DEVELOPMENT OF THE ARCHITECTURE OF THE MODULE FOR ANALYSIS AND CONTROL OF MILK PRODUCTION OF AN AUTOMATED INFORMATION SYSTEM

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The automated information system being created will allow the analysis and control of milk production. This will allow the owners of farms to assess the productivity of cattle, to predict a decrease or improvement in the milk production of livestock. Organize, conduct and keep records of the necessary veterinary measures aimed at increasing the productivity of livestock and ensuring dairy production.

In scientific work Lomakin V.V. a technique for two-stage analysis of systems has been developed. At the first stage, the modular structure of the systems under study is analyzed and compared. At the second stage, the functionality of the systems is evaluated and compared according to a number of criteria. For the criteria, the coefficients of significance were calculated using the method of paired comparisons using the DSS "Solution". [1]

In the scientific work of Voinova E.V. the topic of innovative IT technologies in personnel management is considered. The systems processing information for the highest quality personnel management are considered.

In the work of B.H. Schwendel, T.J. Wester, the difference between organic milk and ordinary milk is noted, this difference affects the cost of production. After research, it turned out that organic milk contains more nutrients and nutrients.

In the work of the authors H.W. Barkema, M.A.G. von Keyserlingk, examines the impact of economic and technological innovations that have positively impacted the industry. Technical innovations have made it possible to automate the production of enterprises. They also made it possible to reduce feed costs due to automatic feeding devices for cattle, by dosing portions per head of the herd. [4]

Considering the problem of increasing milk production, the authors of Bauman, D.E., McCutcheon, S.N, decided to conduct an experiment with the manipulation of the nutrition of separately isolated cows. The results of the experiment showed that when the composition of the feed changes, the composition of the milk changes, while the productivity increased, but not significantly. [5]

V.S. Gorelik in his work carried out a comparative assessment of cows bred on the farm according to Holstein lines, in terms of milk productivity. The study was carried out for 2 years, during this period milk production was taken into account for the completed lactation according to control milkings. The result showed that cows belonging to Holstein lines affect milk production. [6]

Development of the architecture of the module for analysis and control of milk production of the automated information system "Herd management"

The automated information system "Herd Management" is intended for collecting, accumulating and processing information on the livestock kept on the farm, as well as all zoos technical and veterinary measures related to the livestock population (fig.1).
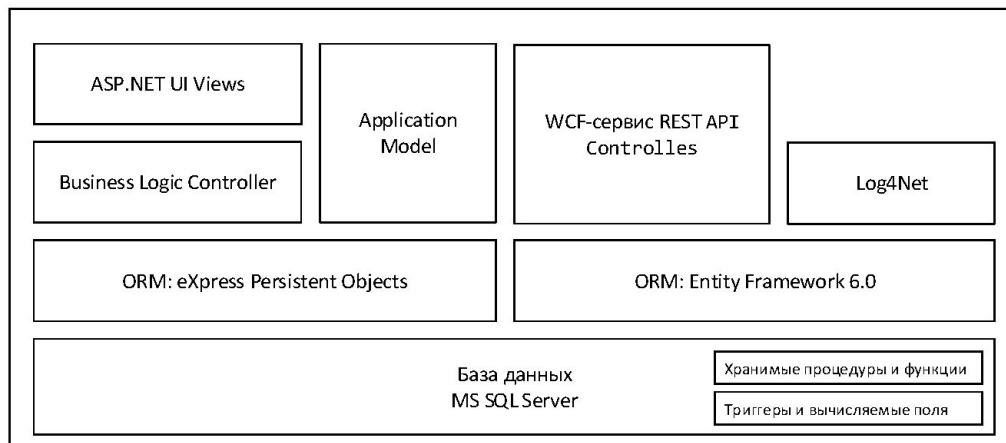

Figure 1 - Architecture of the AIS "Herd Management"

The module for analysis and control of milk production of the automated information system "Herd Management" is part of such subsystems as:

- ASP.NETUIViews;
- BusinessLogicControllers;
- ApplicationModel;
- ORM: eXpressPersistentObjects;
- MSSQLServer database.

ASP.NETUIViews are XAF-generated user interface forms based on the ApplicationModel that are directly accessed by system users through a web browser. [7]

BusinessLogicControllers are specific controllers that implement non-standard business logic of the application, for example, the automatic assignment of the owner farm to a new registered animal by the current authorized user. Most of the operations for viewing lists and individual objects, their editing and saving are implemented by standard controllers of the XAF platform and do not require manual implementation, which saves significant time when developing applications. At the same time, any action requiring a specific implementation can be added or redefined by creating an additional non-standard controller that takes over the function of processing specific logic. [8]

ApplicationModel is an application model that describes in XML format the configuration for building the user interface of the system, formats for checking input data, validation, setting the standard display of lists with data, sorting and filtering parameters. The model also describes the arrangement of elements of the input forms, their grouping and breakdown by tabs, if necessary. [9]

To access the database, object-relational converters (ORM) are used that are part of the development platforms: eXpressPersistentObjects. The peculiarity of this ORM model is that all links in the database will be the envy of the business processes that are embedded in the foundations of the information system. [10]

The system is based on the MSSQLServer relational database, which is responsible for storing all information. The database implements stored procedures and functions that are responsible, for example, for calculating milk production, updating lactation information, updating the sex and age status of an animal when registering zootechnical events, etc. [11]

The conducted research shows that at the moment it is impossible to obtain high-quality milk and products derived from it without strict regulation of all technological processes and the efficiency of production time cycles.

An unsettled cycle of collection and prompt delivery of raw materials leads to production costs and losses, the reimbursement of which will require additional human and financial costs, which will directly affect the cost price and, as a consequence, reduce competition in the market.

In dairy farming, the high quality of milk, together with the recall of farms to the consumer's request, provides a competitive ability in the direction of the livestock industry.

Nowadays, rapidly developing digital technologies provide the opportunity to provide continuous, round-the-clock monitoring according to the 24/7 formula in the livestock sector.

At the same time, digitalization of technological processes in domestic animal husbandry, as a rule, boils down to the formation of certain local systems that unite a number of production processes. In particular, on the diet of cows, milk yield and animal breeding.

The introduction of information systems, without a formed system of extensive monitoring of milk production at all stages, allowing the formation of plans for scientific research work, the efficiency of management of the livestock industry will not be sufficient.

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