

*multimedia databases, tele-medicine,  
distance learning, interactive fast explorer*

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## **THE MULTIMEDIA FILES DEVELOPMENT IN FRAMES OF INTERACTIVE FAST EXPLORER**

The multimedia files settings need various standardisations for simplifying the application development then the files content exploration. The application platform has to provide the user with integrating tools for various data objects. The paper describes several aspects of programming techniques implemented in common platform, called Multimedia Applications Management Shell (MAMS) under Quality Repetitions Unit. This platform has been applied for training system development available by the computer workstation in wide area network.

### 1. INTRODUCTION

Many works has recently been done within Internet network resources distribution; among them multimedia databases. The multimedia applications use various graphical interfaces and rich format of graphics, animation and audio effects. Although many efforts have already been done in this field new challenge one can observe that provide the Internet technology [1], [2], [3].

The paper shows number of interfaces needed to install remote terminals using mainframe databases (via Internet services). Complexity of the database contents implies a structure of an interface that makes possible to go through the database via sequence of questions. In this way, the specified part of the database component can be extracted.

Majority of medical evidences contain ample graphics that are recorded in big computer storages. Files number with their big length need extra organisation schedules providing the data units with exploration tool allowing to check the file content in reasonable time.

Very similar mechanisms for interactive check-up of the data file are implemented for teaching purposes, where the user knowledge is checked by questions-putting unit. The data content of the file is presented to the user till his answers are not satisfactory.

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## 2. THE MAMS & QRU CHARACTERISTICS

The Multimedia Applications Management Shell (MAMS) working under Quality Repetitions Unit (QRU) have been offered. The described product has been made for Macromedia Authorware (APW) improvement, used for e-learning packages development. Complexity of the APW structure makes troubles for multimedia applications developers with obtaining satisfactory characteristics of the application to be used as self-learning package (CAL – Computer Aided Learning model), recommended for Distance Learning (DL) systems.

The discussed product consists of two parts:

- a) the application development shell,
- b) the unit for interactions quality judgment.

These units allow:

(for a)

- unifying applications structure,
- simplifying tasks for applications developer,
- controlling the applications repetition,

(for b)

- improving the interactions quality analysis
- than controlling the repetition process according to the answers results.

The MAMS shell has already been evaluated in University of Silesia Distance Learning Centre; for e-learning content development and for Distance Learning resources distribution.

The distance learning resources organisation has been indicated in Fig.1, where several abbreviation have been used, as:

**DLIE Server** – Distance Learning Interactions Evaluations for QRU unit,

**DLIE library** – set of functions for client usage that link servers of the network nodes,

**API for DLIE** – the Application Programs Interface for DLIE server.

The MAMS & QRU integrated platforms have been developed for client/server application development [5] with indicated units. The client role plays the MAMS presentation platform. Server role plays the unit QRU. For communication services the TCP/IP protocol has been implemented.

The data transmission goes round the *loop-back* via *local-host* address *127.0.0.1*. After the user is identified the MAMS (client) starts execution of the server programs.

### THE DLIE FUNCTIONS

The **screenplay** unit – is an comfortable mechanism for decision making, according to the user actions. They allow:

- a nonlinear repetition mode creation, including presentation and question frames of the application,
- running a Key's strategy [6] of the application organisation, with flexible setting of the application complexity.

The application start-up uses a **default screenplay** settings, as a main path of the application execution. After the application is completed the QRU unit judges the interactions results, for controlling the application repetition.

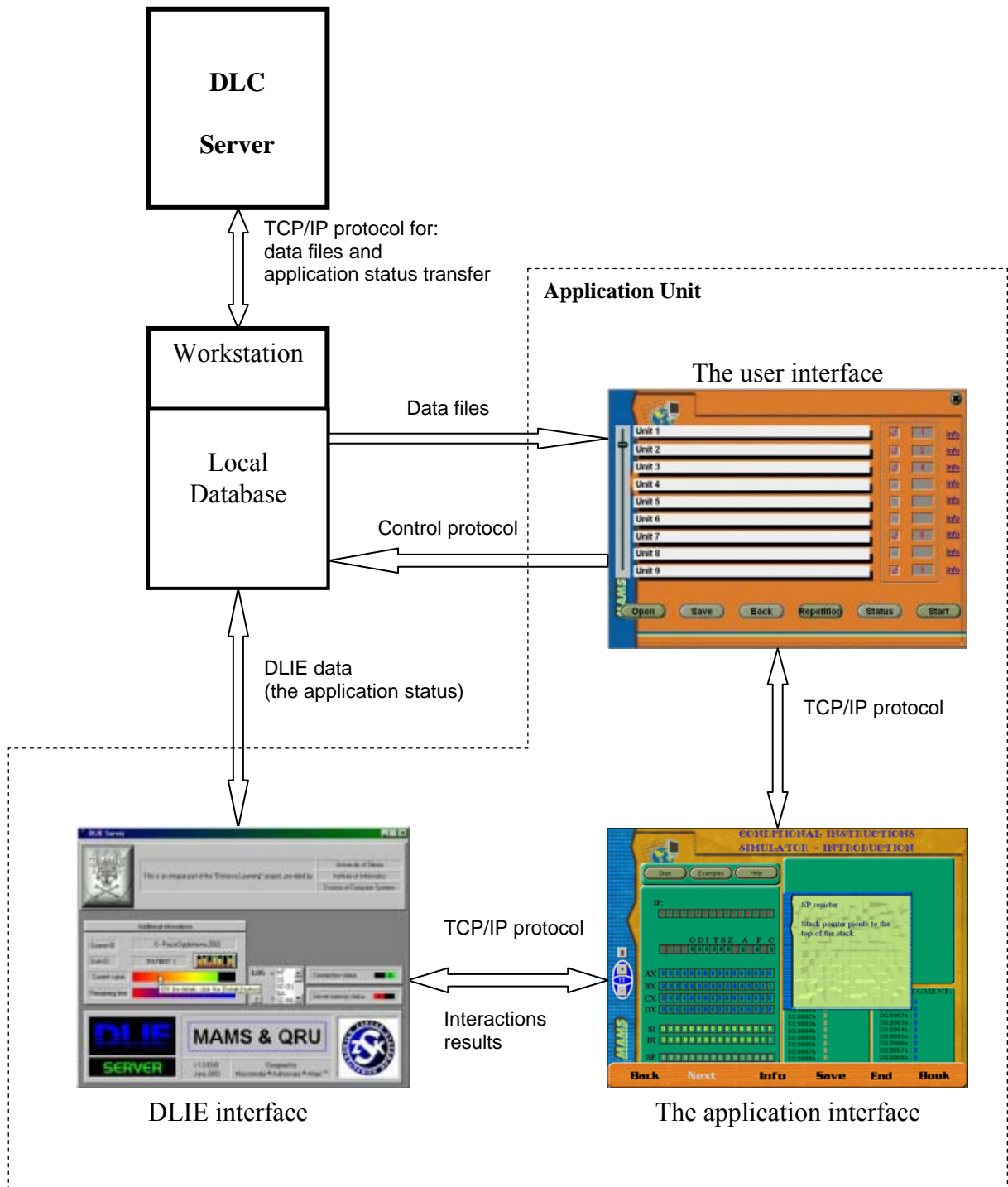


Fig.1 The distance learning resources organisation

**The nonlinear screenplay**

The QRU allows defining the repetition cycle in a very flexible way, where presentation frames are put into the selected sequence. What is more every answer can be provided by its own weight. In addition, the application developer controls the number of repetitions.

### **The answer validation**

The answer is analysed in hierarchical way. The fill-up format of the user interactions is a fundamental structure of the answer analysis. The judging unit distinguishes subsequent fields in the answer protocol. Each part of the answer is combined with an adequate data file and every file is indicated by its unique identifier with its local weight.

Instead of binary value of the answer (usually applied in well-known applications), multi-valued measures have been provided. This way the DLIE server analyses the answers using various measures and algorithms to combine the set of answers into one conclusion.

### **The conditional validation**

It is a method of interactions-control that excludes random factors of putting the answers properly in case the users try to get a successful check-up by chance.

### **The SILWS mechanism**

The SILWS (Scripts Instead of Low-Weights System) unit extracts the data for presentation sequence beyond the final answers judgement. The application complexity is controlled by the user activity “on line” by current interactions of the user.

### **The RelaxTime mechanism**

It has already been proved that the application length needs to be limited into a reasonable time, after that time a break has to be recommended. The relaxing period stimulates the effectiveness level of the course.

### **Modes of DLIE**

The application can run in several activity levels. Three of them have been implemented in these shells:

1. The CAL mode of the application, where many flexibilities are offered to the user. Question system check-up with complete set of presentation frames. Repetition mechanisms instalment for the user activities control.
2. Mode with limited repetition structure – where questions are not repeated. The questions repetition is possible in the default screen play only.
3. Mode with the user knowledge analysis – where questions are presented as a pre-test for the user knowledge check-up (the starting conditions for the application).

### **The course break point**

The user can stop his course without any restrictions in his activity validation. All values of the application variables are recorded in a status unit of the database user record.


### **THE USER INTERFACE OF DLIE**

The user interface of the DLIE server has been presented in Fig. 2, where an example data is given.

The DLIE-server produces several records describing the quality of the user interactions, as:

- a) A connection time of a client: C – Connected / D – Disconnected, with numbers expressing the server activity.

b) A memory status: F – Full, when the server database is overloaded. The letter V – Void, indicates that the database has no data (is empty).

The SILWS defines a final score of the interactions analysis. The button [Details] calls the graphic illustration  that illustrates the activity of interactions. The dialogue window presented in Fig.3 gives more details concerning the answers (activities) statistics.

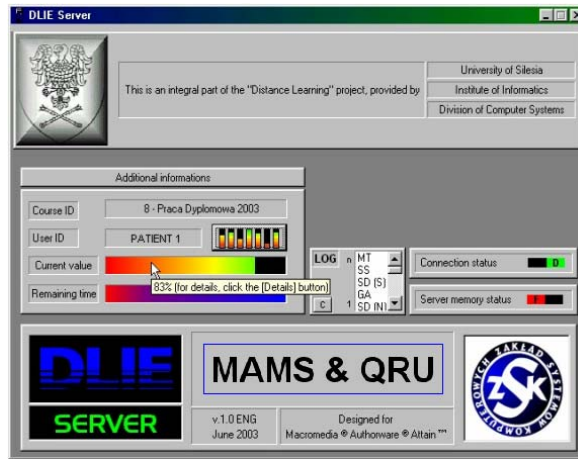


Fig.2. The DLIE-server calculations display

Each bare indicates mean value of the answers with various measures adequate to the questions modes used in the application.

**The time limit**

It indicates a passing time given for the answer (in minute resolution). The „Time Out” indicates the end of the answer time.

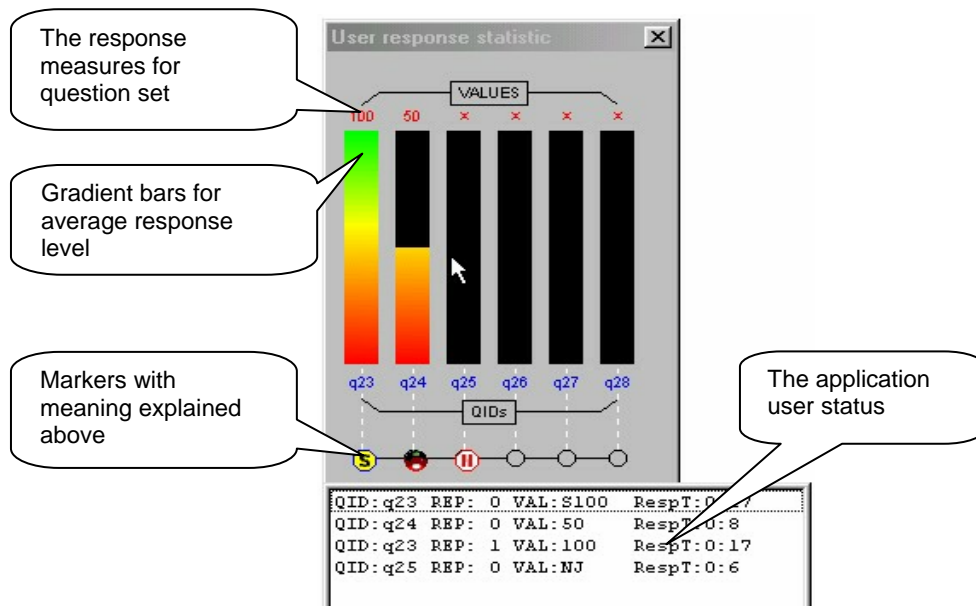


Fig.3. The user dialog window

### 3. THE APPLICATIONS EXAMPLES

After the application start-up is executed the dialog window calls for login password of the user. Then the server DLIE starts its services. The application selection shows the head window presented in Fig. 4.



Fig.4 The application head window

On the left hand side of the window three switches are available. They are used for the MAMS mode selection:

- CAI (Computer Aided Instruction) mode – where linear presentation structure is available.
- Lecture mode – where full database is given. The lecturer can choose units according to his own idea of a lecture.
- CAL (Computer Aided Learning) mode – where full-interactive units are offered.

On the right hand side the button Options is visible. It calls the configuration panel of the MAMS application (Fig. 5).

[Options] allow the application attributes settings, as:

- [Background] – with colours of the window background,
- [Sound ] – setting audio effects (active or not active),
- [Animation speed] – that allows to change a clock–time of the presentation.
- [Repetitions] – that makes repetition control features available (Fig.6):
  - Without questions,
  - Repeat not accepted questions,
  - Do not repeat questions.

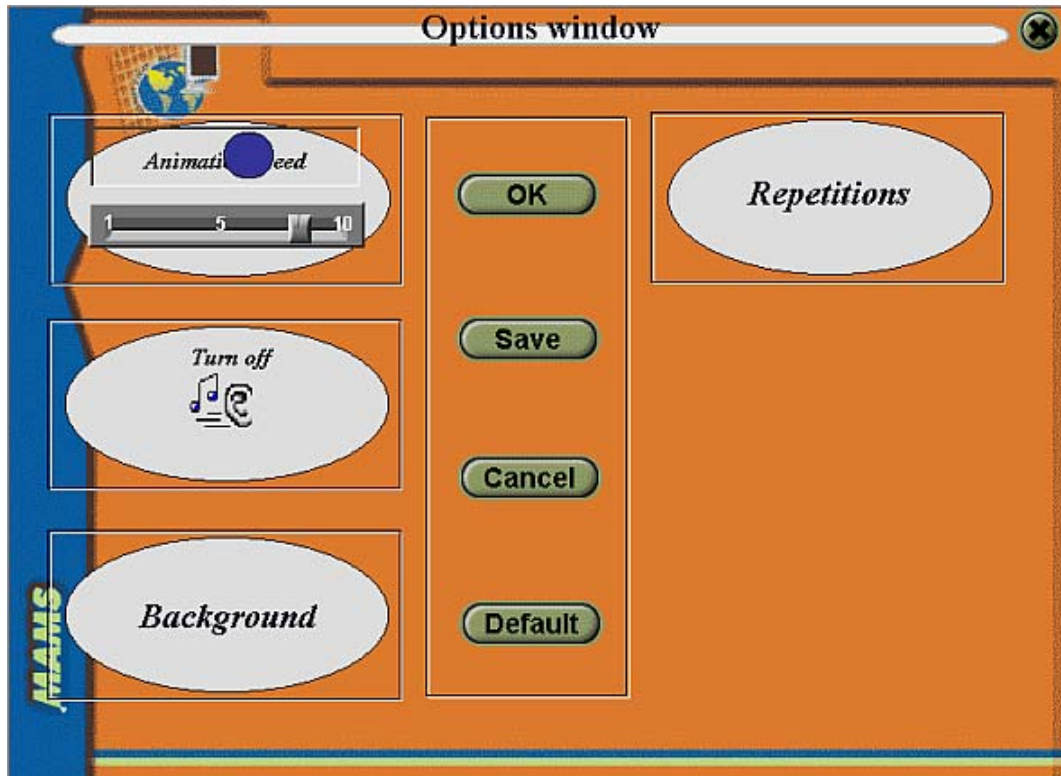


Fig.5 Configuration panel

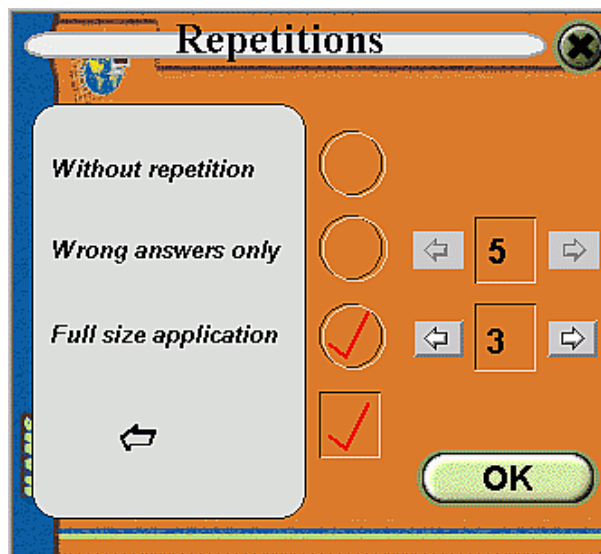


Fig.6. Repetition control interface

In each mode of the application (CAI, CAL, Lectures) the same menu interface (Fig. 7) will start the application.

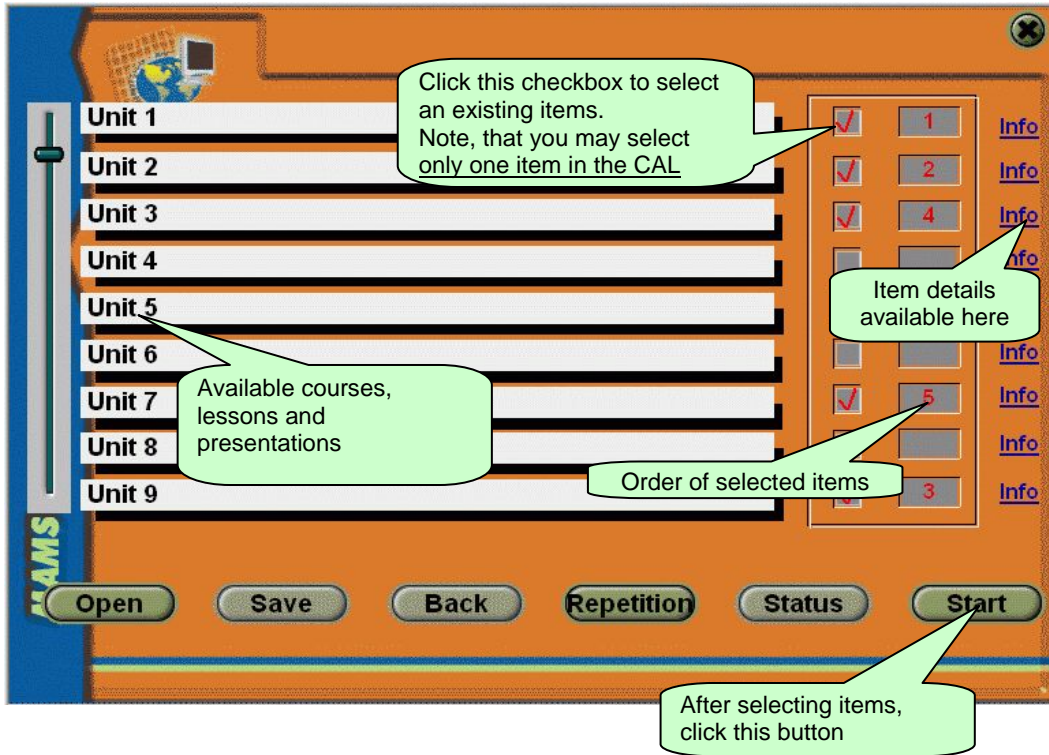


Fig.7. Application units selection interface

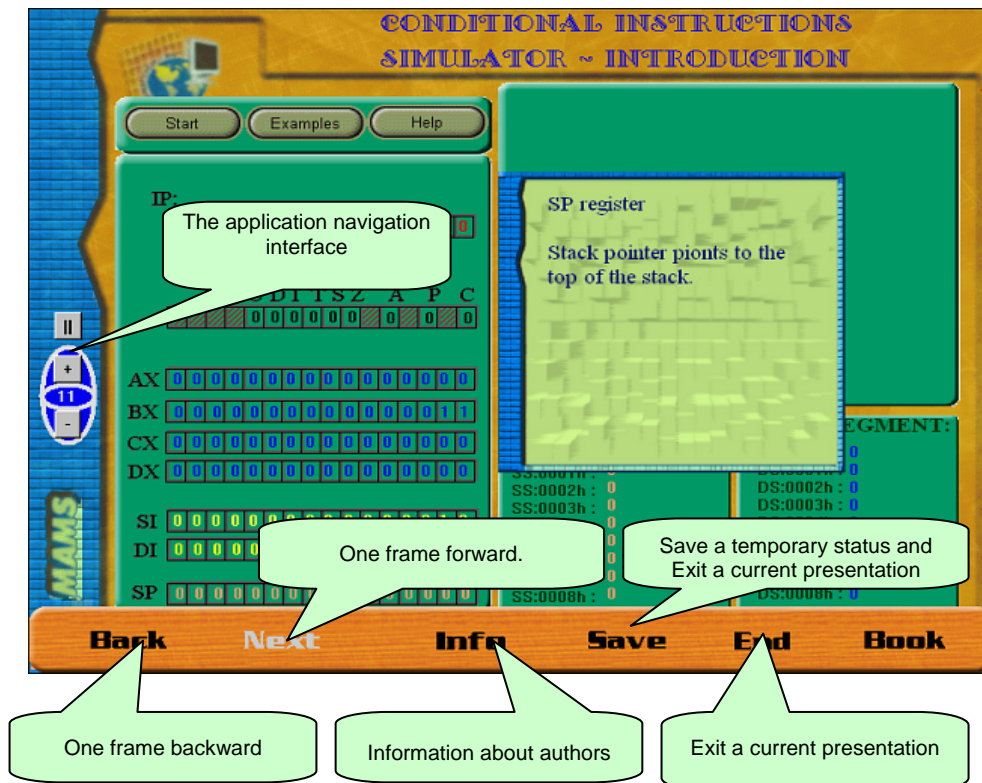


Fig.8. An example presentation frame of the MAMS load



#### 4. CONCLUSIONS

The data files sequential structure, their complexity and length determine the user interface units [7]. They are provided for going through the database via sequence of questions, they need to simplify the application organisation. All this efforts are done to make possible interactive selection of the file content; for exploration of the file content, for presentation units selection or for both.

The database structure described in this paper is the example solution of a fast explorer that allows navigating within the application. The database platform provides the application designer with several unification modes for a whole set of database units.

Medicine is one of the most spectacular field, where computer based learning can be recommended. Many files of patient histograms have to be kept in computer databases: for evidence, for diagnosis records comparison, for monitoring of the rehabilitation processes, etc. The set of data files is growing-up into unlimited numbers. The computational problems can only be solved when we will find very specific formats of recording and exploring these immense data sets.

Trying to find any solution we would offer the multimedia applications developer our MAMS & QRU platforms.

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