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ONLINE SCHEDULING FOR THE PRIVATE CLINIC "OUR DOCTOR" BASED ON WEB 2.0 TECHNOLOGIES

L. SANGEORZAN[1] **M.VARCIU**[2]
R. PEŞTE[1] **L. ROGOZEA**[2]

Abstract: *In the Health Services, computers are being introduced not only to providing direct care for the patients but also to obtain some important information regarding the possibility to schedule at a doctor. The paper presents a site, "Our Doctor", which permits to make an appointment online, to a doctor in a private clinic. Through this application the patient is able to schedule at a doctor and especially at a time convenient for him, depending also on the doctor's agenda. Using Web 2.0 technologies, the patient will be reminded by email, 24 hours before presenting to the doctor, the schedule chosen.*

Key words: *PHP, AJAX, jQuery, Java Script, Database.*

1. Introduction

In the century of speed and information, everybody wants to solve personal problems as quickly as possibly by giving a mouse click [4, 5, 9, 11]. The Internet is providing a range of solutions and useful information in all fields, so in terms **2.** health. On the Internet there are listed some private clinics and this can be accessed easily. Patient's desire is to schedule at a doctor when time allows him. The application called "*Our Doctor" ("Medicul Nostru").* The application comes just support the patient in order to be able to make online programming. The application uses at implementation level the server application PHP. The language PHP has a special flexibility which permits to be used with other technologies. These languages/technologies make possible to obtain remarkable results. The written application in PHP will be posted on a Web server and will be accessible to any user after authentication.

2. Theoretical aspects

WEB 2.0 is a term describing the trend in the use of word wide Web technology and Web design that aims at enhancing creativity, information sharing and communication among users [6]. This technology uses the Internet / Intranet as a platform and includes some of the following techniques: Cascading Style Sheets, AJAX, Flex, HTML, JavaScript, PHP [3, 10] and so many others.

[1] Department of Computer Science, *Transilvania* University of Brasov.
[2] Department of Medicine, *Transilvania* University of Brasov.

2.1. Technologies

2.1.1. JavaScript

JavaScript can function both as a procedural and an object oriented language. Objects are created programmatically in JavaScript, by attaching methods and properties to otherwise empty objects at run time. Once an object has been constructed, it can be used as a blueprint (or prototype) for creating similar objects. JavaScript language has a great advantage; it is a dynamic, interpreted, prototype-based language making it easy to use and flexible [8].

2.1.2. PHP

PHP (Personal Home Page and know PHP Hypertext Preprocessor) is a server-side scripting languages and uses clear, simple syntax; that makes it easy to read and understand, and encourages rapid web application development. PHP can be used on all major operating systems and has also support for most of the web servers [2, 12].

2.1.3. HTML

HTML (Hypertext Markup Language) is designed for delivering a document on the Web. It is the predominant markup language for the web and includes formatting control and syntax to include objects and any type of external element. HTML is compatible with all major operating systems and software [12].

2.1.4. Database

A database is a collection of data arranged for ease and speed of search and retrieval (American Heritage Dictionary of the English Language).

It is a difference in a database and a database management system (DBMS).

A DBMS is a special program for storing and retrieving data, such as Microsoft Access, witch requires more training than using a spreadsheet or word processor.

SQL is a database computer language designed for the retrieval and management of data in relational database management systems (RDBMS), database schema creation and modification, and database object access control management. Many database products support SQL with proprietary extensions to the standard language. The core of SQL is formed by a command language that allows the retrieval, insertion, updating, and deletion of data, and performing management and administrative functions. SQL also includes a Call Level Interface (SQL/CLI) for accessing and managing data and databases remotely. MySQL is a relational database management system (RDBMS) which has more than 11 million installations. The program runs as a server providing multi-user access to a number of databases [11].

2.1.5. AJAX and jQuery

AJAX (asynchronous JavaScript and XML), is a group of interrelated Web development techniques used for creating interactive Web applications. A primary characteristic is the increased responsiveness of the Web pages achieved by exchanging small amounts of data with the server behind the scenes so that entire Web pages do not have to be reloaded each time there is a need to fetch data from the server. This is intended to increase the interactivity, speed, functionality and usability of the Web page [12]. Figure 1 shows a comparison between the traditional Web application model and the AJAX model [7, 8].

Ajax is based on open standards, a cross-platform technique usable on many different operating systems, computer architectures, and Web browsers. There are free and open source implementations of suitable frameworks and libraries.

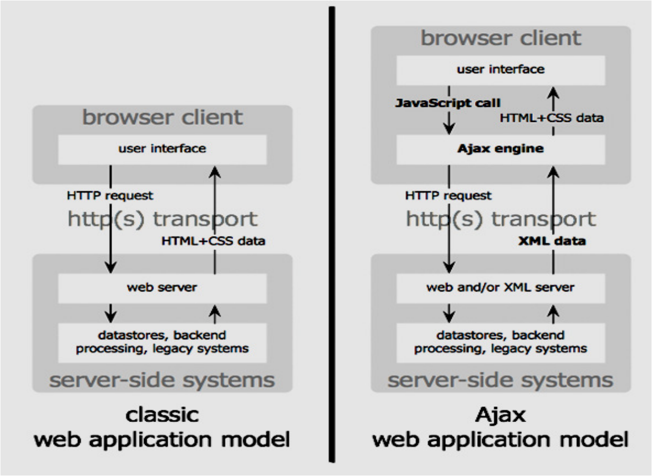


Fig.1. *Comparison between the traditional Web model and the AJAX model [3]*

Ajax allows the creation of better, faster and more user-friendly Web applications. JQuery is a JavaScript library. It allows the creation of animations, communications to server requests, document transversing and event handling.

2.1.6. Advantages of Web applications

Web applications have certain advantages over classic desktop applications: they are easily accessible from anywhere in the world using a computer with an Internet connection, they can be compatible with any client operating system and browser so that anyone can use the same application and there is no need to install anything on the client computer to make the application work because the application is run directly from the server with the application interface supplied through a Web browser like any other Web page. The classic Web application model works as follows: most user actions in the interface trigger an HTTP requesting a Web server. The server performs some processing – retrieving data, talking to various legacy systems – and then returns an HTML page to the client. It is a model adapted from the Web's original use as a hypertext medium, but what makes the Web good for hypertext does not necessarily make it good for software applications. By contrast, an AJAX application eliminates the start-stop-start-stop nature of interaction on the Web by introducing an intermediary — an Ajax engine — between the user and the server. Instead of loading a webpage, at the start of the session, the browser loads an AJAX engine written in JavaScript. This engine is responsible for both rendering the interface the user sees and communicating with the server on the user's behalf. The AJAX engine allows the user's interaction with the application to happen asynchronously — independent of communication with the server.

3. Case study

The proposed software is a WEB application uses JavaScript and jQuery as the programming language. The server side scripting language chosen is PHP. The database is created using SQL and MySql. The application is granted for two categories of users: the administrator and the user (patient).

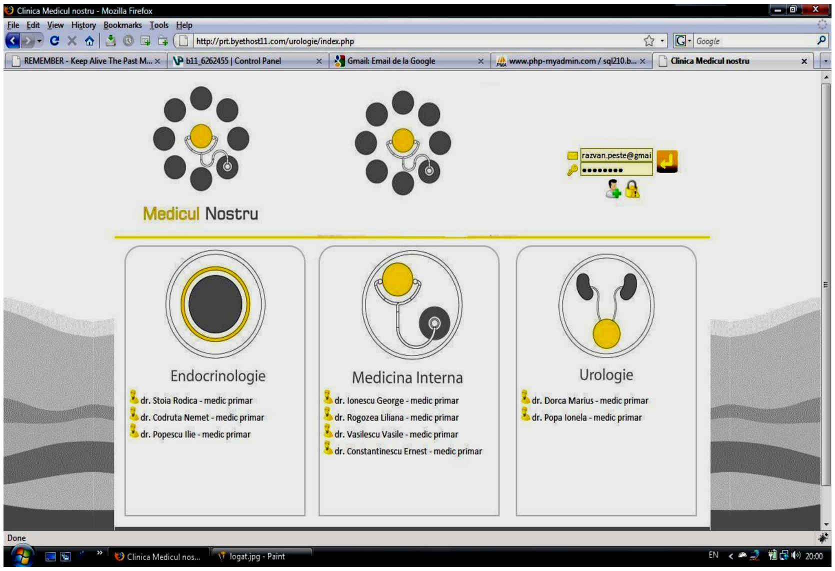
The administrator is the person which has access to all parts of the application allowing him to manage the database information.

The user is a patient, which has access to certain parts of the application, after authentication.

While creating the software system "Our Doctor" (Fig.2), we take into consideration the following characteristics:

Modular construction, apt to be easily extended and also used in other private clinics;

Dividing the application in windows based on the required functionality. Each window is loaded into the application interface independent of each other.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Clinica Medicul nostru
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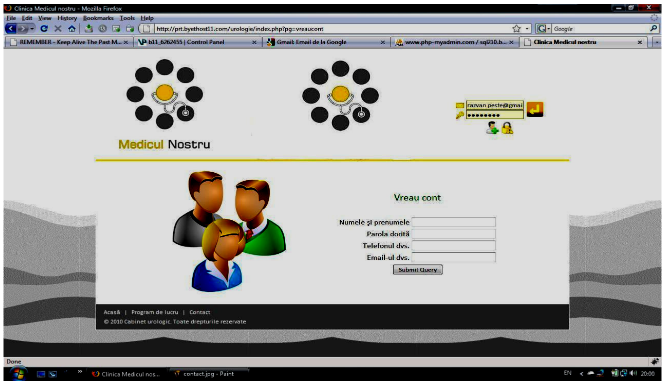
Endocrinologie
dr. Stoia Rodica - medic primar
dr. Codruta Nemet - medic primar
dr. Popescu Ilie - medic primar
Medicina Interna
dr. Ionescu George - medic primar
dr. Rogozea Liliana - medic primar
dr. Vasilescu Vasile - medic primar
dr. Constantinescu Ernest - medic primar
Urologie
dr. Dorca Marius - medic primar
dr. Popa Ionela - medic primar
Done
Clinica Medicul nos...
logat.jpg - Paint
EN
20:00

Fig. 2. *The main Interface of Our Doctor (Medicul Nostru)*

The main Interface (Fig.2) contains the following links to three medical practices:

- Endocrinology (Endocrinologie);
- Internal Medicine (Medicina Interna);
- Urology (Urologie).

Each links allow, after authentication (Fig.3), the choice of a doctor, which is made in concordance with the doctor's schedule. Also CV can be seen for every doctor to know it skills and competences (Fig. 4).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razvan.peste@gmai
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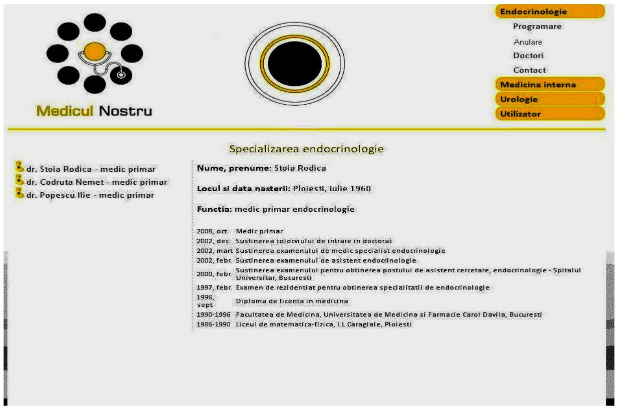
Vreau cont

Numele şi prenumele
Parola dorită
Telefonul dvs.
Email-ul dvs.
Submit Query

Fig. 3. *The window with the authentication /registration*



Specializarea endocrinologie

dr. Stoia Rodica - medic primar
dr. Codruta Nemet - medic primar
dr. Popescu Ilie - medic primar

Nume, prenume: Stoia Rodica

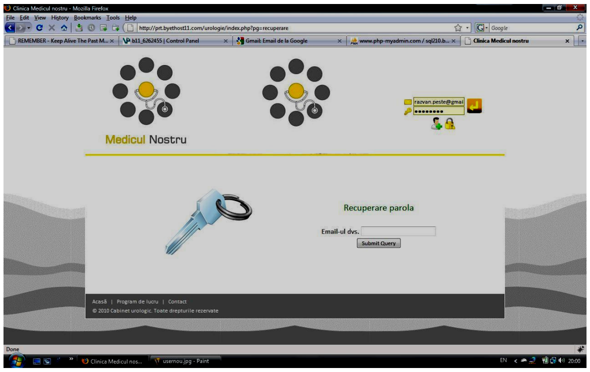
Locul si data nasterii: Ploiesti, iulie 1960

Functia: medic primar endocrinologie

2008, oct.	Medic primar
2002, dec.	Sustinerea colocviului de intrare in doctorat
2002, mart	Sustinerea examenului de medic specialist endocrinologie
2002, febr.	Sustinerea examenului de asistent endocrinologie
2000, febr.	Sustinerea examenului pentru obtinerea postului de asistent cercetare, endocrinologie - Spitalul Universitar, Bucuresti
1997, febr.	Examen de rezidentiat pentru obtinerea specialitatii de endocrinologie
1996, sept	Diploma de licenta in medicina
1990-1996	Facultatea de Medicina, Universitatea de Medicina si Farmacie Carol Davila, Bucuresti
1986-1990	Liceul de matematica-fizica, I.L.Caragiale, Ploiesti

Fig. 4 . *The window with the doctor’s CV*

Each user (patient) has it password and if he forgot the password he has the possibility to recover it (Fig.5). In Figure 6 on can see the possibility to choose a medical practice, and for each medical practice on can choose from am menu list: the schedule, schedule cancellation, doctor, contact.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© 2010 Cabinet urologic. Toate drepturile rezervate
Done
Clinica Medicul nos...
usernou.jpg - Paint
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20:00

razvan.peste@gmai
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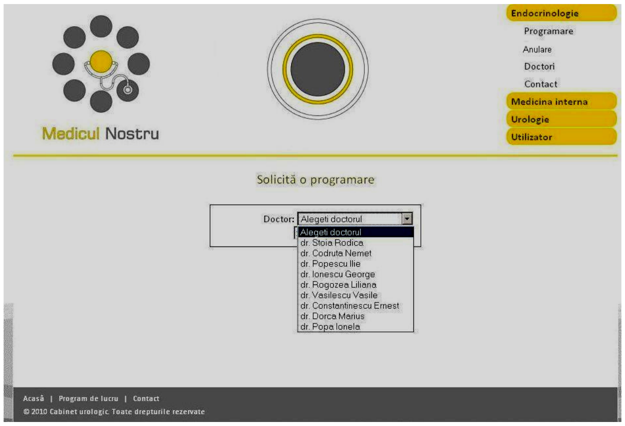
Recuperare parola

Email-ul dvs.
Submit Query

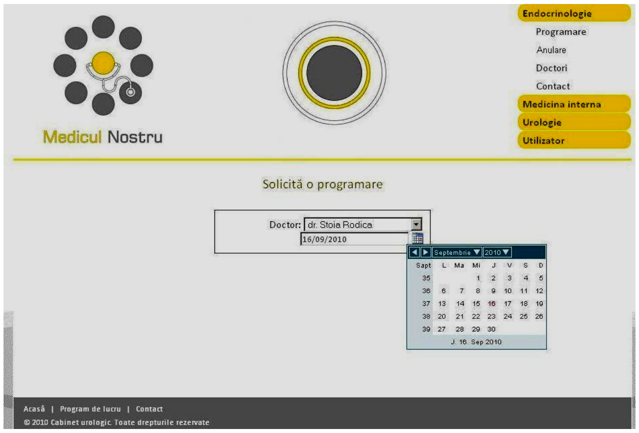
Fig. 5. *The window with the recover of the password*



Doctor: Alegeti doctorul

Fig. 6. *The window with medical practices Endocrinology*

The user has the possibility to choose one data for a medical consultation, by ticking in a calendar that appears on the screen (Fig.7).



Doctor: dr. Stoia Rodica
16/09/2010

Sapt	L	Ma	Mi	J	V	S	D
35			1	2	3	4	5
36	6	7	8	9	10	11	12
37	13	14	15	16	17	18	19
38	20	21	22	23	24	25	26
39	27	28	29	30			

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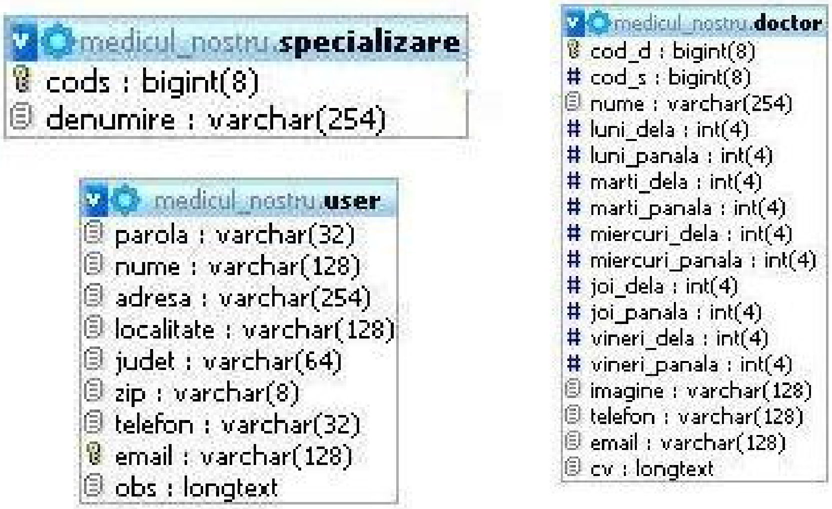
Fig. 7. *The window for medical consultation (practices Endocrinology*)

3.2. Database structure

Considering that the application requires database management, we have to create the model of the database according to the entity relationship method [1, 12]. Figure 6 shows the database tables. The information that can be found in the database, stored in the three tables, is related to: the three medical practices (**specializare**), the doctors (**doctor**) and the patients' (**user**).



```
medicul_nostru.specializare
cods : bigint(8)
denumire : varchar(254)
```

```
medicul_nostru.user
parola : varchar(32)
nume : varchar(128)
adresa : varchar(254)
localitate : varchar(128)
judet : varchar(64)
zip : varchar(8)
telefon : varchar(32)
email : varchar(128)
obs : longtext
```

```
medicul_nostru.doctor
cod_d : bigint(8)
# cod_s : bigint(8)
nume : varchar(254)
# luni_dela : int(4)
# luni_panala : int(4)
# marti_dela : int(4)
# marti_panala : int(4)
# miercuri_dela : int(4)
# miercuri_panala : int(4)
# joi_dela : int(4)
# joi_panala : int(4)
# vineri_dela : int(4)
# vineri_panala : int(4)
imagine : varchar(128)
telefon : varchar(128)
email : varchar(128)
cv : longtext
```

Fig. 6. *Database tables*

4. Conclusion

This software application has been created as to be easily scalable and adaptable (on request) to other medical practices or clinic. The application uses PHP server-side scripting language, MySQL database, all of these technologies are open source, and allow easy implementation on any server with any operating system. The application is very dynamic; it allows obtaining the information about the schedule at a certain doctor in real time. Each patient will be warned 24 hours before, about his clinic schedule, with an email sent automatic by the server each patient will be warned 24 hours before, about his clinic schedule, with an email sent automatic by the server.

Acknowledgements

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