SCHOOL OF DATA SCIENCE

SEMINAR SERIES

Statistical Analysis of Accelerometry Data in Health Studies

Date: 01 November 2018 (Thursday)
Time: 10:00am to 11:00am
Venue: P7510, 7/F, Yeung Kin Man Academic Building (YEUNG), City University of Hong Kong

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Guest Speaker's profile

Dr. Jiawei Bai is an Assistant Scientist in the Department of Biostatistics at the Johns Hopkins Bloomberg School of Public Health. Dr. Bai has 8 years of experience as a biostatistician working on developing statistical methods and applying them to important biomedical and public health problems, in close collaboration with scientific researchers. His main area of expertise is in the design of experiment, data collection, and analysis for studies of objectively measured physical activity. He has developed statistical methods to measure and analyze human physical activity using the massive data collected by wearable devices, such as accelerometers, GPS sensors and heart monitors. Dr. Bai has been involved in the study design, data collection, management and analysis of the accelerometry data for many large-scale epidemiological studies, including the Baltimore Longitudinal Study of Aging (BLSA), the Early Infant Care and Risk of Obesity (Nurture), and the Women's Health Initiative (WHI).

Abstract

Wearable devices, such as accelerometers and heart rate monitors, can now provide objective and continuous measurements of human activity. Such devices have been widely deployed in large observational and clinical studies because they are expected to produce objective measurements that could improve or replace current self-reported activity measuring practices. Modern devices allow collection of high frequency acceleration time series that provides rich information about device wearers' detailed physical activity characteristics. On the other hand, aggregated summaries of the high frequency acceleration, commonly called "counts data", are used more often in practice because they are adequate to capture subjects' 24-hour physical activity trajectory. In this talk, I will present several health studies with accelerometry data and discuss the associated statistical analysis. In particular, I will introduce a set of analysis based on the concept "movelet" to study the type of physical activity at the sub-second level using the high frequency data. Then, I will discuss a few ways to analyze the counts data, including a two-stage model that quantifies the dynamics of 24-hour physical activity trajectory, as well as a set of fragmentation metrics that summarize the allocation of physical activity within 24 hours.

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All are welcome