MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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Not everybody, but some people move like you: Wearable computing in public health

Tuesday, April 7, 2015
10:20 a.m. - 11:10 am
Refreshments 10:00 am
C405 Wells Hall

Abstract

Accelerometers are now used extensively in health studies, where they increasingly replace self-report questionnaires. The sudden success of accelerometers in these studies is due to the fact that they are cheap, easy to wear, collect millions of data points at high frequency (10-100Hz or more), store month's worth of data, and can be paired with other devices, such as heart, gps, or skin temperature sensors. I will discuss the multi-resolution structure of the data and will introduce methods for movement recognition both for in-the-lab and in-the-wild data using second- and sub-second level data. I will introduce movelets, a powerful dictionary learning approach, designed for quick identification of movement patterns. At the minute level I will describe activity intensity measures (activity counts, vector magnitude, and activity intensity) and introduce functional data approaches for characterizing the circadian rhythm of activity and its association with health. The natural data structure induced by such observational studies is that of multilevel functional data (activity intensity measured at every minute for multiple days observed within each subject.) I will introduce fast functional data analysis approaches that can deal with the data complexity, describe its structure and its association with health outcomes. In particular, I will discuss results from a motivating study of the association between age, body mass index (BMI) and the circadian rhythm of activity. I will also explain why you should not trust your calorie counter.

To request an interpreter or other accommodations for people with disabilities, please call the Department of Statistics and Probability at 517-355-9589.