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Bayesian mixture modelling

Tuesday, 19 November 2013 14:00 (1h 45m)

A method to solve the long-lasting problem of disentanglement of the background from the sources is given by Bayesian mixture modelling (Guglielmetti F., et al., 2009, MNRAS, 396,165).
The technique employs a joint estimate of the background and detection of the sources in astronomical images.

Bayesian probability theory is applied to gain insight into the coexistence of background and sources through a probabilistic two-component mixture model. Uncertainties of the background and source signals are consistently provided. Background variations are properly modelled and sources are detected independent of their shape. No background subtraction is needed for the detection of sources. Poisson statistics is rigorously applied throughout the whole algorithm.

The technique is general and applicable to count detectors.

Practical demonstrations of the method will be given through simulated data sets and data observed in the X-ray part of the electromagnetic spectrum from ROSAT and Chandra satellites.

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