

THE UNIVERSITY



OF HONG KONG

Department of Mathematics

## **Numerical Mathematics and Applied Analysis Group Seminar (NMAA)**

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# **Unsupervised learning of prototypes and attribute weights**

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in Room 309, Run Run Shaw Building, HKU

### **Abstract**

In this presentation, we introduce new algorithms that perform clustering and feature weighting simultaneously and in an unsupervised manner. The proposed algorithms are computationally and implementationally simple, and learn a different set of feature weights for each identified cluster. The cluster dependent feature weights offer two advantages. First, they guide the clustering process to partition the data set into more meaningful clusters. Second, they can be used in the subsequent steps of a learning system to improve its learning behavior. An extension of the algorithm to deal with an unknown number of clusters is also proposed. The extension is based on competitive agglomeration, whereby the number of clusters is over-specified, and adjacent clusters are allowed to compete for data points in a manner that causes clusters which lose in the competition to gradually become depleted and vanish. We illustrate the performance of the proposed approach by using it to segment color images, and to build a nearest prototype classifier.

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*All are welcome*

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