



UNSUPERVISED VARIATIONAL CLASSIFICATION THROUGH IMAGE MULTI-THRESHOLDING (MonPmOR2)

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★ Abstract :

In this paper, we propose an improvement of the classical image multi-thresholding methods. The goal is to achieve the precise determination of homogeneous zones in numerical images by pixels classification. The thresholds and the modes are obtained by minimization of a new energy of gravitational clustering initialized with the significant peaks of a cumulated histogram. Then, the best modes and the best thresholds are calculated by alternate optimization of an energy of multi-thresholding, leading to a piece-wise quadratic potential. This energy is built from a total uniformity criterion which measures the homogeneity of a given map of regions. Finally, an unsupervised classification is performed by use of a supervised variational classification approach which minimizes an adapted energy of transitions of phases. The potential which controls the classification process is built from the previously determined best thresholds and modes. The experimental study shows the efficiency and the robustness of the whole method.