

AND WHERE DOES IT COME FROM?

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ABSTRACT:

In a predominant number of cases image analysis is about (1) extracting the relevant structures of interest in an image and (2) counting and measuring them. In this sequence, the quality of the segmentation in the first step directly and critically influences the quality of the data that can be derived. Accurate segmentation of relevant units, however, is often a challenging undertaking. Unsupervised methods typically fail completely and supervised pixel-based methods fail as well in many fields of application. Fortunately, object-oriented approaches to image analysis have made a significant step forward in recent years.

Object-oriented approaches start with object primitives and process them through many iterative steps until the desired objects of interest are created. Within this procedure, two types of knowledge closely interact with each other in a complimentary manner: procedural and descriptive knowledge. Only when both types of knowledge come together is the specific processing of different classes of objects, an essential key, made possible. Object-oriented approaches therefore are inherently knowledge-based. At processing time the knowledge needs to be available in an explicit and structured form. One way to achieve this is to create this knowledge manually using some sort of programming language. An alternative is to point to sample structures through a training process. Appropriate machine learning functionality then is able to transform such implicit knowledge into explicit knowledge, which is then used to perform all steps necessary for a successful segmentation.