Title: Multivariate functional data clustering using unsupervised binary trees

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Abstract: With the recent development of sensing devices, more and more data are recorded in both dimensions of time and space. These measures lead to large amounts of data that are often referred as multivariate functional data. This work proposes a simple clustering procedure for such multivariate functional data. Considering a multivariate functional principal components analysis as a dimension reduction vehicle, a binary tree is grown using a parametric mixture model defined on the projection of the trajectories onto the principal components. The mixture model is fitted by an EM algorithm. Then, a joining step is introduced to eventually merge the similar nodes of the tree that do not share a direct ascendant. A detailed description of the algorithm is provided, along with an extensive numerical analysis on both simulated and real datasets.