

Biclustering Analysis of Biological and Financial Data

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In the commonly used clustering procedure, we classify objects in terms of all features available and measure the similarity between two objects using a distance metric. In biclustering, we detect coherent patterns in both object and feature directions and we are interested in data consistency, such as simultaneous downward or upward changes of a subset of features for a subset of objects, rather than the distances among objects. Biclustering is naturally more difficult than clustering computationally and is often considered intractable mathematically. We have recently developed hyperplane based methods for detection of a class of biclusters. Our methods provide a unified model for several types of biclusters and can be implemented using fast signal processing algorithms. We have applied the methods to disease identification and drug therapeutic effect assessment using DNA microarray gene expression data. We have also used the biclustering methods to analyze foreign currency exchange rates and other financial data. In this seminar, the recent work of our research group on biclustering methods and their applications will be presented.