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Special Issue on Discrete Geometry for Computer Imagery

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Preface

Digital Geometry aims to define proper geometric models and properties onto subsets of the integer plane/space ($\mathbb{Z}^d$). Moreover, it intents to define efficient algorithms for digital object topology and geometry processing. Digital Geometry plays an essential role in the field of image analysis, computer graphics, pattern recognition, shape modeling, computer vision and document analysis. Digital data are unavoidably discrete, but in addition to this fact, Digital Geometry is a subfield of discrete geometry in the sense that it focuses on geometrical objects defined on lattices and grids.

Although this domain emerged during the second half of the twentieth century with the birth of computer graphics and digital image processing, many links have been demonstrated between methods and results from the Digital Geometry domain and fundamental theorems in mathematics (arithmetic, geometry, topology, …), discrete mathematics (word theory, combinatorics, graph theory, …) or computer science (algorithmic, computational geometry, image processing, discrete tomography, computer graphics, …).

The center of gravity of the international Digital Geometry community lies in Europe, but there are also research groups from India, Japan, Australia and the USA contributing to the community. In association with the International Association for Pattern Recognition (IAPR), the community collaborates within the "Discrete Geometry and Mathematical Morphology" Technical Committee, TC18. The TC18 website (http://tc18.org) also provides a platform for interested readers and for the gathering of resources such as datasets, source code or bibliographies.

The articles selected for publication in this special issue cover various topics of the Digital Geometry domain: They range from distance transformations to novel shape descriptors and methods of shape matching, from digital well-composedness to digitization dual combinatorics, and from image vectorization to 2D deformations.

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