segmentation of digital curves" by I. Debled-Rensson and J. P. Reveillès presents a new very efficient linear algorithm for segmentation of

8-connected digital curves based on a definition of digital lines using a linear double diophantine inequality.

2-D, 3-D Grammars and Automata

The paper, "Some notes on parallel coordinate grammars" by A. Nakamura discusses some properties of parallel coordinate grammars and examines a relationship between the sequential coordinate grammars and parallel ones. The second paper, "Basic puzzle languages" by K. G. Subramanian, R. Siromoney, V. R. Dare and A. Saoudi shows that the emptiness problem for non-overlapping basic puzzle grammars is decidable, and also establishes a hierarchy among the various classes of puzzle languages. The third paper, "Cooperating systems of three-way, two-dimensional finite automata" by Y. Wang, K. Inoue and I. Takanami introduces a cooperating system of three-way, two-dimensional finite automata, and presents several fundamental properties of this system as a two-dimensional language acceptor whose input tapes are restricted to square ones. The last paper in this section, "The effect of inkdots for two-dimensional automata" by A. Ito, K. Inoue, I. Takanami and Y. Wang investigates how much the addition of an inkdot to conventional two-dimensional automata increases the ability for recognizing two-dimensional languages.

Thinning and Tracking

The first paper in this section, "On topology preservation in 2-D and 3-D thinning" by T. Y. Kong presents systematic and fairly general methods of verifying that a given parallel thinning algorithm always preserves topology, for the cases where 8-/26-adjacency is used on the 1's and 4-/6-adjacency on the 0's, or vice versa. The second paper, "Two methodologies to implement 3D thinning algorithms on distributed memory machines" by V. Marion-Poty presents two methodologies to implement skeletonization algorithms on MIMD machines, one based on the decomposition of the thinning operator into sub-operators, and the other based on the decomposition of the study domain (image) into sub-domains. The third paper, "Analysis and design of parallel thinning algorithms — A generic approach" by Y. Y. Zhang and P. S. P. Wang presents a generic approach for the analysis and design of parallel thinning algorithms, and describes the procedures for designing 4-subcycle/iteration, 2-subcycle/iteration, and 1-subcycle/iteration thinning algorithms using this generic approach. The fourth paper, "A new 26-connected objects surface tracking algorithm and its related PRAM version" by L. Perroton introduces some notions related to surfaces of 18 and 26-connected objects in 3D discrete images, and a new sequential algorithm to extract the surface and contours of 26-connected objects. It also presents a PRAM related algorithm to construct the successor function of the surface graph.

This collection of papers has also been published as a special issue of the *International Journal of Pattern Recognition and Artificial Intelligence* (Vol. 9, Nos. 4 and 5, 1995). We wish to thank all the authors for their contributions and the members of the program committee, without whose help this volume is impossible.