Multivariate statistical analysis for food science and agriculture: an introduction

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Course objective: to provide an introduction to basic multivariate statistical analysis techniques in food science and nutrition

Prerequisites: basic knowledge of statistics (variables, hypothesis testing, univariate techniques). Ability to use a statistical analysis software.

Course content:

Lectures (8x2 h). Introduction. Planning statistical analysis. An overview of descriptive and inferential multivariate statistical analysis techniques. Bad data and good data. Multivariate data. Preprocessing, transformation and standardization. Know thy batch: graphic exploration of multivariate data. Principal component analysis. Hierarchical and non-hierarchical cluster analysis. Multidimentional scaling. Neural networks. Discriminant analysis. Principal Component Regression and PLS regression.

Workshop (4x2 h). Individual and group work: statistical analysis of data in food science, technology and nutrition.

Please note: this course will be delivered in two modes
a. in a classroom (ASD, 5th floor building 3B) for Master and PhD students of
b. over the internet, using vyew (http://vyew.com). Addresses for the virtual rooms will be provided, but to interact with the lecturer an E-mail registration (eugenio.parente@unibas.it) is needed. Only 20 remote students can be accepted.
The first introductory lecture is scheduled for December 10th, 16.30 Rome time in room http://vyew.com/room#/663583/Multistatlecture1

Suggested readings.
Introductory textbooks:
Gacula, M., Singh, J., Bi, J., Altan, S. 2008. Statistical methods in food and consumer research. Academic Press.
Multivariate techniques:
Arvanitoyannis, I.S. and Tzouros N.E. 2005. Implementation of quality control methods in conjunction with chemometrics toward authentication of dairy products. Critical Reviews in Food Science and Nutrition 45: 231–249.
Everitt B.S., Dunn, D. 2001. Applied multivariate data analysis. Arnold
Everitt B.S., Landau S., Leese M. 2001. Cluster analysis. Arnold
Parente E. 2011. Analytical methods: Multivariate statistical tools for analytical data. In: Encyclopedia of Dairy Science, 2nd edition, John W. Fuquay, editor in chief. Elsevier. ISBN 978-0-12-374402-9, pp 93-102
Wold S., Sjöström M., Eriksson L. PLS-regression: a basic tool of chemometrics. Chemometrics and Intelligent Laboratory Systems 58: 109–130