

Bayesian Penalized Function-on-Scalar Regression for Longitudinal Accelerometry Data

Jeff Goldsmith, Ph.D.

Department of Biostatistics
Columbia University

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3:30-4:30pm, New PI 6th Floor Multipurpose Room (6602)
Light refreshments provided

Abstract

Wearable devices promise to revolutionize the understanding of physical activity patterns by providing continuous collection of movement information, rather than relying on after-the-fact self report. Characterizing observed activity requires the development of regression models in which continuous measures of activity, observed over several days for each subject, are the outcome of interest. We discuss the formulation of function-on-scalar regression methods that allow for subject-level random effects. Our model is directly and intuitively related to a standard multilevel model using daily average activity as a scalar outcome, but utilizes the full daily time course as a functional outcome. Parameters are jointly estimated in a Bayesian framework, and we implement a computationally efficient approximation algorithm using variational Bayes. Simulations indicate that the proposed method yields accurate estimation and inference, and application results suggest time-specific age and BMI effects on physical activity.

Biographical Note

Jeff Goldsmith is assistant professor of Biostatistics at the Columbia University School of Public Health. He is inspired by scientific questions to develop general, principled methods for the analysis of challenging datasets. Dr. Goldsmith's primary methodological area of interest is functional data analysis, motivated by collaborations in fields ranging from accelerometry to motor learning.

¹ The PI Biostatistics Seminar Series is held on Tuesdays at New York State Psychiatric Institute. If you are interested in receiving regular announcements for our seminars in the future, or if you need further information, please contact Jina James (jamesji@nyspi.columbia.edu, (212) 543-5589).