

# Modeling and Understanding Social Influence in Groups and Networks

by

**Julia Neidhardt**

## **Advisor:**

Univ.Prof. Dr. Hannes Werthner (TU Wien, Austria)

## **Reviewers:**

Univ.Prof.i.R. Dr. Wilfried Grossmann (University of Vienna, Austria)

Prof. Dr. Markus Zanker (Free University of Bolzano, Italy)

## **Abstract**

Social influence occurs when a person changes her behavior according to the behavior of other people in the social system. Today, these complex mechanisms can be studied by making use of vast amounts of detailed data on human behavior and social interactions, coming from the World Wide Web and other data sources.

The main objective of this work is to capture social influence processes in computational models on a large scale. In the presented analysis, three levels of information are distinguished (i.e., individual, group and network level). To illustrate each level in detail and to show their differences, conventional methods and their shortcomings are discussed and empirical studies are conducted. At the individual level, regression models are applied; at the group level, approaches based on geometric data analysis; and at the network level, social network analysis. At the network level, conditional random field models are introduced as an alternative way to capture social influence processes. Finally, it is discussed, how all three levels can be integrated into one model. The empirical analyses are related to travel recommender systems, churn behavior, sentiments in online forums and team-vs-team competitions.

The results of this belong to two categories: 1) methodological advances; 2) concrete statements in different domains of application. It is shown that the introduced models are able to capture social context in an accurate way. Most of them, moreover, scale well. Furthermore, integrating different levels of information allows comparing them and their associations with the studied social influence processes directly. Thus, a more comprehensive picture of the respective domain of application is obtained.