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INTELLECTUAL INFORMATION KNOWLEDGE BASE CREATION MECHANISMS

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Abstract. *Global socio-economic and scientific-technical changes are taking place in world practice. In many developed countries, much attention is paid to the development of intelligent educational information systems. In world practice, scientific research is being conducted to improve the quality of education through the use of intelligent platforms, with the goal of automation. Modern information and communication technologies, based on multidimensional databases and intelligent analysis technologies, make it possible to create intelligent systems that provide the necessary dynamic information to the processes of organizing activities. Today, the development and use of intelligent information systems is relevant. Particularly in the field of education, intelligent information systems bring a number of conveniences. For example, in developed countries, artificial intelligence decides the issue of continuing studies or expelling students, passing exams, etc. At the same time, it is important to correctly determine the abilities of students in schools, as well as teach them professional skills. School psychologists have a great responsibility to help students correctly assess their interests, guide them, monitor their mental state and, based on this, correctly determine their professional choices. Therefore, this article describes the stages of creating an intelligent information system called "Psychological Diagnostics System", the purpose of which is to determine the abilities of students, organize effective training in a certain direction, through an intelligent system, the basis of which is knowledge bases, databases. The designed information system will ensure efficient work with students and their parents, intelligent data analysis, and quality monitoring.*

Keywords: *information system, intellectual system, intellectual knowledge base, database, intellectual test system*

INTRODUCTION

Intelligent information systems are becoming increasingly relevant in today's world due to the vast amount of data generated by individuals and organizations. These systems use artificial intelligence and machine learning algorithms to analyze data, identify patterns, and provide insights that can be used to make better decisions. Here

are some of the key benefits and relevance of creating and using intelligent information systems:

1. Improved decision-making: Intelligent information systems can help individuals and organizations make more informed decisions by providing insights based on data analysis. This can lead to better outcomes and improved performance;

2. Increased efficiency: By automating data analysis tasks, intelligent information systems can help organizations save time and resources. This can lead to increased efficiency and productivity;

3. Enhanced accuracy: Intelligent information systems use advanced algorithms to analyze data, which can lead to more accurate results compared to manual analysis.

Overall, the creation and use of intelligent information systems are relevant in today's world due to the increasing importance of data-driven decision-making.

Creating a database and a knowledge base are important steps in developing an intelligent information system as they provide the foundation for data storage, organization, and analysis.

A database is a collection of structured data that can be easily accessed, managed, and updated. This data can come from various sources such as customer information, sales data, or product inventory. By creating a database, an organization can store and organize large amounts of data in a way that makes it easy to retrieve and analyze.

A knowledge base, on the other hand, is a repository of information that has been collected, organized, and analyzed to support decision-making. This can include information such as customer preferences, market trends, or best practices. By creating a knowledge base, an organization can leverage its collective expertise and experience to make better decisions and improve performance.

Together, a database and a knowledge base form the backbone of an intelligent information system. They provide the necessary infrastructure for storing and analyzing data, as well as the insights needed to make informed decisions.

2. METHODOLOGY

The creation of a knowledge base typically involves several stages, including:

1. Identifying the scope and objectives: The first step in creating a knowledge base is to determine what information should be included and what the goals of the knowledge base are. This involves identifying the topics to be covered, the target audience, and the desired outcomes.

2. Gathering information: Once the scope and objectives have been defined, the next step is to gather relevant information. This may involve conducting research, interviewing subject matter experts, or analyzing existing data.

3. Organizing the information: After the information has been gathered, it needs to be organized in a way that makes it easy to access and use. This may involve categorizing the information into different topics or creating a hierarchical structure.

4. Creating content: With the information organized, the next step is to create content that is informative and engaging. This may involve writing articles, creating videos, or developing interactive tools.

5. Testing and refining: Once the content has been created, it is important to test it with users to ensure that it is effective and useful. Based on user feedback, the knowledge base may need to be refined or updated.

6. Maintaining the knowledge base: Finally, it is important to maintain the knowledge base over time by adding new information, updating existing content, and ensuring that it remains relevant and useful to users [1-3].

There are several approaches to the development of intelligent information systems, including:

1. Structured, based on the principle of algorithmic decomposition. In this approach, the structure of the system describes the tree of functions in it and the exchange of information between individual elements. In this case, methods of structural approach such as IDEF0, IDEF1, IDEF3, DFD can be used.

2. Object-based, in which the structure of the system is expressed in the form of a set of objects and connections between them, based on object composition. It is possible to use object-based methods of describing information systems such as Rational Rose, Staruml, Visual Paradigm UML, Argouml, BOUML, Yed.

The creation of an intellectual information system using Unified Modeling Language (UML) involves several steps:

1. Requirements gathering: The first step is to gather requirements from stakeholders and users. This involves identifying the goals and objectives of the system, as well as the features and functionalities that are required.

2. Use case modeling: Use case modeling is used to identify the actors (users or systems) that interact with the system and the tasks that they perform. This helps to identify the functional requirements of the system.

3. Class modeling: Class modeling is used to identify the objects and their relationships in the system. This helps to identify the data requirements of the system.

4. Sequence modeling: Sequence modeling is used to identify the interactions between objects and actors in the system. This helps to identify the behavioral requirements of the system.

5. State modeling: State modeling is used to identify the states that objects can be in and the transitions between those states. This helps to identify the dynamic requirements of the system.

6. Component modeling: Component modeling is used to identify the components that make up the system and their relationships. This helps to identify the architectural requirements of the system.

7. Deployment modeling: Deployment modeling is used to identify how the system will be deployed on hardware and software infrastructure. This helps to identify the operational requirements of the system [4,5].

Once these steps are completed, the UML diagrams can be used to generate code for the intellectual information system. The UML diagrams serve as a blueprint for the system, guiding its development and ensuring that it meets the requirements of stakeholders and users.

The designed system is presented in Figure 1, which consists of the following visual tools of the UML language:

• server-client architecture is connected using two nodes (server, client) according to the "many to many" principle;

• "user module" and "administrator module" in the client node are combined into a logical package "client components";

• in the same way, the "Application Server" and "Database Server" modules in the Server node are connected to the "Server Components" package;

• The Database Server component uses the interface provided by the database management system to communicate with databases.

• "user module" and "administrator module" in the client node are combined into a logical package "client components";

• in the same way, the "Application Server" and "Database Server" modules in the Server node are connected to the "Server Components" package."

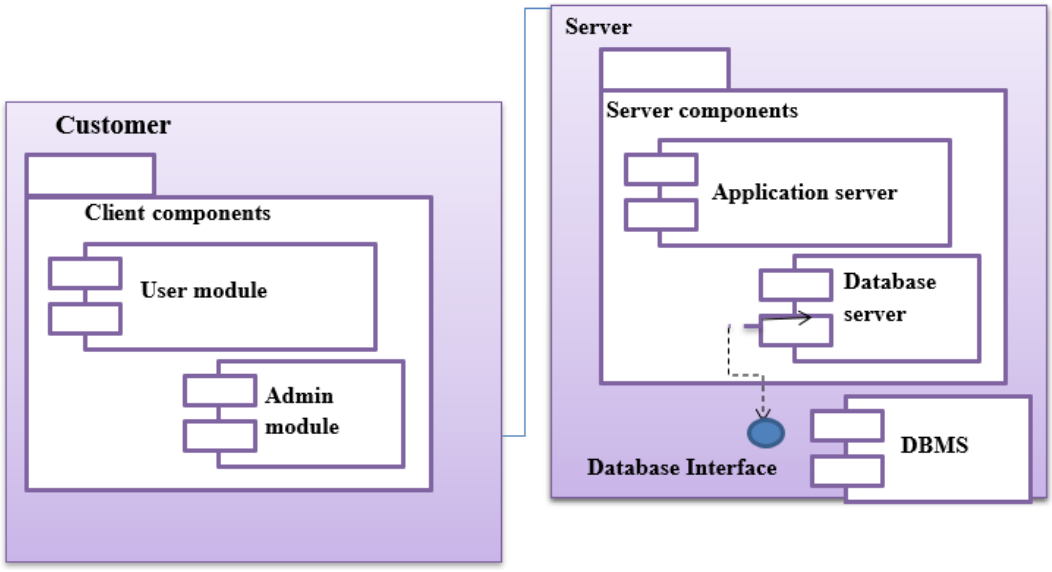

Fig.1. UML diagram for system architecture

REALIZATION OF THE CONCEPT

The following algorithms were developed to create the intellectual knowledge base of the psychological diagnosis intellectual test system:

Algorithm 1: "Scheme of User Interaction with the Intelligent System".

We divided the users of our intellectual systems into the following groups:

– admin is the technical manager of the software tool, debugger and the person fully responsible for the system operation.

– a student is a person who registers with the software, uses the information in it and creates his own database of results.

– a parent is a person who monitors the result window and can communicate with the teacher through the system if necessary.

– a teacher is a person who monitors the results window and can communicate with parents through the system if necessary (Figure 2).

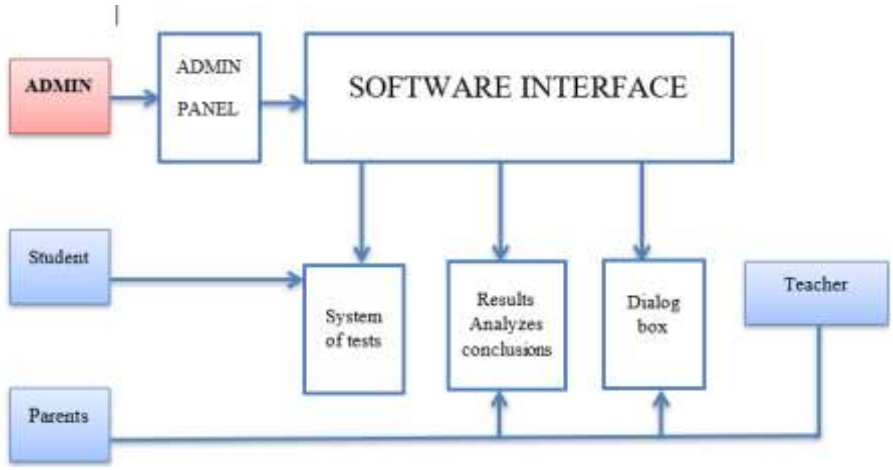

Fig.2. General scheme of interaction components

Algorithm 2: "Scheme of general functions of the knowledge base".

"Working with Knowledge Base" generally includes the following functions: "Create Knowledge Base", "Add Knowledge", "Modify Knowledge", "Remove Knowledge", "Work with Knowledge Base", " Maintaining the knowledge base. These functions are connected as follows.

Algorithm 3: "Database Schema prepared in SQLite3".

In SQLite MBBT, student (student), Category (subjects), Sub_category (science stages), Result (results), PSTSubcategory (psychological tests), PSTResult (Psychological test results), PSTQuestion (Psychological test questions), PSTAnswer (Psychological test answers), tables named Question (questions), Answer (answers) and their corresponding fields are created and connected as shown in the figure (Figure 3).

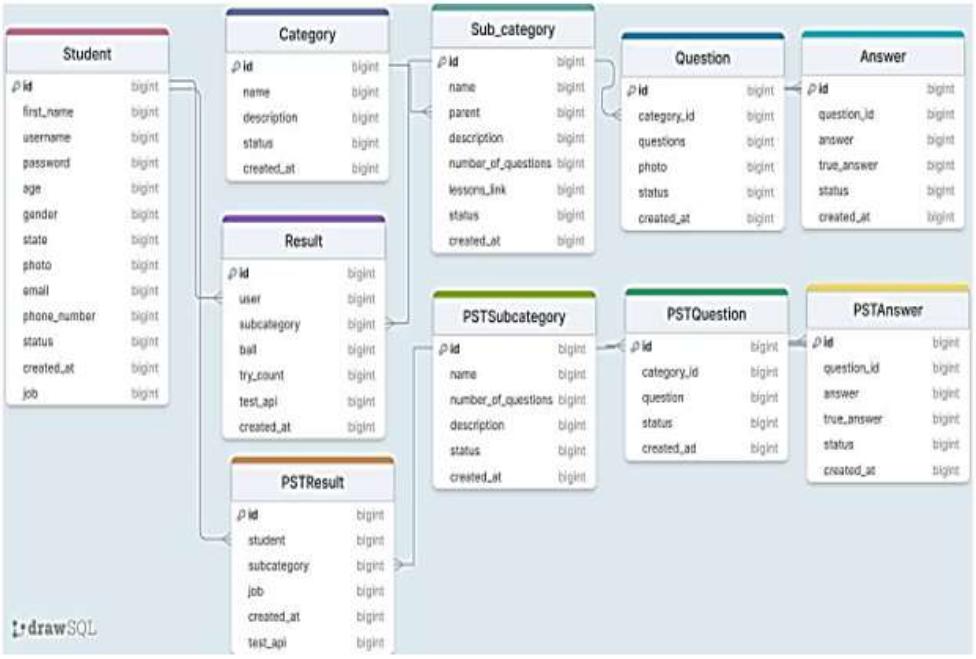

Fig.3. The scheme of connecting data with each other in the database management system (SQLite3)

The developed software tool includes working with a database, so existing database management systems are reviewed. The most popular of them: MySQL, Oracle DB, PostgreSQL, MongoDB, SQLite Microsoft SQL server, IBM DB2 [6-9].

When selecting a database management system (DBMS) for the intellectual information system, the following factors should be considered:

1. Data requirements: The nature and volume of data that the system will handle will influence the choice of DBMS. For example, if the system deals with large amounts of unstructured data, a NoSQL database like MongoDB may be a better choice than a traditional relational database like Oracle.

2. Performance: The speed and efficiency of the DBMS will affect the overall performance of the system. Factors such as indexing, caching, and query optimization should be considered.

3. Scalability: The ability of the DBMS to handle increasing amounts of data and users over time is an important consideration.

4. Security: The security features of the DBMS, such as encryption, authentication, and access control, should be evaluated to ensure that they meet the requirements of the system.

5. Cost: The cost of licensing, maintenance, and support for the DBMS should be considered.

Based on these factors, some of the popular DBMS options for the intellectual information system are:

1. MySQL: A popular open-source relational database management system that is known for its speed and scalability [10].

2. PostgreSQL: Another open-source relational database management system that is known for its robustness and support for advanced features like JSON data types and full-text search [11].

3. MongoDB: A NoSQL document-oriented database that is designed for handling unstructured data and offers high scalability and performance.

4. Microsoft SQL Server: A popular commercial relational database management system that offers advanced features like business intelligence and data warehousing.

5. Oracle DB: A commercial relational database management system that is known for its scalability and security features [12].

Ultimately, the choice of DBMS will depend on the specific needs and requirements of the intellectual information system.

For creating intelligent systems, we present the advantages of the following software: Python, Django, Peewee, Java Script [13,14].

DISCUSSION OF RESULTS

In this chapter, the process of designing a software tool of the issue selected for consideration of "Methods of designing and creating an intellectual information knowledge base" has been covered. In this, the construction of the model, the structure of the algorithms were mentioned, and the software tools necessary for creating a program based on the constructed algorithms were studied. After analyzing the necessary software tools for the implementation of the project, the most suitable tools were selected. The capabilities of each of the selected software tools have been explored.[15]

The software tool is in the form of a platform, Python and Javascript programming language and Django Rest Framework, React JS libraries were used for the BackEnd part. The purpose of using this is that the API, that is, the data sent for the Frontend part of the program with the help of these libraries, will be very fast and safe, in which the development of the program is convenient compared to other programming languages and their Frameworks, which provides time saving, modern, convenient and does not require excessive time. SQLite was used for the database.

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