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APPLICATION OF COMBINATORIAL OPTIMIZATION IN IMAGE PROCESSING VIA GRAPH THEORETIC TOOL

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Abstract

In image processing, labeling of the image is a very fundamental problem. In case of vision, the label may be intensity or disparity of the pixel. The difficulty in the labeling process is the characteristics required to be fulfilled by the final labeling. The label should be smoothly varying but should preserve sharp discontinuity existing in the image e.g. objects boundary. The problem is solved using efficient energy minimization. The equivalent problem would be to design an energy function which takes care of two parameters (i) labeling in accordance with the observed or pre-existing data of the image. (ii) Smoothly varying labeling along with preservation of sharp discontinuity existing in the image. In general, the problem of energy minimization is NP–hard. Graph cut has been used in various algorithms with different moves. We propose an algorithm which determines the local minimum with respect to special type of move, namely restricted α-β-swap move. This algorithm use combinatorial optimization technique with the help of graph theoretic tools.

Keywords: Cut on a graph; energy function; restricted α-β swap move.

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