
Università di Pisa
Scuola di Dottorato
Galileo Galilei
School of Graduate Studies

# SEMINARIO GALILEIANO

**Prof.ri Fosca Giannotti[1] e Dino Pedreschi[2]**

# "Mobility Data Analysis and Mining: Understanding Human Movement Patterns from Trajectory Data"

Abstract: Uncovering the patterns of human mobility, which characterize the trajectories humans follow during their daily activity, is not only a major intellectual challenge, but also of importance for urban planning, transportation engineering, public health, and economic forecasting. Recently, the availability of mobile-phone records, global-positioning-system data and other mobility-related big data capturing aspects of human mobility are providing a new powerful social microscope, and have given empirically driven momentum to the subject. Based on these data, a new multidisciplinary research area is emerging at the crossroads of mobility, data mining, statistical modeling, and privacy. The seminar assesses this research frontier by providing an account on the models of human mobility recently developed by network scientists and statistical physicists, as well as on the methods for mobility data mining, such as trajectory pattern mining and trajectory clustering, developed by data mining researchers. We illustrate the key results of a European-wide research project called GeoPKDD, Geographic Privacy-Aware Knowledge Discovery and Delivery, which created an integrated platform for complex analysis of mobility data, and show its analytical power in unveiling the complexity of urban mobility in a large scale experiment, based on a massive real life GPS dataset, obtained from 17,000 vehicles with on-board GPS receivers, tracked during one week of ordinary mobile activity in the city of Milan, Italy. We argue how statistical modeling and computational sciences are converging towards a data science that, powered by the big data of ICT-mediated human activities, is aiming at a quantitative understanding of social phenomena. We conclude with an example of how the combined methods of data mining and network science can provide deeper insight into the interplay between human mobility and the social network, and how the movement behavior of people impacts the dynamics of social ties.

## Martedi 8/3/2011 - ore 15:00

## Aula 131 - piano terra - Ed. C

## Dipartimento di Fisica "E.Fermi"

(1) Knowledge Discovery and Data Mining Laboratory KDD LAB, Istituto di Scienza e Tecnologie dell'Informazione "A. Faedo" del CNR, Pisa
(2) Knowledge Discovery and Data Mining Laboratory KDD LAB, Dipartimento di Informatica, Università di Pisa