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Optimal cut-point estimation for functional digital biomarkers: Application to continuous glucose monitoring

Óscar Lado-Baleato[1,2], Marcos Matabuena[3], Carla Díaz-Louzao[4] and Francisco Gude[5]

[1] Research Methods Group (RESMET), Health Research Institute of Santiago de Compostela (IDIS), Santiago de Compostela, Galicia, Spain.

[2] ISCIII Support Platforms for Clinical Research, Health Research Institute of Santiago de Compostela (IDIS), Santiago de Compostela, Galicia, Spain.

[3] Department of Biostatistics, Harvard University, Boston, MA 02115, USA.

[4] Department of Mathematics, University of Coruña, A Coruña, Galicia, Spain.

[5] Primary Care Centre, Concepción Arenal, Santiago de Compostela, Galicia, Spain.

Abstract

In digital health, defining optimal cut points for functional biomarkers is crucial for enhancing diagnostic accuracy, particularly when working with continuous data from wearable devices. In this communication, we present a mathematical model for determining optimal cut points for the distributional representation of continuous glucose monitoring (CGM) data, known as glucodensities. The model defines optimal cut points by introducing a continuous parameter that partitions the Hilbert space of glucodensity functions into regions corresponding to health and disease states. The method was validated using real-world data from the A-Estrada Glycation and Inflammation Study (AEGIS) cohort, a large population-based study which includes CGM data. It demonstrated high efficacy in distinguishing diabetes prevalence (AUC = 0.94) and it predicted diabetes incidence with fair accuracy (AUC = 0.78).

References

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