# Chapter 4
# DISMON:
## Using Social Web and Semantic Technologies to Monitor Diseases in Limited Environments

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## ABSTRACT

*Information technology and, more precisely, the internet represent challenges and opportunities for medicine. Technology-driven medicine has changed how practitioners perform their roles in and medical information systems have recently gained momentum as a proof-of-concept of the efficiency of new support-oriented technologies. Emerging applications combine sharing information with a social dimension. This paper presents DISMON (Disease Monitor), a system based on Semantic Technologies and Social Web (SW) to improve patient care for medical diagnosis in limited environments, namely, organizations. DISMON combines Web 2.0 capacities and SW to provide semantic descriptions of clinical symptoms, thereby facilitating diagnosis and helping to foresee diseases, giving useful information to the company and its employees to increase efficiency by means of the prevention of injuries and illnesses, resulting in a safety environment for workers.*

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## INTRODUCTION

Nonfatal workplace injuries and illnesses among private industry employers in 2008 occurred at a rate of 3.9 cases per 100 equivalent full-time workers (U.S. Bureau of Labor Statistics, 2009). Due to these sick leaves the companies are forced to hire new workers in order to fill the temporary vacancies, often employing the new members of the staff in short time-frames. Thus, it drives the company to carry out a quick selection process which entails a bad performance of this task and finally it can conclude with a no proper decision. In addition in most of the cases the incorporation of the new employees comprises an in-service training period or/and an adaptation period, therefore an efficiency loss. On the other, hand if the company does not hire new workers, it presents a worse scenario. Hence all these issues can imply loss of money by the company; unsatisfied clients; loss of partners; and unhappy stakeholders.

This paper proposes an automatic system for monitoring and helping to foresee the diseases using the social web and semantic technologies, giving useful information to the company and its employees in order to increase the efficiency by means of the prevention of injuries and illnesses, resulting in a safety environment for the workers. The system by means of analyzing the different information exchanged in the social web, will detect the diseases that are suffering the employees of a given company in a particular time. Furthermore the system will inform to the company about the spreading of the different illnesses and the recognized patterns. The aim of DISMON is to prevent massive infections and by means of the recognized patterns inferring which environmental conditions of the working place could have been the cause of a given disease, for instance temperature of the offices, contaminated air or water. In addition the system will report to each employee how probably is for them to be infected, based on the profile of the user, as age, location, previous illnesses or allergies in order to compare them with the characteristics of the previous infected workers, obtaining a percentage of the possibilities of the workers to get an illness.

## STATE OF THE ART

### Social Web

In latest years, the number of Social Web Sites has increased very quickly; these webs allow the knowledge to be generated just by using the contributions of the users via blogs, wikis, forums, online social networks, and so forth (Kinsella et al., 2009). The Web 2.0 phenomenon made the Web social, initiating an explosion in the number of users of the Web, thus empowering them with a huge autonomy in adding content to web pages, labeling the content, creating folksonomies of tags, and finally, leading to millions of users constructing their own web pages (Breslin & Decker, 2007). Therefore the user participation is the key and the main value of the Social Web. This participation concludes in a "collective intelligence" or "wisdom of crowds" where the opinion taking into account is the one expressed by a group of individuals rather than single or expert opinions answering a question.

The concept of collective intelligence, or "wisdom of the crowds" (Surowiecki, 2004), stands that when working cooperatively and sharing ideas, communities can be significantly more productive than individuals working in isolation. Moreover, the ability of multitudes to generate accurate information from diverse data sets has been well documented elsewhere and is not unique to Web 2.0 (Surowiecki, 2004). That's why social web has demonstrated its success with efforts like the Wikipedia, in which the "wisdom of the crowds" is creating and maintaining world's largest online encyclopedia.

The Social Web can be used by anybody with internet connection, but for the Social Web to work properly, the web developers have to provide

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