Chapter 15
Using Social Networks to Obtain Medical Diagnosis

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ABSTRACT

Web 2.0 Applications have gained much power and usability in the last years. A particular case is medicine Web sites, like forums, wikis, and others. In most cases, these sites provide general information without making contact with the physicians. On other side, the CDSS (Clinical Decision Support Systems) are very useful applications, and many of them are ontology based. In this chapter, the authors propose a social Web application that allows patients to make contact with their physicians through a CDSS list of signs. This application combines social Web, CDSS, and Web services.

INTRODUCTION

In this chapter, we propose a Web 2.0 platform focused on the concerns described below. The proposal covers a platform where the physicians can share information and collaborate in order to obtain more accurate diagnosis of the patients that they are treating for a better service.

We have defined two main roles which will interact with the platform proposed. Each of the roles are described below.

The first role are the physicians, which are the users that can feed the knowledge base through the introduction of new observations (findings) to define the relation which exist between the diseases and their observed findings. They also can associate to each disease a degree of probability which will be based on several statistic methods such as Bayes method.

The insertion of these observations will be through a formulary which will be available on the platform. Once a diagnosis (the relations between the disease and their associated findings) has been defined, the system offers the possibility to other physicians to modify it by adding or removing
findings and redefine the probability values. The physicians should work together updating the knowledge base, in what is known as collective intelligence, in order to obtain better diagnosis.

The second role of the platform are the patients. Patients may enter their own health observations into the system, and wait for the physician which they have associated to send them a reply. In this case, the doctor will receive from the system the patient’s medical data and a proposed list of diagnosis obtained from the knowledge base. The diagnosis will be provided by an external system presented in (García-Crespo, Rodríguez, Meneke, Gómez-Berbís, & Colomo-Palacios, 2010). The doctor will review the case and send a response to the patient with the treatment (assuming responsibility for it) or may request a visit at a date and time.

The reasons why the system can not send directly to the patient the diagnosis is the risk of frightening the patient with a diagnosis that may not be correct due to external factors. It is important to try to avoid self-medication and the serious problems that entails. Finally, the system itself could not be responsible for providing diagnosis and treatment.

This system also could be used as a learning platform for medical students, in which the system may present case studies with specific data and a set of diseases as result of the diagnosis process to the student to identify which one is the correct or more likely.

RELATED WORK/STATE OF ART

Since the proposal turns around a Web 2.0 Application, we are going to start this section highlighting its main feature. The main feature of the Web 2.0 applications is the collaboration. As is indicated in (Kamel Boulos & Wheeler, 2007) the Web 2.0 applications encourages the human collaboration and interaction due the sense of being in a social environment, and it is benefit for the motivation too because it decreases the isolation that could be a significant barrier. And another feature is that the Web-based environments are useful to obtain help and guidance from others. Another feature is that Web 2.0 allows more participation because the users are readers and writers at the same time.

As it is defined by (Heylighen, 1999), the intelligence is the ability to solve problems, and the collective intelligence is the ability of a group to solve more problems than its individual members. In his paper he says that the concept of collective intelligence has been more used with the growing interest in complex adaptive systems, artificial life and simulated societies, and that we can say that a group exhibit collective intelligence if it members working together can find more or better solutions than the whole of all solutions that would be found by its members working individually. Furthermore he recognizes the problem that occurs when the people play power games. It happens when every member wants to be recognized as the smartest or most important one. He argue that the problem can be solved dividing the entire group in small groups and parallelizing its activities but this implies that the small groups must keep close contact in order to exchange information.

There are some different kinds of Social Web applications, like forums, wikis, blogs, podcast, RSS, and also many Web pages which allow their visitors to write their comments about any theme treated in there.

We can find in (Boulos, Maramba, & Wheeler, 2006) a brief description of what are wikis, blogs and podcast. A wiki is a collaborative Web site where the users can edit its content to change or update it. In the wikis, we can obtain information and knowledge and collaborate with others.

The Blogs are Web Sites where the content is chronologically ordered and can be written by one person or by a group. The content could be links to other Web sites or comments, as well as images.

The podcast is another way to share information in audio or video format, and it allows the
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