Introduction to Finite Mixture Models and Latent Class Analysis

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Duration: 20 hrs, in the period going from 18th to 26th of February 2021, for a total of 4 CFR

Description. This course is intended as both a theoretical and practical introduction to finite mixtures as a model based clustering tool. We will introduce the concept of finite mixture of distributions for categorical as well as continuous variables. We will study the problem of maximum likelihood via expectation-maximization (EM) algorithms. We will start from simple data structures and then move to the introduction of regressors and to more complex model structures. We will also explore the problem of model selection and choice of the number of clusters. We will see practical applications with the aid of devoted packages in the statistical software R. Students will learn how to implement an analysis and how to read and interpret outputs and graphical representations of results.

Time table

- Thursday February 18, 9:00–13:00

- Friday February 19, 9:00 – 13:00

- Tuesday February 23, 9:00 – 13:00

- Wednesday February 24, 9:00 – 13:00

- Friday February 26, 9:00 – 13:00

Language: English or Italian

Prerequisites

Principles of Statistical Inference Theory, Basics of Probability Theory, Principal Probability distributions, Basic Knowledge of R Statistical Software is preferred but not required

Literature and readings suggested

McLachlan G. & Peel D. (2000) *Finite Mixture Models.* John Wiley & Sons: Wiley Series in Probability and Statistics

Hagenaars J. & McCutcheon A. (2002) *Applied Latent Class Analysis.* Cambridge: Cambridge University Press.

Collins L. M., Lanza S. T. (2009) *Latent Class and Latent Transition Analysis: With Applications in the Social, Behavioral, and Health Sciences.* John Wiley & Sons: Wiley Series in Probability and Statistics

Lectures' slides will be provided. Other reading material could be suggested along the course

Contacts and modalities

Students interested in following the course must send an email to silvia.columbu@unica.it by February 16.
The course will be held online via zoom. A link will be indicated to students interested in the course.