

## DIGITAL TECHNOLOGIES IN THE ACTIVITIES OF PATRONAGE NURSES

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**Abstract.** *Currently, the need for informatization and digitization of medical institutions is increasing. It is practically impossible to process huge flows of information: financial, statistical, medical, without the use of modern information and computer technologies. At the moment, the digitalization and informatization of patronage nurses' activities is especially relevant, which allows effective use of available resources, increasing the quality of medical care provided to them, and strengthening the health of the population. In the Decree of the President of the Republic of Uzbekistan dated December 7, 2018 "On comprehensive measures to fundamentally improve the health care system of the Republic of Uzbekistan" No. PF-5590 "On the widespread introduction of the electronic health care system" health care systems, uniform national standards on the basis of creating a complex of integrated information systems and databases.*

**Keywords:** *nurses, digitalization, patronage nurses, digital technologies.*

Currently, the need for informatization and digitization of medical institutions is increasing. It is practically impossible to process huge flows of information: financial, statistical, medical, without the use of modern information and computer technologies. At the moment, the digitalization and informatization of patronage nurses' activities is especially relevant, which allows effective use of available resources, increasing the quality of medical care provided to them, and strengthening the health of the population. In the Decree of the President of the Republic of Uzbekistan dated December 7, 2018 "On comprehensive measures to fundamentally improve the health care system of the Republic of Uzbekistan" No. PF-5590 "On the widespread introduction of the electronic health care system" health care systems, uniform national standards on the basis of creating a complex of integrated information systems and databases.

The purpose of the study is to inform the activities of patronage nurses.

Materials and methods.

Patronage is the daily work of nurses, a multi-functional platform "SMART patronage" that allows evaluation. Multi-stage methods (cluster and strata sampling), modern socio-hygienic, social, sanitary-statistical, expert assessment and timing, and IT technologies were used to form a randomly selected group.

Research results: despite the fact that the partner IT company has sufficient experience in the development of medical information systems, taking into account the essence, type of activity, volume, structure, and time spent on the work of patronage nurses, the goals and tasks that must be solved by developing a special program were determined. and for their implementation, an algorithm of patronage nurses' activities was developed, and the senior programmer of the IT company was fully explained and presented to him with this algorithm.

Polyclinic No.10 in Sergeli district of Tashkent city was selected as a pilot facility for testing the developed system and implementing it in healthcare practice. The members of the group held meetings with representatives of the polyclinic and agreed to close cooperation. Together with the management of the polyclinic, 4 responsible nurses with life experience were selected

from among the nurses. Among specially allocated patronage nurses, we held several seminars among them, explaining the goals and tasks of our work, and established cooperation relations. During the work, regular meetings were held with our working group and polyclinic representatives. In order to facilitate communication between employees, we have organized a "Smart patronage group" on the Telegram channel.

Created the initial version of the terms of reference and discussed with the project and presented to the project manager for approval. During the implementation of the project, the terms of reference were further refined and the initial version of the terms of reference was agreed upon, and the development of the web portal for the project began.

The main issue is the choice of technology, according to which we will develop the system. The choice is huge now. All modern programming languages have enormous capabilities. We explored several technologies based on some criteria.

In technology, we have identified 3 levels:

Pure language is the material from which anything can be made. We are limited only by the possibilities of language. All major sites in the world with hundreds, millions and billions of users such as Instagram, YouTube, Pinterest, Tumblr, Dropbox, Twitter, Facebook, Amazon, Digg, LinkedIn, etc. are built in pure language. In addition, the largest projects in the world even create new technologies for themselves, because they are not satisfied with the existing ones.

A framework is a unique development environment for a developer with ready-made rules and tools. The framework, on the one hand, helps and accelerates development, and on the other hand, it imposes certain limitations. Frameworks are used for medium complexity projects with millions of visitors.

CMS is a ready-made solution, a constructor, in which we assemble the necessary project in parts. It is configured, not programmed. There are so many limitations, it's hard and inefficient to go outside the box. Simple sites are created in CMS with traffic of up to a million users per month.

A short list of popular languages and features:

PHP is mainly used for simple and medium projects.

Python is a modern language, working on it is fast and high-quality. Use for medium to large projects.

Java is long and expensive to develop. It is mainly used for large projects with specific requirements.

C# is an analogue of Java and is often used for large projects in the financial sector.

JS is developing very fast; this is the trend of recent years. Lots of development and you can write anything you want, even games. It's used for medium to large projects, but the language has gotten really powerful recently, as there are only a few large projects so far.

Large scale projects are written with increasing demands for flexibility, workload and security, without using frameworks and boxed solutions.

Examples of large sites:

Programming language	Site
<b>PHP</b>	Facebook, Vkontakte, KinoPoisk
<b>Python</b>	Instagram, Pinterest, Reddit
<b>Java</b>	Ebay, Amazon, Alibaba

<b>C#</b>	Guru, Stack Overflow, Bank of America
<b>JS</b>	LinkedIn, Walmart, PayPal

Frameworks are used to develop very large and complex sites with unique functionality. It is much faster and cheaper than a pure language, but at the same time, this solution allows you to develop really complex things and optimize all this for workloads.

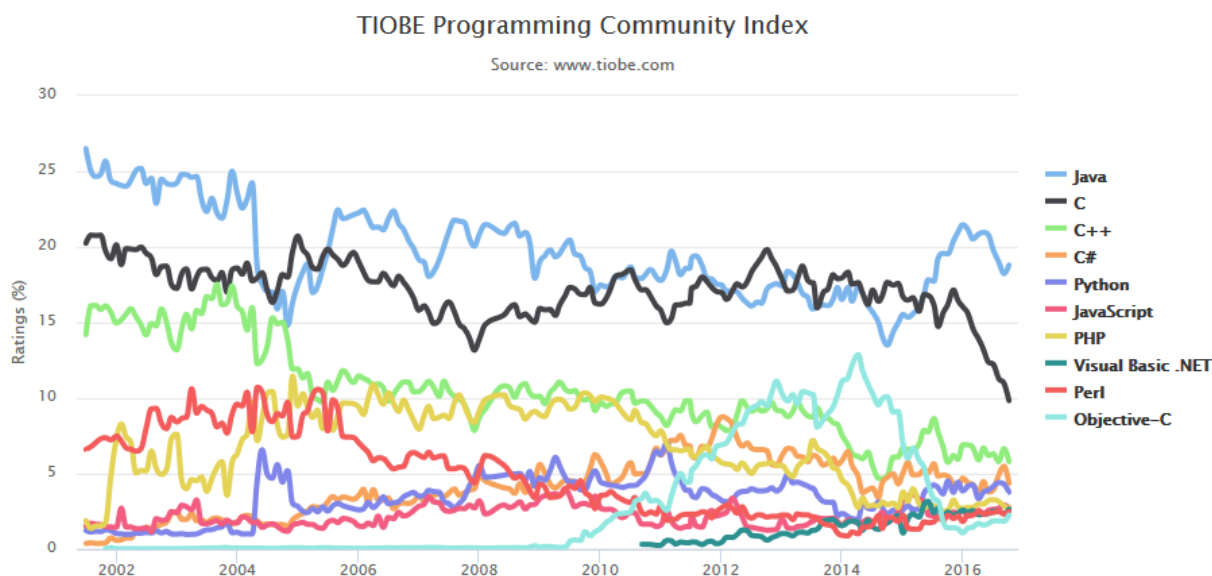
Popular frameworks and platforms:

Programming language	Framework
<b>PHP</b>	Symfony, Laravel, Yii
<b>Python</b>	Django
<b>Java</b>	Spring
<b>C#</b>	.NET, Xamarin
<b>JS</b>	Node.js, AngularJS

We didn't look at CMSs because none of them fit our needs.

When choosing technology, we need to look ahead. Especially if it's a big project. All technologies are developing very quickly, more and more new versions are released.

There are studies that give us advice. For example, the TIOBE Index study reveals some interesting statistics:



According to these statistics, Python seems to be the clear leader.

In addition, considering the technologies used in the implementation of large projects recently:

Based on the above research and the fact that the system is based on the principles of artificial intelligence, we chose the Python language and its popular Django framework.

The next step is to choose a database management system (DBMS).

Popular database management systems OracleDB is a database created in 1977 and remains the most popular and reliable solution today. Takes first place in DB-Engines ranking.

Project	Written programming language
<b>Airbnb</b>	Ruby
<b>Instagram</b>	Python
<b>Pinterest</b>	Python
<b>Foursquare</b>	Python
<b>Groupon</b>	JS
<b>Twitter</b>	Scala
<b>Uber</b>	JS

It has backed by Oracle, so it's reliable. The developers say that OracleDB rarely crashes and receives regular updates.

It is capable of processing massive amounts of data on a large scale. The tax system of Uzbekistan also works in this DBMS.

OracleDB is the most popular DBMS, but also one of the most expensive. Since our system needs to be open source, this DBMS is not suitable for us.

MySQL is one of the most popular relational database management systems, created in 1995 and currently managed by Oracle. It is available for free, but additional features are available at a fixed price.

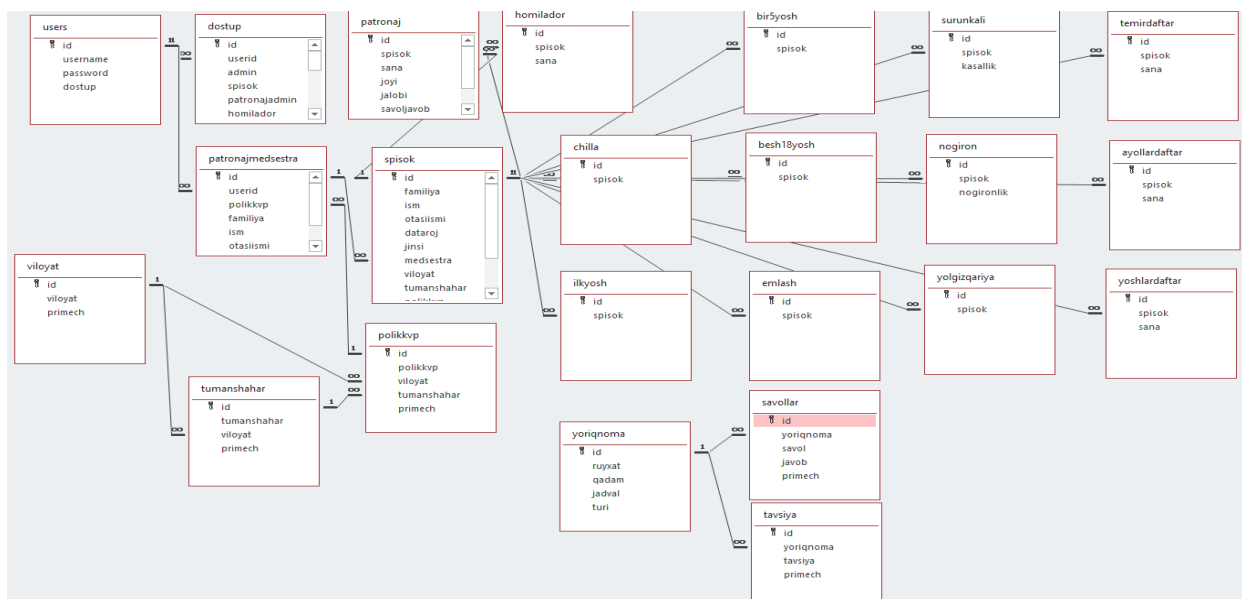
Uber, Facebook, Tesla, YouTube, Netflix, Spotify, Airbnb and many others use MySQL for their services.

PostgreSQL is ideal for large systems because it is scalable and designed to handle terabytes of data. A role hierarchy provides additional security for enforcing user rights. It can handle heavy loads easily. Unlike MySQL, the PostgreSQL database is completely free.

Based on the results of the studies, our choice is suitable for PostgreSQL.

Since the foundation of our system is data, the structure of the database plays the most important role. Our team has designed the database structure to accommodate all the information needed for statistics and monitoring. The structure should also be convenient for reporting.

After a few changes, the database structure looked like this:



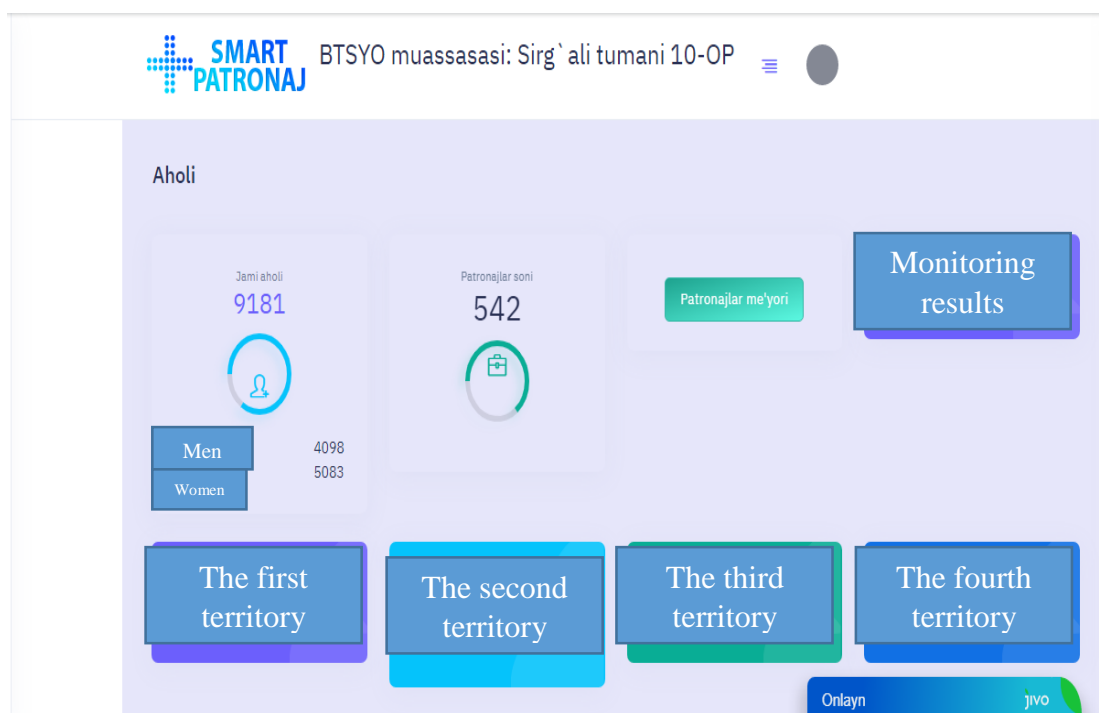
While you are working on the system, there may be more changes in the structure. To deploy the system, we have registered the domain "smart-patronaj.uz" and its hosting. In order for the system to be secure, it is imperative that only authorized people can access it. Therefore, in the admin panel, an opportunity was created for each user to choose the necessary permission.

Here, the system administrator selects which database each user is allowed to access and which one is not allowed.

To enter the system, you will be asked for a login password.



The main window of the system is created as follows.



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General population list Overall population – 1703 Men – 780 Women - 923	Patronage list Overall - 128
Monitoring results	
Pregnant women	Women in “chilla”(40 days after giving birth)
Children between 0 and 10 ages	Children between 1 and 5
Children between 5 and 18	The patients with chronic diseases
Alone elderly people and the disabled	People who are registered in women`s list, the poor`s list and youth`s list

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