**Scheda insegnamento**

**Modulo di “Modelli mistura Gaussiani per il clustering, la classificazione e la stima di densità” / “Gaussian Mixture Models for Model-Based Clustering, Classification and Density Estimation”**

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|  | **Italiano** | **English** |
| **Docente/Instructor**  | Luca Scrucca | Luca Scrucca |
| **Titolo/Title**  | Modelli mistura Gaussiani per il clustering, la classificazione e la stima di densità | Gaussian Mixture Models for Model-Based Clustering, Classification and Density Estimation |
| **Contenuti/Contents** | ‐ Modelli di misture finite‐ Modelli mistura Gaussiani ‐ Modelli per la cluster analisi basati sulla distribuzione Gaussiana multivariata ‐ Algoritmo EM‐ Selezione del modello ‐ Stima di densità tramite modelli mistura Gaussiani‐ Classificazione tramite modelli mistura Gaussiani- Selezione delle variabili‐ Il pacchetto mclust per R  | - Finite mixture models‐ Gaussian Mixture Models ‐ Model‐based clustering based on multivariate Gaussian distribution ‐ EM algorithm ‐ Model selection ‐ Density estimation via finite mixture modeling‐ Classification using Gaussian mixture models- Variable selection‐ The R package mclust  |
| **Metodologia/Method** | * Analisi teorica
* Discussione di articoli
* Discussioni in classe o realizzazione lavori individuali
 | * Theoretical analysis
* Discussion of scientific papers
* In class discussion or individual assignments
 |
| **N. Ore/ N. hours** | **10** | **10** |
| **Mese/Month\*** | **Febbraio/Marzo** | **February/March** |
| **Curriculum** | - QME | - QME |
| **Testi di riferimento/ Suggested readings** | Fraley C., Raftery A. E. (2002) *Model‐based clustering, discriminant analysis, and density estimation*. **JASA**, 97(458), 611-631.McLachlan G., Peel D. (2000) *Finite Mixture Models*. New York: Wiley.Scrucca L., Fop. M., Murphy T. B. and Raftery A. E. (2016) mclust 5: clustering, classification and density estimation using Gaussian finite mixture models. *The R Journal*, 8⁄1, 205-233. <https://journal.r-project.org/archive/2016-1/scrucca-fop-murphy-etal.pdf>Scrucca L. and Raftery A. E. (2018) clustvarsel: A Package Implementing Variable Selection for Gaussian Model-based Clustering in R. *Journal of Statistical Software*, 84(1), pp. 1–28. <http://doi.org/10.18637/jss.v084.i01>  | Fraley C., Raftery A. E. (2002) *Model‐based clustering, discriminant analysis, and density estimation*. **JASA**, 97(458), 611-631.McLachlan G., Peel D. (2000) *Finite Mixture Models*. New York: Wiley.Scrucca L., Fop. M., Murphy T. B. and Raftery A. E. (2016) mclust 5: clustering, classification and density estimation using Gaussian finite mixture models. *The R Journal*, 8⁄1, 205-233. <https://journal.r-project.org/archive/2016-1/scrucca-fop-murphy-etal.pdf>Scrucca L. and Raftery A. E. (2018) clustvarsel: A Package Implementing Variable Selection for Gaussian Model-based Clustering in R. *Journal of Statistical Software*, 84(1), pp. 1–28. <http://doi.org/10.18637/jss.v084.i01> |

\* For details, please, refer to the calendar available at <http://dottorato.ec.unipg.it/it/>