
Management of data resulted from vibration measurements through relational databases

Gilbert-Rainer GILLICH

“Eftimie Murgu” University of Reșița, Romania
P-ta Traian Vuia 1-4, 320085 Reșița, raini@uem.ro

Viorel – Ionuț BIZĂU

“Eftimie Murgu” University of Reșița, Romania
P-ta Traian Vuia 1-4, 320085 Reșița, v.bizau@uem.ro

Nicoleta GILLICH

“Eftimie Murgu” University of Reșița, Romania
P-ta Traian Vuia 1-4, 320085 Reșița, raini@uem.ro

Ovidiu VASILE

“Politehnica” University of Bucharest, Romania
Splaiul Independenței 313, 060042 Bucharest, vasile@cat.mec.pub.ro

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Abstract: - Measurements of natural or manmade vibrations are often done, resulting information directly linked to the vibration parameters (acceleration, velocity, displacement, frequency, etc.) or to the environment (operator, place, time, equipment, meteorological conditions, etc.). Usually the information is stored in files with specific extensions, but it is also possible to use common extensions like .txt or .xls. This approach is practical if the data is used or processed on one or few computers. Even in this case it is not easy to find correlated information in a short time. Databases and especially relational databases offer a strong tool in data management, making the process of searching or selecting easy and fast. An application using relational databases to handle information resulted from vibration measurement, developed by the authors, is presented in this paper.

Keywords: relational databases, vibration

1. ABOUT RELATIONAL DATABASES

One of the most powerful tools computers provide is the ability to store and search data. If the data is simply organized, it forms a database. A database contains tables which are basically descriptions of types of data. First hierarchical and network databases have been developed, which are now replaced by relational databases. Here, tables in turn contain records which is the actual data. By using a common identifier between tables it is possible to "relate" one table to another. For instance, it can be realized a table that contains data about vibration parameters obtained by different pollution sources and tables that give details about the measurement conditions (name of the operator, place, time, beneficiary, address, meteorological conditions, etc.). Now, it is possible to find out very easy who made which measurement, or where are the places with the

highest intensity of acceleration, or which equipment is used more intensively. This aspect of relating data is what gives a relational database its power and the fact that the Internet supports them well convinced us to use such kind of databases.

However, the simple storage of files in folders, even if different software producers offer more and more specialized applications, can't assure the facilities described above.

What is needed to have a strong relational database? First of all, we need a computer with an operating system (e.g. Windows). Then, a server like Apache, a programming language like PHP and a management database system like MySQL, possible to be downloaded (for free) in a unitary structure: WAMP. At last, we need structured data, and this is the main point of the approach. The way how it was managed by the authors is presented below.

2. DESCRIPTION OF THE APPLICATION

The application is focused on data resulting from vibration measurements. It can be accessed by persons having different roles, such us:

- Administrator
- Programmer
- Operator
- End user

They have different access permissions, the Administrator has total control, the Programmers have restrictions to import data and the Operators have permission to upload files and process data. End users have as single permission the access to read files and see graphs.

The application can be accessed entering a *username* and a *password* in the appropriate fields in the window authentication (figure 1).

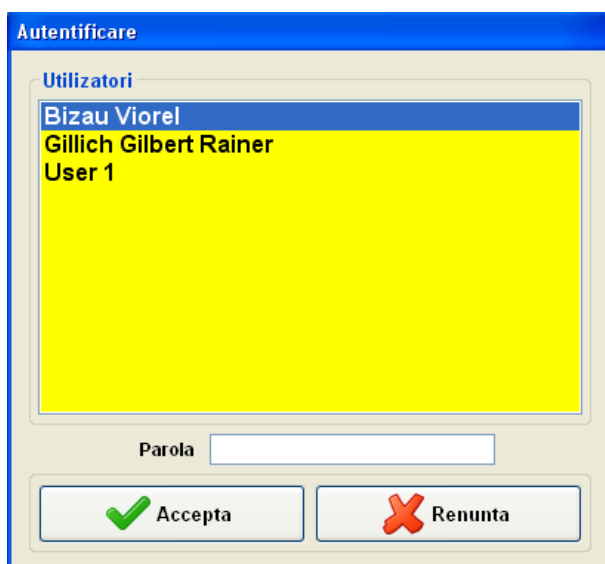
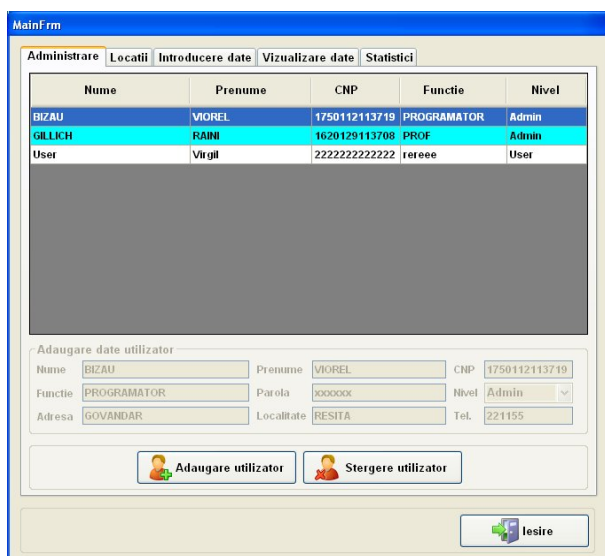


Figure 1. Access window



Nume	Prenume	CNP	Funcție	Nivel
BIZAU	VIROEL	1750112113719	PROGRAMATOR	Admin
GILICH	RAINI	1620129113708	PROF	Admin
User	Virgil	2222222222222	ireeee	User

Figure 2. User management window

The administrator can add or delete users and manage their rights trough the window presented in figure 2.

After entering the application, users (depending on the type of permission) can view or enter information about:

- the Beneficiary (name, address, location, telephone.)
- the Operator;
- the Equipment;
- the Place where the measurement is done;
- the Time when the measurement started;
- Atmospheric conditions when the measurement is done how it is presented in figure 3.

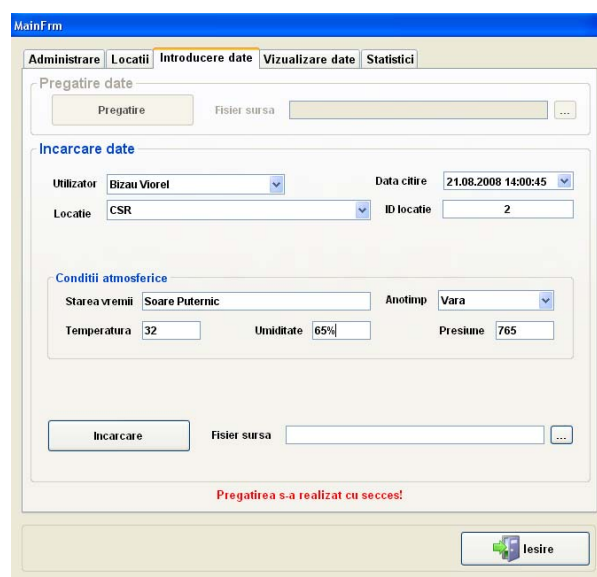


Figure 3. "Administration" window

The vibration parameters are imported in application from .txt files. These txt files are generated as a result of the measurements made in the working environment, with specific application for data acquisition (LabVIEW). It is very important that processed data is complete and accurate.

Once imported parameters in the database, they are available for all users who have the permission to use this application, ("Data Visualization" and "Statistics"), but also for other End users who connect to this database.

ID Citire	Coordonata X	Coordonata Y	Coordonata Z	Data citirii	Personal
1	-9	-64	-98	26.11.2007 10:56:41	Bizau Viorel
1	-18	-3	-6	26.11.2007 10:56:41	Bizau Viorel
1	-58	-18	-88	26.11.2007 10:56:41	Bizau Viorel
1	-11	-64	-52	26.11.2007 10:56:41	Bizau Viorel
1	19	24	31	26.11.2007 10:56:41	Bizau Viorel
1	47	16	61	26.11.2007 10:56:41	Bizau Viorel
1	68	18	80	26.11.2007 10:56:41	Bizau Viorel
1	83	37	53	26.11.2007 10:56:41	Bizau Viorel
1	58	83	30	26.11.2007 10:56:41	Bizau Viorel
1	-87	-82	-16	26.11.2007 10:56:41	Bizau Viorel
1	78	5	73	26.11.2007 10:56:41	Bizau Viorel
1	-78	-31	-55	26.11.2007 10:56:41	Bizau Viorel
1	97	21	46	26.11.2007 10:56:41	Bizau Viorel
1	-89	-40	-50	26.11.2007 10:56:41	Bizau Viorel
1	-22	-73	-82	26.11.2007 10:56:41	Bizau Viorel
1	7	94	98	26.11.2007 10:56:41	Bizau Viorel
1	-35	-48	-55	26.11.2007 10:56:41	Bizau Viorel

Figure 4. "Data Visualization" window

The application permits filtering of data loaded into the database, as shown in figure 5. Filtering is done by the following criteria:

- the Place where the measurement is done;
- the ID of the measurement (allocated automatically by the application)
- the Time when the measurement started.

Figure 5. "Search" window

The use of relational databases permits, additional to storage and filtering, the processing of information using mathematical tools. The information can later be exported to dedicated

programs like LabVIEW, MathLab, SciLAB, etc. It is also possible to post information on the Web, in form of tables or graphs, using web applications. These web applications must be able to connect to the database server and to process data; web application developers must know the structure of tables from the database.

3. CONCLUSIONS

Relational databases are a powerful tool for data management, offering facile storage and searching facilities, and a good visibility on the Web. The developed application, realized using open source programs permit a simple handling on different levels of information resulted by vibration measurements, without inducing supplementary software costs.

Another advantage of using the application based on relational databases is the fact that it makes possible the simultaneous access of a large number of users, the limitation being given by technical issues (server configuration and Internet connection), which is not possible in other way.

In future, the authors intend to realize a more complex and user-friendly application, and to extend the usability in the field of acoustics.

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