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Classification of forensic glass fragments using R

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Statement of the Problem: Crime scene glass fragments have been collected and the goal is to discriminate among them. A classification rule is to be obtained, such that when one or more samples of glass fragments are available their type be predicted as accurately as possible. In addition, a demonstration of how to use R in order to do the analysis will be provided.

Methodology & Theoretical Orientation: Such measurements come in percentages and for each of the available sample glass, information on 8 chemical elements is provided. For this reason, multivariate statistical techniques, specifically designed for such data are to be used.

Findings: The proposed method works satisfactorily and is mostly appropriate for data with many zeros.

Conclusion & Significance: When dealing with multivariate proportions, especially with many zeros, our algorithm is suggested. An R package exists already for the analysis of such data, going even further, from classification to regression tasks.

Biography

Michail Tsagris is an Expert on Compositional Data Analysis. Compositional data are met in forensics and other related sciences, especially when the composition of chemical substances is available and conclusions must be drawn. Currently he is working as a Research Associate at the Department of Computer Science in the University of Crete, Greece, focusing on applications of statistics to real world data.

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