

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences de l'Ingénieur

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Master ingénieur civil en mathématiques appliquées

Understanding Social Dynamics through Big Data

Data are everywhere. They pervade our world. From e-mails we send, online status we post or friends we call, to credit cards we swipe or papers we cite, most of our everyday actions leave digital traces. As our ability and capacity to measure natural and social phenomena is rapidly increasing at an unprecedented scale, we witness an exponential growth of all these digital traces. This growing digital information is what we call *Big Data*; Data that we generate and acquire far more rapidly than the rate at which we process, analyse and exploit it.

In science, the ability to collect and analyse massive amounts of data traces have fuelled numerous advances and unambiguously transformed many research fields. But nowhere are these advances more important than in the study of social systems. Indeed, the flood of data capturing activities of individuals enables an entirely new scientific approach for social analysis, which this thesis aims at illustrating. More particularly, our contributions evolve around three different yet intrinsically related aspects of social dynamics: human mobility, social interactions and success.

In the first part of this work, we focus on mobile phone data. We first demonstrate that these large-scale social data can provide reliable and dynamical estimates of population densities over large geographical extents, offering concrete solutions to population mapping issues in low-income countries. We then show how these data can also reveal remarkable and unexpected social structures over entire countries, as well as help us uncover universal relationships between human mobility and social interactions, fuelling applications on epidemic spreading or traffic forecasting.

In the second part, we investigate the social mechanisms of success through the analysis of large-scale publication data. Publication data are a valuable source of individual information as mobility, interaction and citation information can be extracted from these. Based on these data, we investigate the patterns of scientific success as well as its connection with human mobility.

Lundi 21 septembre 2015 à 16h00

Auditoire BARB 93
Place Sainte Barbe
1348 Louvain-la-Neuve



Membres du jury :

Prof. Vincent Blondel (UCL), promoteur
Prof. Raphaël Jungers (UCL), président
Prof. Paul Van Dooren (UCL), secrétaire
Dr Roberta Sinatra (Northeastern University, USA)
Prof. Renaud Lambiotte (Université de Namur)
Dr Zbigniew Smoreda (Orange Labs, France)