

Living Analytics Methods for the Social Web

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Abstract

The collective effervescence of social media production has been enjoying a great deal of success in recent years. The hundred of millions of users who are actively participating in the *Social Web* are exposed to ever-growing amounts of sites, relationships, and information.

This work contributes state-of-the-art methods and techniques to the emerging field of *Living Analytics*, whose main goal is to capture people interactions in real-time and to analyze these data in order to relieve information overload. We introduce intelligent filtering approaches that exploit social interactions, multidimensional relationships, metadata, and other data becoming ubiquitous in the social web, in order to discover and recommend the most relevant and attractive information that meets users' individual needs. In particular, the contributions of this work fall into mainly two categories:

- (i) *Recommender Systems*: We present novel algorithms that advance the state-of-the-art in Online Collaborative Filtering. Moreover, we propose an approach based on Swarm Intelligence to directly optimize ranking functions for item recommendations. New approaches to address the cold-start problem in social recommender systems are also part of our contributions. In addition, we also offer a personalized ranking algorithm for Epidemic Intelligence.
- (ii) *Collective Intelligence*: Our contributions in the field of computational social science are twofold. First, we explore how social media streams can be exploited for Epidemic Intelligence and show its potential for early warning detection and outbreak analysis and control. Second, we show how the real-time nature of social media streams can be leveraged to take the pulse of political emotions.

In total, the methods and studies included in this work constitute an *analytics toolbox* to help understand and analyze the social web.

Keywords: Machine Learning; Collaborative Filtering; Social Media.

Available online at: http://www.L3S.de/~diaz/ebook_lamsw_diaz-aviles.pdf