PhD Defence

PhD student Andrea Cuttone
"Data Mining and Visualization of Large Human Behavior Data Sets".

Wednesday, 5 October 2016, at 14:00

The Technical University of Denmark, Building 308, Auditorium 11

Principal supervisor: Associate Professor Jakob Eg Larsen
Co supervisor: Associate Professor Sune Lehmann Jørgensen

Examiners:
Director, Professor Jakob E. Bardram, DTU Compute
Associate Professor Mikkel Braun Kjærsgaard, Syddansk Universitet
Reader in Data Science Mirco Musolesi, University College London

Chairperson at defence:
Associate Professor Morten Mørup, DTU Compute

A copy of the PhD thesis is available for reading at the department

DTU Compute
Institut for Matematik og Computer Science

Technical University
of Denmark

DTU
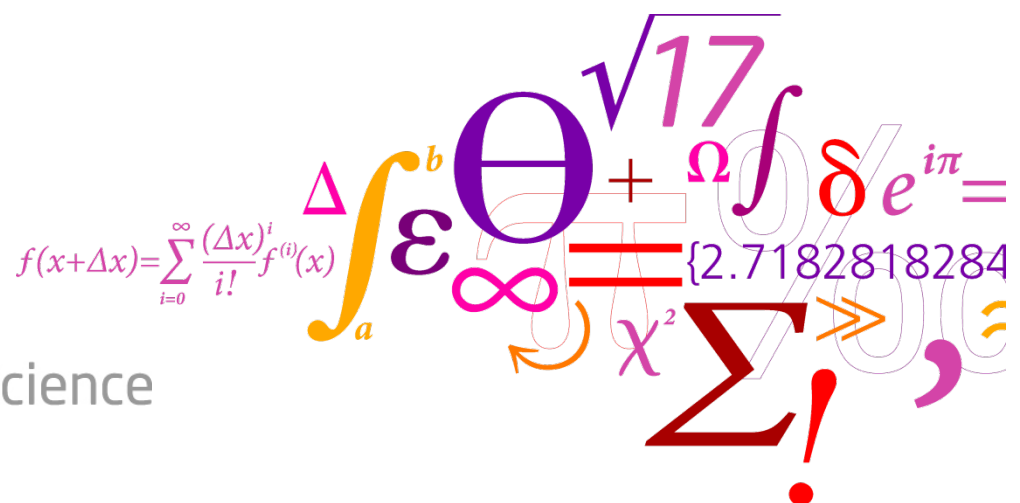
Popular science summary of the PhD thesis in English

PhD student	Andrea Cuttone
Title of the PhD thesis	Data Mining and Visualization of Large Human Behavior Data Sets
PhD school/Department	DTU Compute

Science summary

Traditional methods for studying human behavior such as surveys and manual collection are expensive, time-consuming and therefore cannot be easily applied at large scale. In recent years an explosive amount of digital traces of human activity - for example social network interactions, emails and credit card transactions - have provided us new sources for studying our behavior. In particular smartphones have emerged as new tools for collecting data about human activity, thanks to their sensing capabilities and their ubiquity. This thesis investigates the question of what we can learn about human behavior from this rich and pervasive mobile sensing data.

In the first part, we describe a large-scale data collection deployment collecting high-resolution data for over 800 students at the Technical University of Denmark using smartphones, including location, social proximity, calls and SMS. We provide an overview of the technical infrastructure, the experimental design, and the privacy measures.

The second part investigates the usage of this mobile sensing data for understanding personal behavior. We describe two large-scale user studies on the deployment of self-tracking apps, in order to understand the patterns of usage and non-usage. Moreover we provide some design guidelines for facilitating reflection in self-tracking systems. Finally we propose a model for inferring sleep patterns from smartphone interactions.

In the third part, we focus on a specific aspect of collective behavior: human mobility. We perform an experiment to verify the feasibility of inferring places from location traces using mobile sensing data. We develop a hierarchical model for human mobility, which is able to measure mobility properties at multiple scales. We perform a study on the factors influencing the accuracy of next-place prediction models. Finally we present an open-source tool for creating geographical visualizations.

Please email the abstract to the PhD secretary at the department