Multidimensional Sequential Analysis
- The Harmonic DNA of the Beatles and other more business-related analyses

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ABSTRACT

Dynamic sequences are quite common in business, happening whenever multiple discrete events (movie downloads, songs listened, products purchased, etc.) are tracked over time. In many of these dynamic sequences the number of events involved (movie or titles, SKUs, parts) is very large, leading to the “curse of dimensionality.” In this presentation I will start by analyzing the harmony in the Beatles’ rich musical repertoire, using this popular topic to illustrate the “curse of dimensionality,” my proposal for handling it, and the dynamic state-space model utilized to analyze these sequences. After this illustration of the modeling framework, I will present two applications to business problems. The first business application tracks new customers for a bank from acquisition to the end of the second year (or defection), leading to a quantification of the customer lifecycle, which allows us to predict future individual customer behavior based on observed behavior. The second business application tracks the contents of each shopping cart in a large sample of shopping sessions from the very first SKU added to the cart to the end (successful or not) of the session, resulting into a dynamic Market Basket Analysis (MBA).