


Independent components analysis of sensory evaluation data

Instructor: John Castura  Compusense Inc., Canada
Duration: 3 hours
Audience: Open to all interested persons
Background: Basic familiarity with multivariate statistical methods (e.g. principal components analysis)

The tutorial begins with an overview of independent components analysis (ICA), which can be used to conduct blind source separation (BSS). A motivating example for BSS involves p microphones recording overlapping conversations at a noisy cocktail party, where the goal is to recover k source signals (guest voices, music, etc.) that become mixed. The number of source signals is often unknown a priori. Sensory perceptions arise from the integration of inputs from multiple sensory systems. The observed sensory perceptions might be considered to be mixed signals, and ICA a method for recovering the source signals.

The temporal check-all-that-apply (TCATA) method is introduced using as a case study a trained panel evaluation of Syrah wines (Baker et al., 2016). The Syrah data are submitted to PCA and ICA using the JADE algorithm. WineSips trajectories are then visualized with uncertainty in various ways using bootstrap techniques. Results from PCA with and without attribute standardization, and with and without varimax rotation and oblimin transformation are compared with results obtained from ICA.

The tutorial will offer an opportunity to learn about ICA and to discuss its potential for analyzing temporal sensory data as well as other types of sensometric data.

Various bootstrap approaches to investigate uncertainty will also be discussed.

Although this workshop is not a hands-on tutorial for learning R, it will include discussion of the functions used for conducting PCA and ICA in R, and for plotting (and animating) WineSip trajectories.