

Title: Variable Selection in Multivariate Calibration considering Non-Decomposability Assumption and Building Blocks Hypothesis

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The procedure used to select a subset of suitable features in a given data set consists in variable selection, which is important when the dataset contains large number of variables and many of them are redundant. Multivariate calibration combines variable selection with statistical techniques to build mathematical models which relate the data to a given property of interest in order to predict this property by selecting informative variables. In this context, variable selection techniques have been widely applied to the solution of several optimization problems. For instance, Genetic Algorithms (GAs) are easy to implement and consist in a population-based model that uses selection and recombination operators to generate new solutions. However, usually in multivariate calibration the dataset present a considerable correlation degree among variables and this provides an evidence about the problem not being properly decomposed. Moreover, some studies in literature have claimed genetic operators used by GAs can cause the building blocks (BBs) disruption of viable solutions. Therefore, we claimed that selecting variables in multivariate calibration is a non-completely decomposable problem (hypothesis 1) as well as that recombination operators affects the non-decomposability assumption (hypothesis 2). Additionally, we proposed two versions of an Epistasis-based Feature Selection Algorithm (EbFSA) to improve model prediction performance and avoid BBs disruption. Based on the performed inquiry and experimental results, we were able to endorse the viability of our hypotheses and demonstrate EbFSA can overcome some traditional algorithms.

Biography

Lauro is BSc, MSc and PhD in Computer Science from Federal University of Goiás – Brazil. He is an Associate Professor at the Federal Institute of Bahia – Brazil; has published more than 30 scientific papers in conferences and journals with relevant impact factor; has presented some of his works in four different countries: Morocco, USA, Canada and Germany; and has been serving as reviewer and editorial board member of international scientific journals. He also has achieved some awards for excellence in scientific research. In 2019, his last paper was invited to be published as a book chapter by Springer Nature.

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Session name/ number: Analytical Chemistry
Category: Oral presentation