Dimension Reduction for Fréchet Regression

Lingzhou Xue, PhD

Professor of Statistics at Penn State University

With the rapid development of data collection techniques, complex data objects that are not in the Euclidean space are frequently encountered in new statistical applications. Fréchet regression model (Peterson & Müller 2019) provides a promising framework for regression analysis with metric space-valued responses. In this paper, we introduce a flexible sufficient dimension reduction (SDR) method for Fréchet regression to achieve two purposes: to mitigate the curse of dimensionality caused by high-dimensional predictors and to provide a visual inspection tool for Fréchet regression. We established the consistency and asymptotic convergence rate of the proposed methods. The finite-sample performance of the proposed methods is illustrated through simulation studies for several commonly encountered metric spaces that include Wasserstein space, the space of symmetric positive definite matrices, and the sphere. We illustrated the data visualization aspect of our method by exploring the human mortality distribution data across countries and by studying the distribution of hematoma density.

Thursday, September 14, 2023, 3:30-4:30PM Eastern

133 Rosenau Hall

Zoom Link: **https://unc.zoom.us/j/95131277245**

Meeting ID: 951 3127 7245

Passcode: 203117

UNC | GILLINGS SCHOOL OF GLOBAL PUBLIC HEALTH
Biostatistics