

SEMINAR ANNOUNCEMENT

Tuesday, 20th January 2026, at 11:00 am

Room "Sala seminari" - Abacus Building (ex U14)

A New Bayesian Approach to Learning Hybrid Bayesian networks

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Abstract

After a general introduction to Bayesian networks, we propose a new approach for learning the structure of Bayesian networks from hybrid data, that is, data containing both continuous (Gaussian) and discrete (categorical) variables. Consistent with state-of-the-art hybrid Bayesian network models, we do not allow discrete variables to have continuous parent nodes. Our model differs from existing approaches by incorporating discrete variables through multivariate linear regression rather than mixture modeling. Specifically, we apply multivariate linear regression, using the discrete variables as potential covariates, to adjust the means of the continuous Gaussian variables while simultaneously learning the dependencies among them. For each continuous variable, we infer a separate regression model with its own set of covariates (discrete parent nodes). The empirical results suggest that the new approach is a strong alternative to existing methods for learning Bayesian networks from hybrid data.

Short bio

Marco Grzegorzczuk is an Associate Professor for Computational Statistics in the Mathematics Department of the Bernoulli Institute of Groningen University (Netherlands). He is Associate Editor of the journals: Computational Statistics, the Journal of Applied Statistics and Statistica Neerlandica, a member of the Representative Council of the International Biometric Society (IBS) and the treasurer of the Statistical Modelling Society (SMS). His research expertise is in graphical models and Bayesian Statistics, and his main research interest is on developing new advanced (dynamic) Bayesian networks models for learning the unknown structures of regulatory networks and pathways from data.