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Optimal nonparametric testing of Missing Completely At Random, and its connections to compatibility

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11:50 AM
110 Frelinghuysen Road, Hill Center, Room 552

Zoom Meeting: Meeting ID: 99075124232
Password: 952486

https://rutgers.zoom.us/j/99075124232?pwd=UDdPVjRncXZFcXpvbFE0OWJyMVdSUT09

Abstract:

Given a set of incomplete observations, we study the nonparametric problem of testing whether data are Missing Completely At Random (MCAR). Our first contribution is to characterize precisely the set of alternatives that can be distinguished from the MCAR null hypothesis. This reveals interesting and novel links to the theory of Fréchet classes (in particular, compatible distributions) and linear programming, that allow us to propose MCAR tests that are consistent against all detectable alternatives. We define an incompatibility index as a natural measure of ease of detectability, establish its key properties, and show how it can be computed exactly in some cases and bounded in others. Moreover, we prove that our tests can attain the minimax separation rate according to this measure, up to logarithmic factors. Our methodology does not require any complete cases to be effective and is available in the R package MCARtest.

Bio:

Professor Richard Samworth obtained his PhD in Statistics from the University of Cambridge in 2004, and has remained in Cambridge since, becoming a full professor in 2013 and the Professor of Statistical Science in 2017. Samworth currently holds an European Research Council Advanced Grant. His main research interests are in high-dimensional and nonparametric statistics, including problems in shape-constrained inference, missing data, changepoint estimation, variable selection, independence testing and classification, amongst others. He received the COPSS Presidents' Award in 2018, gave an Institute of Mathematical Statistics (IMS) Medallion lecture (2018), and was awarded the Adams prize (2017) and the Royal Statistical Society (RSS) Guy Medal in Bronze (2012). He recently completed a term as co-editor of the Annals of Statistics (2019-2021), and was elected a Fellow of the Royal Society in 2021.