Theoretical Computer Science
Thematic Special Issue

*Theoretical Computer Science Issues in Image Analysis and Processing*

**Call for Papers**

*Theoretical Computer Science (Elsevier)* is seeking original and unpublished manuscripts for a special journal issue on “Theoretical Computer Science Issues in Image Analysis and Processing,” scheduled for publication in 2010/11.

Image analysis and processing is a scientific discipline providing theoretical foundations and methods for solving problems that appear in a wide range of areas, as diverse as medicine, robotics, defense, and security. In the process of searching efficient solutions to practical problems, researchers often face and challenge themselves by theoretical problems that are germane to important theoretical computer science issues. Among these are concerns about problem complexity, algorithm efficiency and optimality, advanced data structures for representing data, etc. Note that, due to the very nature of the underlying practical problems, in image analysis and processing the amount of data processed is usually huge, which makes complexity and efficiency issues crucial.

The present proposal invites prospective authors to submit papers that advance the development of the theory of image analysis and processing in view of the above-discussed relations to theoretical computer science. The major contributions should be to the theoretical foundations of the field rather than on particular applications. To be eligible for consideration, a paper must feature considerable mathematical depth and be relevant to major theoretical computer science issues, such as problem complexity, algorithm performance, time and space efficiency or optimality. Structural results should reveal essential properties of combinatorial or geometric structures relevant to image analysis and processing (such as polygons and polyhedra, lattice polygons and polytopes, convex bodies, manifolds, graphs, etc.). The proposed algorithms should feature sufficient level of sophistication. The authors should provide thorough theoretical analysis of both the problem and the algorithm rather than present practical algorithms for solving specific problems. Comparison with existing results is expected, in particular, in order to make clear how the presented result improves the existing state-of-arts.

In general, the successful papers should present results of potential interest to the broader audience of TCS.

Possible topics can include, but are not limited to:
- Combinatorial problems in the digital plane and space related to image analysis and processing (e.g., problems of polyhedral combinatorics, lattice polygons and polytopes, tilings and patterns, combinatorial pattern matching)
- Discrete/combinatorial or algebraic geometric structures and/or algorithms (e.g., based on graph-theoretic approaches). Topology and geometry of digital curves, surfaces, and manifolds and related algorithmic problems
- Integer programming, linear programming, and computational geometry – new structural results and/or algorithms related to problems of image analysis

In case of parallel architectures and algorithms for image analysis and processing, addressing time and work optimality issues would be of particular importance.

Papers that consider conventional image analysis and processing problems and present only practical solutions to those problems will not be considered relevant to the proposed special issue.

**Submission procedure**

Manuscript should conform to the standard guidelines of Theoretical Computer Science (Elsevier). Guidelines for formatting papers can be found in the Guide for Authors. Prospective authors should submit an electronic copy of their complete manuscript through the Elsevier online submission system by May 10, 2010. “Theoretical Computer Science Issues in Image Analysis and Processing” special issue should be indicated in the corresponding cover letter. All submitted papers will be reviewed by at least two independent reviewers.

**Guest-Editors:**

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