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# Minimal Component-Hypertrees

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## Abstract

Component trees are interesting structures of nested connected components, efficiently represented by max-trees, used to implement fast algorithms in Image Processing. In these structures, connected components are constructed using a single neighborhood. In recent years, an extension of component trees, called component-hypertrees, was introduced. It consists of a sequence of component trees, generated from a sequence of increasing neighborhoods, in which their connected components are also hierarchically organized. Although this structure could be useful in applications dealing with clusters of objects, not much attention has been given to component-hypertrees. A naive implementation can be costly both in terms of time and memory. So, in this paper, we present algorithms and data structures to efficiently compute and store these structures without redundancy obtaining a minimal representation of component-hypertrees. Experimental results using our efficient algorithm show that the number of nodes is reduced by approximately 70% in comparison to a naive implementation.

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