UTSA College of Business
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"Quantile Regression for Functional Data and Time Series Forecasting"

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Abstract

The advance in computation and technology generated an explosion of data that have functional characteristics, which has triggered a rapid growth of the functional data analysis (FDA) field with an overwhelming emphasis on mean regression. Quantile regression introduced by Koenker and Bassett Jr (1978) has been widely used in many application areas to study the effect of predictor variables on a given quantile level of the response, and can reveal important information about how the entire distribution of response varies with predictors in ways that might not be captured by mean regression.

In this talk, we propose a Bayesian framework to perform function-on-scalar quantile regression, and develop theory for the scalar-on-function case. When applied to mass spectrometry proteomics, we identify proteomic biomarkers of pancreatic cancer missed by previous mean regression approaches. If time permits, we will also introduce a median autoregressive model motivated from Conditional Autoregressive Value at Risk (CAViaR) model but used for time series forecasting, which shows excellent forecasting accuracy compared to state-of-the-art alternatives under both squared and absolute error loss.