INTERNET DATABASE OF SCOLIOSIS SCREENING

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Abstract

In Gerinco2 project there are a lot of examinations. To store data of examination a new database created with Internet technology. The aim of database is to screen to explore of scoliosis and follow treatment ill of children.

Keywords: scoliosis screening, Internet, MySql, artificial intelligence

1. Method, the structure of database

There are two main parts of database. One of them is the database with its defined structure of a server. The other is a client program for doctors and assistants. The data structure is realized in $MySQL^1$ system which is free of charge and it is able to serve more users in one time. The structure of database is shown on the *Figure 1*.



Figure 1. Structure of the database

Structure of the database ensures that the data traffic is as low as possible. Because of the used method the system is usable even on a week Internet connection. The pictures are stored on the

server machine. Users download only the needed pictures. The downloaded pictures are stored in the client machine and they downloaded again only the case of changing.

There are four tables in database there. Data institutes and examiners authorized to use the system are stored two separate tables. The system uses different levels of authority and password so everybody can use only his own information.

The data of patients and the examinations are stored in the other two tables. In case of pupils the data of school and the class are stored. There are special identification numbers in the system so the personal identification data are not used. Results of all examinations are in the examination table.

2. Result, the database management software

System specification					
Supported operating system:	Windows XP				
	Windows 7				
Needed software:	MySQL ODBC Connector 5.1				
Processor:	1GHz Pentium processor				
RAM:	256 MB				
Hard disk:	50 MB free space (suggested plus $500 MB$ for the				
	downloaded pictures)				
Display:	1024 x 768 high color, 32-bit				
Internet connection is needed for	usage of the system.				

2.1 Setup and upgrade

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 $GDB_setup.exe$ ($\bigcirc GDB_setup.exe$) program installs the software in an interactive way. The user can define the position of the program in the machine and the Start menu. Default position of the program is C:\Program Files (x86)\GDB\. (*Figure 2.*)

🕞 GDB Telepítő 📃 🗉 🛋	🕝 GDB Telepítő 📃 🗉 💌
Telepítési hely kiválasztása Válassza ki a(z) GDB telepítésének mappáját.	Start menü mappa kijelölése Start menü mappa kijelölése a program parancsikonjaihoz.
A GDB a következő mappába kerül. Másik mappa választásához kattintson a Tallózás gombra. Kattintson a Tovább-ra a folytatáshoz.	Jelöljön ki egy mappát a Start menüben, melybe a program parancsikonjait fogja elhelyezni. Beirhatja új mappa nevét is.
Telepítés belve Ct/Program Files (x86)/CDB Tallózás	Accessories Accessories Administrative Tools Adobe Adobe Design Premium CS5 AGFAnet Android SDK Tools Android SDK Tools ANSYS, Ir.C. License Manager ADSYS, Ir.C. License Manager
Heivigeny: 1.am/ Szabad terület: 8.1GB Nullsoft: Telepitőrendszer v2.46	Blender Foundation Blender Foundation Blender Foundation Blender Foundation Comparison all helyezés Nullsört Telephörendszer V2.46
< <u>Vi</u> ssza <u>Tovább</u> <u>M</u> ágse	< <u>Vi</u> ssza <u>Ielepités</u> <u>Mégse</u>

Figure 2. The setup dialog

After setup there is an icon in the Desktop and the Start menu to start the program. The login panel of the program is shown in *Figure 3*.



Figure 3. The login panel of GDB

The program is able to upgrade itself. After every ten usage the application searches for the newer version on the server. The needed version of MySQL ODBC driver also can be downloaded. After the log in we can use the software. The language of the communication is Hungarian.

2.2 Data of examiners

Data of examiners are username, name, qualification, status, address, phone number, e-mail, authorization, status (*Figure 4*). Examiners are able to change their own data (*Figure 5*.).

A vizsgáló személy és a viszgálat helye	l									
Név	Végzettség	Beosztás	Cím		Telefon	E-mail				
Teszt	Teszt	Teszt	Teszt		Teszt	Teszt				
Data of examiners										
Vizsgálat helye: Vizsgálóhely neve										
BME - MOGI										
Heim Pál Gyermekkórház Ottopédiai Klinik a										
Salus Ortopédtechnika										
D1 C	•									
Place of exa	amination									
						Tovább a személyeki	hez			
		*					_			
Szűrés:		-				Kilépés				

Figure 4. Data of examiners

A vizsgáló személy és a	viszgálal helye	
Vizsgáló személy:		
Felhasználónév	Teszt	
Név	Teszt	
Végzettség	Test	
Bensztás:	Teszt	
Cím	Teszt	
Telefon	Test Changing data of examiner	
E-mait	Teszt	
Jogosultság:	Orvos	
Státusz:		
Ment Szűrés: Teszt	és Mégrem	
Vizsgálat helye: Vizsgálóhely neve BME - MOGI Heim Pá Gyermekkk Ontopédia Kinka Salus Dinopédiachni	dóház b ka b	
Szűrés:		

Figure 5. Modification of personal data of examiners

We can continue with the patient data.

2.3 Data of patients

Panel of patients data has three parts. Name of patients are in the left side. There is a filtering possibility to help the searching process. (*Figure 6.*)

zemély adatai								
Személy	adatai:							
Azon	Név	Szül dátum	^	Név	Texat			
- 3	_Teszt	2000.07.14.				_	Módosítás	
41	Abádi Gergely	1900.01.01.		Szul.datum:	2000.07.14.			
11	Ágh Anna	1900.01.01.		TAJ:	000-000-000		Új személy felvétele	
10	Bakó Rebeka	2001.05.08		Anvia neve:	Teszt Teszt			
73	Bálint Barbara	1998.12.03.	1	Cold% to before an form	001111111 Detieret	a2 d.	Törlés	
12	Bárány Melinda	1900.01.01.		Szulo telefonszama:	Patient	s a	ala	
13	Both Vivien	1900.01.01.		Irányítószám:	1111			
14	Bozó Márton	1900.01.01.		Település:	Teszt			
15	Burszán Fruzsina	1900.01.01.	-	Circu.	Teast			
104	Csigi Cintia Réka	1998.05.16.		UIM:	16520			
84	Csurgai Vivien	1997.01.16.		Iskola neve:	Teszt Gimnáium			
93	Czeizer Anna	1997.09.02		Osztály:	III.			
86	Danda Andrea	1996.08.17.						
16	Fodor László	1900.01.01.						
1/	Foldvari Marton	1900.01.01.		A bejelentkezett fe	łhasználó:		Adatok módosítása	
18	Fullajtar Akos	1900.01.01.		Adminisztrátor				
19	Gerhat Lilla Marikattie IIIS	1900.01.01.		A vizsgálat helve:	User info	rm	tionaleneti fáilok törlése a számítónénről	
20	Lionczy Vivien	1900.01.01.		BME - MOGI	User mit	л III	LIOT	
21	Gorog Rita	1900.01.01.					E-theory (16 Linds and an	
57	Grósz Gabor	2011.11.22					reinasznaló kijelenikezese	
22	Hajdú Petra	1900.01.01.						
00	Hamala Anita	1997.06.13.						
95	Hegedus Narolina	1997.10.31.	-					
32	Heicz Boglatka Lilla	1998.01.14.	-					
8/	Holio Zsombor	2000.05.01.	-					
89	Horvath Petra	1000.01.01	-					
23	Hudak ∠solia	1000.01.01	-					
24	Jani Bogiarka	1000.01.01	-					
25	Jozser Fruzsina	1000.01.01	-					
20	Junasz vanga Kamanujaski Casasa	2012.02.07						
106	Kamernyiczki usengie Kias Davathus	1996.06.20					Tovább a vizsgálatokhoz	
0.0	Kiss Dorottya Kisa Janka Méra	2009.06.12	-					
Szűrés:	Niss Jailka Hula	2000.06.12	•				Kilépés	

Figure 6. Patients' panel

Data of the selected patient (name, date of birth, name of mother, phone number, address, school, class) are shown in right side on the panel. There are possibilities to change or delete the patients.

User name and place of the examination are the user information as they were defined at login phase.

2.4 Data of examinations

In the right side of dialog we can see the examinations. There is a possibility to choose an examination or create a new one. The selected examination data are shown in the dialog and we are able to modify or delete the data if we have enough rights. (*Figure 7.*)



Figure 7. Results of examination

There are a lot of examination can be stored on database: the main data of the patient, X-Ray pictures, moving the hip, moiré and Kinect pictures.

2.4.1 Main data of examinations

The data can be stored are data of left rib hump, right rib hump, left calcaneus, right calcaneus, left knee, right knee, kyphosis, lordosis, shoulder, shoulder point, asymmetry of body-hand, deformity of chest paravertebralis muscle portrusion, left compensation, right compensation, data of legs



Figure 8. Main data

2.4.2 xRay pictures

Panel of X-Ray there is a possibility to store and analyze the recorded pictures. (Figure 9.)



Figure 9. The X-Ray panel

In the left side there are some input field to store the diagnosis (Scoliosis, Scheuermann), the type of illness the Lenke classification² factor and other data of vertebras (Cobb angle, rotation³).

With help of a special function there is a possibility to analyze X-Ray pictures. On the *Figure 10* there are some moveable line segments there with moveable endpoint of A, B, C, D, E, F and G. Of course the picture can be zoomed and rezoomed.



Figure 10. Analysis of X-Ray picture

The angle between the AB and CD sections defines the Cobb angle, and E, F and G sections defines the rotation, depend on the F (*Figure 11*).



Figure 11. The Cobb angle (a,) and the rotation % (b,)

2.4.3 Hip movement

On the Hip movement panel the user can define a lot of test data as we can see on the Figure 12.

	Ι	eft Site.		Right Site			
Ext/Flexio:	10	0	110	10	0	125	
Thomas test:	0			0			
Abd (90°):	35			35			
Abd/Add (0°):	40	0	30	40	0	30	
BRo/KRo (90°):	20	0	30	25	0	30	
BRo/KRo (0°):	25	0	10	40	0	15	
Antetorsio:	5			5			

Figure 12. Hip movement data

2.4.4 Moiré (Kinect) analysis

Either on the traditional moiré⁴ pictures or Kinect procedure⁵ there is a possibility to measure POTSI (POsterior TrunkSymmetry Index⁶) visible in *Figure 13*. or the Gerinco2 project evaluated Prediag method⁷ visible on *Figure 14*.



Figure 13. POTSI analysis



Figure 14. The Prediag analysis

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