Automatic extraction and tracking of hot spots from time-series three dimensional grid data - application to meteorological radar data -

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A large amount of time-series three dimensional data has been accumulated also in the field of Earth and planetary science. We have developied a method of automatic extraction and tracking of hot spot areas included in a time-series three dimensional data, aiming to discover spatio-temporal pattens from them. The distribution of hot spots is modeled by a mixture of multivariate normal distribution. Hot spots are then extracted by obtaining the model parameters via EM algorithm. We used position of the grid data where the observed value exceeds the threshold as input in previous study. We modified this method to use data values themselves as weight coefficients during EM algorithm. The method was applied to synthetic data and real data of phased array meteorological radar data and the accuracy of detected number of hot spots was siginificantly imporoved. We are aiming to apply this method to detection of localized heavy rainfall precursor from 3D meteorological radar data.

Keywords: data mining, knowledge discovery, mixture model, phased array meteorological radar