A social networking application for psycho-therapy support

ROBERT BUCHMANN
Faculty of Economic Sciences and Business Administration
Babes Bolyai University
Teodor Mihali Street, No. 58-60 Zip:400591, Cluj-Napoca
Romania
robert.buchmann@econ.ubbcluj.ro

LIANA STANCA
Faculty of Economic Sciences and Business Administration
Babes Bolyai University
Teodor Mihali Street, No. 58-60 Zip:400591, Cluj-Napoca
Romania
liana_stanca@yahoo.com

IOANA POP
Faculty Of Horticulture
University of Agricultural Sciences and Veterinary Medicine
Calea Mănăștur Street, No. 3-5, Cluj-Napoca
Romania
popioana@usamvcluj.ro

Abstract: - Diseases of modern society are felt by a growing number of citizens of the world and thus implicitly of Romania. These diseases have existed throughout history but are catalyzed by the functional and informational stress of the modern society. In this context, the paper proposes a “polymorphic” application model based on the Ruby on Rails framework, destined to be used as a substitute for a medical cabinet, specifically a psycho-therapy cabinet. The application is a social networking on-line service with medical purpose and increased communication possibilities, and provides statistical tools such as correlations, recommendation systems and clustering over a person’s network or an entire virtual community.

Key-Words: - Social networking, Psychological counseling, AJAX, Ruby on Rails technology

1 Introduction

Direct interhuman relationships have always existed and will continue to exist because individuals, by their nature, need and want to interact, to create groups based on sympathy or interests. But something is changing even in interhuman relationships. Individuals are focusing much more on the professional development, career, job, issues and the time remaining for the so called social life is reducing. Ignoring the importance of the social life has a negative impact on the personality of the individuals over the time, and generates some of the modern society psychological diseases.

Individuals, by their nature, were not created to live isolated but to integrate themselves in a social context, to attach to different groups, social or professional categories. The modern IT&C technologies make it possible to establish, develop or maintain relationships in a virtual environment. This way, people can virtually meet and communicate even in some situations when they have not enough time to go to a common meeting point.

The first part of the paper describes basic elements of the new trend of social networking in medical communication, while the second part proposes a networking service application based on the Ruby on Rails technology, an ideal tool for rapid development and maintenance.

2 Social Networking, evolution

The Internet has appeared and developed from the desire to communicate in the shortest possible time, with reduced costs and without geographical barriers. At the beginning of the Internet era, the communications was almost all asynchronous (for example e-mail), in many cases because of the technical limitations of the networks. Then the synchronous communications such
as chat, forums or instant messaging, appeared and introduced the concept of virtual communities.

As Internet started in the academic world, one of the first virtual communities were launched in 1995[12] and their goal was to identify and reestablish the links between the college or faculty colleagues, using Internet. Almost at the same time, there were developed specialized sites for establishing virtual friendships between people with or without social integration problems. Some of the relations established this way between people that never meet physically before, evolved in strong friendship or business relationships or even marriages.

The interaction between parts were usually a synchronous one (chat), which is well suited to one-to-one contacts, but then evolved to discussion forums on different themes, were people are connecting based on their interests, debating and offering solutions. Today there exists and develop many forums in fields like education, medicine, politics, social issues, mass-media, etc. In this context, the transition from groups to social networks was a natural evolution. Social networks have emerged based on the social structures theory developed by S.F. Nadel[5][6][7][11], Emile Durkheim and Tönnies Ferdinand.

Tönnies[8][5][6][7][4] shows that groups can be identified as an entity (individual) that can interact at a certain moment with another entity (group) creating this way social networks. The characteristic of such social networks is represented by the fact that between the entities implied in the social networks we have:

1. direct social links between the members of the groups, that share the same values and beliefs
2. indirect and impersonal links.

The concept of “social networking” was also sustained by the theory of Durkheim [11][6][7] which states that the modern society is an organic solidarity that is evolving based on the cooperation between independent individuals with precise roles into groups. Together with Georg Simmel, they say that in a network, the interaction between the members is much more evolved in strong friendship or business relationships or even marriages.

The starting principle in creating the social networking was obtaining as much information as possible about different people, in order to be used in the economic, social, cultural or educational fields. The sites dedicated to social networking are designed such as to inspire trust to the people that think about joining. Inside such a site, it is very important that members and those to want to join are intending to do the following tasks:

1. fill-in detailed profiles describing their fields of interests, hobbies and what is motivating them in their work;
2. posting personal and family pictures together with other personal data;
3. interacting and discuss with as many other members is possible;
4. determining other people to join to groups;
5. creating online journals.

The advantages [12][13][5] offered by the membership to a social network are:

1. one can make himself known by many people;
2. sharing and obtaining information about people or about fields of interest in a very short time;
3. maintaining and developing friendship and professional relations;
4. establishing love relations that can finish into a marriage, especially in the case of the shy or bashful people;
5. obtaining some revenues or advantages with no costs;
6. a cheap method for advertising;

But there are also some disadvantages [12][13][5] like:

1. you can not be sure that you are discussing with people that corresponds to their published profile
2. your Internet activity as a group member can be monitored or even intercepted by other people with malicious intentions that can use the intercepted information for unlawful actions;
3. members can easily become target for spam messages;
4. in some cases, adults or children intensively using the social networks are becoming more isolated into the virtual environment and out of the real life;
5. the professional career can be affected when the activities inside the social networks are interfering with the professional or job duties;

The social networking phenomenon is continuing to extend at worldwide level with great success, with a growing number of sites, groups and networks. The best known social networking sites are:

1. MySpace – the first social networking site;
2. Classmates – specialized for college and faculty colleagues
3. Friendster – dedicated for bringing friends together;
4. Facebook – focused on pupils and students;
5. Last.Fm, YouTube, DeviantArt – music, art and cultural communities;
6. LinkedIn – oriented to professional contacts;
7. Care2 – ecologists community;
8. Hi5 – friendship, dating and marriage sections.
9. PatientsLikeMe[5] is a site where people suffering from different physical or mental diseases can join groups of other people having the same problems. The site is divided in 4 sections. The first section is intended for the discussions between the community members, the second one contains pages describing the symptoms of different diseases, the third one offer advices and possible therapies for those diseases and the last one is intended for the presentation of the research results in different medical fields;
10. SoberCircle[15][5][19] is a site that tries to help people addicted to alcohol or drugs. It is somehow similar to the Alcoholic Anonymous associations.
11. SparkPeople[5][19][15] is intended for people with weight problems and eating disorders and provides advices, diets and proposes exercises and physical activities
12. Info-Sanatate[16] is a Romanian social network started in 2007. It includes articles and videos about diseases, therapies, hospitals and physicians from Romania.

The development of the social networks has accelerated the introduction of the Internet technologies in the medical sector. Those networks are representing a real and useful help to their members but in some cases, they also have negative results because:
1. the members are giving advices including medication, even if they do not have a medical qualification;
2. sometimes the pharmacies can use these communities to advertise different drugs or facilitate links with internet pharmacies that pose safety risks for consumers.

However, we have to admit that there are many positive results derived from the development of the medical social networks:
1. Specialists from many medical fields are joining these social networks, offering free professional advices for patients that otherwise could not meet;
2. In some cases, physicians can interact directly with their patients;
3. New therapies and drugs can be publicized sooner by those who used them;
4. Patients can obtain details about physicians, hospitals, their concrete results and relevant experiences, how to prevent and recover after some diseases;
5. Easy access to specialized information, at no cost and in less time
6. The stories and experiences presented by the patients can be very helpful also for the physicians, because they represent a very good feedback information source and indirectly a knowledge-sharing method, especially for rare diseases.

According to the statistics analysis done by the Pipl site during November-December 2007 [14], it results that:
1. Europeans are using mainly Hi5, MySpace and Friendster
2. Americans are preferring Hi5, Friendster and MySpace
3. Asians are using mostly Hi5, Friendster and MySpace

The popularity of these sites is not constant, it increase or decrease from time to time, as new social networks with innovative ideas, methods and topics are launched and are becoming available

3 Instrumentation and methodology

Rails is a framework for developing Web applications, based on the Ruby programming language and fit for agile software development methodologies. It was developed by David H. Hansson and is currently in version 2.3. [9][17]. Its main quality is the support for free productivity, by meeting web developers needs and promoting reusability and coding conventions. The general features of Rails are:
• It imposes a very disciplined Model-View-Controller design pattern;
• It’s based on Ruby, an object-oriented language that improves technological homogeneity in Rails applications, by avoiding the necessity to use multiple languages (SQL, HTML, JavaScript, PHP and others) in the same application; Rails functions manage database queries, scripting and act as HTML/JavaScript generators; HTML’s role is reduced to structuring the application views (the View layer); [2]
• Its core is the ORM (object-relational mapping) library ActiveRecord, which defines the model layer;
• It provides a framework for automated testing, both black box and white box, on three levels: functional, unit and integration, using test data in the YAML format;
• It’s adaptable to the developer’s needs, providing both high-level tools generating powerful reusable code, and the possibility to work on a lower-level;
• It provides an initial structure for Rails applications, encourages code reuse, readability and refactoring, discourages code duplication;
• It’s open source and platform independent.

Following Rails recommendations, the design pattern on which our medical-social networking application is built is MVC and the development methodology is agile and incremental, with automated tests developed for every development iteration and code refactoring stage. The main shortcoming of the application’s current state is the lack of real user requirements: specifications were developed based on common social network services, at a time when the emphasis fell on approaching Rails as an experimental web development platform rather than orienting the application towards a specific field. However, the MVC pattern and the complete modularity approach (based on extreme code refactoring for maximum task separation between the M, V and C layers), in the agile development context, has permitted swift adjustments in specifications and an elegant migration of the application between domains: having it initially used as a web tool providing basic statistics (correlation and clustering, mainly, with plans for developing it in a full-fledged data-mining web tool for social networks), in the current state the application was specialized for two domains – e-commerce (as a product recommendation system) and e-health (as a medical social network service). Further efforts will be invested in developing a supermodel (on the Model layer of MVC) which would permit switching the application between various models and, implicitly, various domain semantics. This paper is strictly oriented on presenting the current version of the socio-medical version, which is in acceptance testing stage in several psychological cabinets.

Automated testing has been applied intermittently, using the three levels of testing provided by the Rails framework:
• Unit testing, applied on the Model layer of MVC, especially for model validation;
• Functional testing, applied on the View (for black-box user interaction simulation) and Controller (for white-box variable tracing and processing) layers of MVC;
• Integration testing which, in the Rails context, implies cross-controller use cases.

Rails maintains three versions of the database: deployment, development and testing, associated with three environments in which the application may run. This greatly facilitates agile development by completely separating testing tasks from development tasks and “real-life” maintenance for the deployed version. Also, all Rails automated tests are transactional in a semi-ACID sense (they don’t interfere, they don’t cause inconsistency but conveniently lack durability - the database is reset at the end of a test).

Application deployment is still an issue for Rails. The current Rails version recommends a “collaborative” configuration involving a traditional HTTP server for static files (Apache), a number of specialized HTTP servers for dynamic Rails pages (Mongrel instances) wrapped under a Mongrel Cluster, a proxy balancer and software for version control. Even if such a deployment configuration provides the proper stability and performance, we expect future versions of Rails to provide solutions easier to maintain.

4 Design aspects

The application architecture respects the structure defined and recommended by the framework:

The View layer is built around an Embedded Ruby (HTML and HTML generators) template filled with the forms and information specific to each view. Views are structured with HTML, partials (reusable HTML code) HTML generators (called “helpers” - reusable functions that generate HTML/JavaScript code). Although helpers may contain practically any reusable code modules, Rails discipline recommends that they should only serve the View layer. Any data processing should be managed by controllers or pushed inside the model classes.

The Controller layer is defined by the controllers – groups of related views. From a linguistic perspective controller granularity should be set so that a controller represents an entity (a noun), while a view represents an action (a verb) [3]. The role of a controller is to:
• exchange data with the views through instance variables;
• query the models;
• intermediate form validation, by moving data and messages between the model validation rules and the views;
• provide granularity for error isolation during functional testing,
which is applied on a controller-level.

![Diagram of Rails application structure]

- **Will_paginate**, a library for paginating query results (record sets) in the views, compatible with Ferret queries.

**The Model layer** is defined by ORM models which are classes mapped on database tables or files. The models provide complete abstraction of the data storage implementation, by using ActiveRecord queries which encapsulate all the platform-specific querying details, including Ferret searching. Even database structure management is hidden beside ActiveRecord migrations, which are sets of functions that alter the database structure in a transactional manner, in order to provide consistency and database versioning.

The application provides networking services for two types of users: doctors and patients. Based on many-to-many relationships defined on the model layer, the application will host the following types of networks:

1. Patient-to-patient;
2. Doctor-to-doctor;
3. Doctor-to-patient.

The services provided for network members are:

1. Basic services: searching, browsing, peer-to-peer communication (e-mail system based on Rails ActionMailer); [1][3]
2. One-to-many communication (blogging using Rails’ support for AJAX and Restful resources);
3. Statistical tools on network-level or community-level: similarity indicators (using, in the current state, only euclidean distance and Pearson correlation), recommendation systems and clustering. This allows doctors to conduct their own studies, based on the chosen attributes and datasets.

### 5 Conclusion

The experience of developing the proposed application has proved that Rails is an essential tool for increasing Web productivity on long term, through separation of concerns and modularity, especially useful when it comes to switching a polymorphic application between various similarly structured domain-specific models.

From an outer perspective, that of a casual user, Rails in itself doesn’t bring a new experience but provides support for AJAX-improved usability by promoting use of Prototype and Script.aculo.us (automatically installed in the application skeleton generated by Rails).
We expect that the release of Rails 3, which will absorb another similar framework with higher performance and flexibility (Merb), will ease the deployment process and will bring Rails closer to the mainstream in terms of hosting availability. Further efforts will be invested in separating the statistical tools as Ruby gems in order to transform the application in an on-line data mining tool for social networking.

6 Acknowledgement

This paper represents an intermediary result of the research project “E-marketing and software quality management based on eye-tracking diagnosis”, code 2443/2008 funded by the National Research Program PNCDI-IDEI, managed by Lect. Robert Andrei Buchmann Ph.D.

References:
[10] Ezra Zygmuntowicz, Bruce Tate, Clinton Begin, Deploying Rails Applications, Pragmatic Bookshelf, 2008
[16] Rețeaua Info-Sănătate ro.wikipedia.org/wiki/Re%C5%A3eaua_Info-S%C4%83n%C4%83tate