Approaches to building population registers in special automation systems

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Abstract. The program aims to develop new forms of automation of the management of territorial registers for special purposes. It is based on an innovative interdisciplinary approach to improving the parameters of automation subjects. This program complements the regional register of subjects' parameters in order to monitor those that are subject to special impacts. Subjects are monitored during special impacts. During the implementation of the program, the decision-maker oncologist receives personal data that provides communication with the subjects. The developed pilot project of the population register in specialized automation systems is important for optimizing the parameters of automation entities.

1. Introduction

Automation systems for the functioning of population registers of special subjects, as a rule, performs a number of functions, namely: automated personified registration; registration of abnormal states of subjects and their transition to a terminal state; assessment of the main parameters characterizing the state of the automation system itself; monitoring of special subjects throughout the observation period; formation of state reporting [1,2,3].

But even with the modern information support of the register, it is impossible to track the change in the state of special subjects in dynamics if there are tens of thousands of special subjects in the database.

For the effective monitoring of special subjects, the role of lower-level grouping is invaluable. For this purpose, an original program of the territorial registry was developed, which is distinguished by monitoring of special entities that received various regulated influences.

According to our program, the functions of monitoring the territory include identifying the parameters of special entities that have undergone regulated influences, as well as monitoring the timing of monitoring [4, 5].

The program features are as follows:

- dialog boxes;
- issuance of special entities for which the receipt of regulated impacts has not occurred or has not been completed;
- the possibility of registering special entities subject to special influences in other administrative territories;
- prompt response to routing defects of special entities;
• prompt response to unregulated reactions of special entities upon receipt of regulated impacts.

The main methods for developing this program are the methods and tools described in the scientific publications of a number of researchers [6-12].

2. Materials and methods
The developed software implements a user interface to the database of special subjects of the territory. The software uses the SQL database management library to store data. The program is designed as a main executable file and a set of third-party dynamically connected library files to support database operations.

The choice of a library as a means of storing and processing data is that it does not have external software dependencies, does not require the installation of server software and additional configuration before use. Unlike most databases with SQL support, the library directly reads and writes files to disks that contain a full-fledged SQLite database with many tables, indexes, projections, and triggers. The database has a cross-platform format. The same database file can be used in 32- and 64-bit PC architectures. The information in the software is in 2 files, including personal data of the patient and monitoring data. They can be located in different directories of the PC file system, which allows you to configure different access levels for each file.

Each new record about a special subject in the system is automatically assigned a global identifier that allows you to associate a patient record with monitoring records in another data file. The identifier is a 128-bit integer generated by the operating system using a special algorithm. This allows you to further combine databases on special subjects and information on regulated impacts stored on several PCs into a central database for advanced analysis.

3. Features of building a data management subsystem
The ramified multilevel structure of the register, which is based on the desire for a complete, comprehensive computerization of its functioning, unambiguously determines the hierarchical network topology of a complex of technical means.

As a server, a computer with two mirrored hard drives was selected. This will provide high performance in the data access cycle and effective protection. Workplaces are equipped with personal computers of low and medium power.

Communications in the system are provided by standard network adapters. The system is technically compiled according to the Client-Server architecture. In such a system, data processing is shared between two or more computers. At the same time, the client part of the system uses a PC to present and manipulate data. The server is used to store, sort, modify, combine and protect data. Samples that are the results of query execution written in SQL are transmitted over the network.

Using these two components together provides flexibility in interacting with data. Using the client-server architecture allows you to more fully use all the resources of the system (clients, server and network). The separation of tasks between the client and the server allows you to use the power of all computers in the system and at the same time take advantage of centralized storage and the ability to remotely access data. In addition to this, the developer gets the opportunity to combine various operating systems, databases and client parts in his system. The modular structure of the system in the client-server architecture facilitates the process of its modification: individual parts of the system can be changed independently of each other. One can, for example, make changes to the client part or transfer the server to a more powerful machine.

The exchange of information between systems is ensured by a router that has "intelligent" functions and is focused on the applicable transmission protocols. This provides traffic filtering between different segments, a high level of data protection and wide batch processing capabilities.

Workstation computers are equipped with printers. Sending / receiving email and fax messages is supported by the fax modem.

The overall architecture of the system is presented in figure 1.
Figure 1. The overall architecture of the system.

The system contains:
- non-cost accounting system;
- execution system;
- monitoring system;
- database administrator system.

In turn, the accounting subsystem is represented by the registry and the statistics block.

The treatment subsystem under the supervision of the department head includes the initial appointment, the appointment of a specialist.

The monitoring system provides data processing; data grouping; pattern recognition and visualization.

4. Program futures

The multidisciplinary integrated management system software is built from system components and applications. System software is the basis for the functioning of a computing system. With the help of system software, the tasks of computing process control, distribution of system resources: processor, memory, disk space, communication are solved.

Application software is a set of programs that implement the functions of the system. The database system is based on many subject catalogs.

The Windows-oriented user interface provides a simple and convenient dialogue between a non-programmer user and the system, a wide range of tools for manipulating, presenting and documenting data, a navigation system and prompts.

The main window serves for monitoring, access to lists, as well as dialog boxes for searching patients in the database and entering information about a new special subject. Access to the main groups of controls is carried out using the tabs "Processing", "Observation", "Failures" located on the left side of the main window.
Entries in the table are selected by querying the database. The list output algorithm provides a choice of color and line style in accordance with the totality of data presented on each line. This condition provides control over the planned impact, as well as work with implicit impact. Above the table there is a panel with buttons that are placed in an active state depending on the information in the highlighted row. The row is highlighted and a comment about the reasons for the failure is displayed in the right column.

For observation by special subjects, the dates of their alleged appearance are established (during the first year 1 time per quarter, 2 years - 1 time per half year, 3 years, and then 1 time per year) are displayed on the tabs “Identification in progress” and “No subject”. These tabs contain information selected by database queries according to various criteria. A list of special subjects is displayed with an assigned identification date. The combination of fields and the possibility of arbitrary sorting by them allow you to receive additional information from special subjects, as well as establish contact with them.

Double-clicking on a row of any of the tables brings up the corresponding dialog box about treatment.

There is a button on the main program window that brings up a dialog box for searching special subjects in the database. It contains a search query input line to display a list of special subjects by fragments of their personal data. The functional search window allows you to enter additional criteria for forming an array of results, including by special parameters.

5. Discussion of results
The implementation of the program of automation of the territorial register reduced the number of special entities that did not pass the identification of parameters by 40.4%. The number of special subjects with a violation of the parameters decreased by 50.9% due to the timely conduct of special impacts. Purposeful work was carried out with those who refused to identify the parameters, which made it possible to minimize the number of failures by 73.5%.

6. Conclusion
As indicated in [13], “in order for the register data to be as accurate as possible, it is necessary to monitor the accuracy of information at each stage: the appearance of primary data, collection and transfer to structures that can sort and group them, collection of already sorted data, and only the very end - the calculations of the necessary indicators. There is no doubt, and at this last stage there is a chance of error. But such errors are immediately visible. They can be determined by analytical methods. The most difficult thing is to solve problems with errors in the primary data. In world practice, verification of the quality of registration, as a rule, falls within the competence of registries and scientific institutions attached to them.”

The program aims to develop new forms of automation of the management of territorial registers for special purposes. It is based on an innovative interdisciplinary approach to improving the parameters of automation subjects. This program complements the regional register of subjects' parameters in order to monitor those that are subject to special impacts. Subjects are monitored during special impacts. During the implementation of the program, the decision-maker oncologist receives personal data that provides communication with the subjects.

During the implementation of the program, the specialist receives personal data of a special subject, which provide communication with those who need special operational impact, who refused to identify the parameters.

To monitor special subjects that have received a special impact, the program provides control over the timing and scope of parameter identification. Dialogs allow you to make adjustments to the routing of special subjects in the process of identifying parameters. The program distinguishes 2 SQLite files - patient personal data and monitoring, as well as parameter identification in order to protect information.
The developed pilot project of the population register in specialized automation systems is important for optimizing the parameters of automation entities.

The main approaches to the development of a program for automating the territorial register of special entities, based on information technologies at the level of the primary parameter identification system, have made it possible to optimize the identification of parameters and special influences for special entities.

The automation system for managing the territorial register of special entities may be in demand in any administrative territory.

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