

A NOVEL CONCEPT OF MORPHOLOGY PIVOTAL ELEMENTS FOR OBJECT IMAGE RETRIEVAL

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ABSTRACT. *In this paper, we introduce a novel and simple Pivotal Element (PE) concept in mathematical morphological operations for object image retrieval schemes based on combinations of empirical and statistical analyses. Mathematical morphology is very attractive for this purpose because it efficiently deals with geometrical features like size, shape, contrast or connectivity that can be considered as image retrieval oriented features. With an optimized structure, morphological dilation is more effective to detect object spot target in image sequences. Based on the real convex figure, morphological operation with circular structure is designed in this paper. The PE is introduced to optimize the noisy background elements. The empirical threshold is decided approximately based on the statistical characters. In this aspect, two approaches for solving morphological applications to image data distributed on the unit circle are presented. In the first approach, a framework for analyzing images, called pivotal role, has been developed based on a set of concentric circles with adjustable radii, with exactly one circle centered at each pivotal image pixel. The second approach is based on Markov decision processes which operate only on grouped data. The retrieval quality is improved by dynamically changing the combinatorial coefficients that are used in equations of optimality principles. by using it as a priori knowledge of the morphology operation, it does favor to improve the algorithm's accuracy and adaptability. The experiment shows that the new concept of PE has made the morphological operations to achieve a higher retrieval efficiency and accuracy.*

Keywords: Image retrieval, Pivotal element, Morphological operations, Shape analysis, Morphometric

1. Introduction. Advances in image mining and spatial analysis have led to tremendous growth in a very large and detailed spatial information retrieval. Such spatial information, if analyzed with proper tool, can reveal much useful information to the human users. Henceforth, we need the most efficient technique for processing of such information. Mathematical morphology can act as a powerful tool for solving several image related queries. The need for morphology has been evident in various fields of science and engineering.

Mathematical morphology is a tool for extracting image components that are useful for representation and description. It is mathematical origins stemming from set theory, topology, lattice algebra, random functions, stochastic geometry, etc. Hence, we say that it involves set theoretic method of image analysis providing a quantitative description of geometric structures. It is most commonly applied to digital images, but it can also be employed on surface, surface meshes, graphs, solids and many other spatial structures. It characterizes various topological and geometric continuous-space concepts such as shape, size, convexity, connectivity and geodesic distance on continuous and discrete spaces. It