

An introduction to ASCA

Unlock the power of multi-factorial data through ANOVA-Simultaneous Component Analysis

Course Goal

ANOVA Simultaneous Component Analysis (ASCA) is a powerful tool that combines ANOVA with PCA, bridging the gap between rigorous statistical inference and intuitive multivariate visualization. ASCA is a unique technique for data interpretation, especially for data coming from a multi-factorial experimental design or observational data where objects are naturally arranged in several factors (e.g., multi-way tensors). Whether you are dealing with complex experimental designs or massive observational datasets, ASCA allows you to decompose "data noise" into clear, factor-specific insights.

Why ASCA?

- Integrated Power: Combines the structured testing of ANOVA with the exploratory depth of PCA.
- Visual Clarity: Transform abstract matrix factorizations into interpretable plots that reveal the underlying patterns of your experimental factors.
- Versatile Application: From metabolomics to sensory science, ASCA is the go-to tool for objects naturally arranged in multiple layers.

What You'll Learn

This introductory course is designed to take you from the fundamentals to functional mastery. You will explore:

- The mathematical elegance of data partitioning.
- How to interpret factor-specific scores and loadings.
- Real-world case studies demonstrating ASCA's versatility across disparate scientific fields

Teaching hours: 3.5 Course monitor

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Valencia (2007). He specializes in extracting knowledge from data and the design of new algorithms to do so. He has worked on research projects on data analysis, machine learning and statistical inference in diverse domains, including personalized medicine (from genomics to metabolomics), industrial chemometrics, ecology, volcanology, computer networks, and cybersecurity.

Schedule

The proposed course schedule is the following. All four parts include hands-on examples.

13:30-14:15	Multivariate Exploratory Data Analysis
14:15-15:00	ANOVA and Multivariate extensions of ANOVA
15:00-15:30	Break
15:30-16:15	ANOVA Simultaneous Component Analysis (ASCA)
16:15-17:00	Variable-selection ASCA (vASCA)