A Study on Computational Complexity and Efficient Implementation of Region Segmentation Problem of an Image under Various criteria

1997 Fiscal Year Final Research Report Summary

A Study on Computational Complexity and Efficient Implementation of Region Segmentation Problem of an Image under Various criteria

Research Project

Project/Area Number

08680382

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

計算機科学

Research Institution

Japan Advanced Institute of Science and Technology (1997)
Osaka Electro-Communication University (1996)

Principal Investigator

ASANO Tetsuo Japan Advanced Institute of Science and Technology, School of Information Science, Professor, 情報科学研究科, 教授 (90113133)

Project Period (FY)

1996 – 1997

Keywords

Computational Geometry / Algorithms / Image Processing / Computer vision / Region segmentation

Research Abstract

In this study we considered regions segmentation problem which is a basis for image understanding from as viewpoint of algorithm theory. First, for each of various criteria for regions segmentation we analyzed the computational complexity of the problem of finding an optimal solution under the criterion together with consideration on requirements for polynomial-time implementation. One of the main results is that we obtained a polynomial-time algorithm for finding an optimal segmentation based on discriminant analysis. Experimental results suggest practical application of the algorithm. Especially various algorithmic techniques developed in computational geometry made great contributions to the algorithm.
The research results were presented in several international conferences and accepted for publication in international journals. One of the future plans is to do more computer experiments for really practical applications.

Research Products (9 results)

All | Other

All | Publications

[Publications] T.Asano, N.Katoh: "Variants for Hough Transform for Line Detection" Computational Geometry : Theory and Applications. 6. 231-252 (1996)

[Publications] T.Asano, D.Ranjan, T.Roos: "Digital Halftoning Algorithms Based on Optimization Criteria and Experimental Results" IEICE Trans.on Fundamentals. E-79-A,4. 524-532 (1996)

[Publications] T.Roos, T.Asano, D.Ranjan, E.Welzl, P.Widmayer: "Space Filling Curves and Their Use in the Design of Geometric Data Structures" Theoretical Computer Science. 181. 3-15 (1997)

[Publications] T.Asano, T.Tokuyama: "Topological Walk Revisited" IEICE Trans.on Fundamentals. (1998)

[Publications] 浅野, 茨木, 室田, 小島: "離散構造とアルゴリズムV" 近代科学社, 200 (1998)

[Publications] T.Asano and N.Katoh: "Variants for Hough Transform for Line Detection" Computational Geometry : Theory and Applications. vol.6. 231-252 (1996)

[Publications] T.Asano, D.Ranjan and T.Roos: "Digital Halftoning Algorithms Based on Optimization Criteria and Experimental Results" IEICE Trans.on Fundame4ntals. vo.E-79-A,No.4. 524-532 (1996)

[Publications] T.Roos, T.Asano, D.Ranjan, E.Welzl, and P.Widmayr: "Space Filling Curves and Their Use in the Design of Geometric Data Structures" Theoretical Computer Science. vol.181. 3-15 (1997)

[Publications] T.Asano and T.Tokuyama: "Topological Walk Revisited" IEICE Trans.on Fundame4ntals. (to appear).

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