

EXPERT COMPUTER SYSTEM FOR POULTRY FARMING

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Problem setting. The problem of software development for modern farming in whole and for poultry farming in particular is very urgent in Europe and Ukraine.

The analysis of the available software for enterprises has shown a number of problems. A lot of information is stored in non-optimal form, therefore a lot of time is required for search of that information which is necessary for certain criteria and operations. The probability of a mistake during search of very large volumes of information is also high.

Development of an expert system for technology of chicken breeding. It is necessary to make solutions of certain problems in the field, for example, to answer various questions «How is it correct to organize feeding of chickens of a certain age?» and to introduce the new technology of chicken breeding.

The purpose of the work is to develop the expert system for poultry farming which will be a static forecasting knowledge system.

Basic research. On the basis of the carried-out analysis it is possible to make the following requirements to the system:

- it is necessary to develop the system which provides centralized and the objective answer to questions of workers;
- to create the system of exchange of information between the worker and the expert;
- to create the knowledge base which will answer the questions posed.

Before development of the expert system for users, it is necessary to develop the knowledge database by means of programming or using tools.

The tasks of our expert system are to create the expert system for poultry breeding which will have a simple and clear interface and it will be user-friendly; to create the knowledge base in which information and logical communications for making recommendations will be entered.

The operation cycle of the expert system is in fact an algorithm with a logical output and data processing. A logical output can occur in different ways from among which a direct order of output and the reverse order of output are the most widespread.

For full operation of the expert system which is developed it is necessary to create the corresponding knowledge base. We will directly create this base in a code in the text form.

The general methodology of creation of the expert system of direct order is defined as follows.

At first we will find and consider the main criteria of this agrarian technology and detect some basic rules which are used in the expert system, for determination of its logics and the data output process.

We will define a step by step technique of expert system development:

Step 1. Obtaining the specification of the expert system from a wildlife area (a farm, an enterprise).

Step 2. According to the literature and requirements the main criteria for this agrarian technology according to the specification are defined.

Step 3. For each of these criteria the most significant factors influencing the breeding process are defined.

Step 4. The basic production rules according to which the programming of the system will be carried out, namely the module of logical knowledge processing, for this agrarian technology are defined. These are also input parameters (factors) of expert system development.

We can formulate the production rules of the expert system as following:

Rule No.1: if one breeds meat chicken with a productivity and a breed entered into the system, the system can calculate necessary chicken quantity.

Rule No. 2: if one breeds chicken during the periods of summer and long-term keeping, then it is necessary to add the relevant information about winter keepings (diseases, poultry house materials, a diet) to the technology.

Rule No. 3: if relative egg productivity and the meat grade are determined, the system displays only the breeds conforming to the requirements;

Rule No. 4: if the certain breed of chicken is chosen, the system shows a possibility of purchase of this breed in the recommendations.

Rule No. 5: if there is a disease during chicken breeding, the system displays the list of possible diseases and finds the recommendations about the relevant disease.

Step 5. The basic criteria are determined which will be output after processing of entrance rules of the expert system on the basis of logical conclusion, according to the corresponding agrarian technology for the set breed.

Step 6. In addition (in need of or upon the demand of the wildlife area) in the expert system form special buttons for more convenient use are designed. For example, buttons of window cleaning, the button of storage of recommendations in the separate text file, the exit button from the expert system and others.

Step 7. Testing of the developed system by users and the wildlife area.

Step 8. Acceptance of the developed system by the wildlife area and its corrections.

The interface of the expert system is presented in Figure 1.

The output rules (factors or recommendations) for the developed expert system are the following:

Recommendation No.1: the recommended rules of housekeeping;

Recommendation No.2: possible diseases and their treatment;

Recommendation No.3: the recommended diet;

Recommendation No. 4: recommendations of chicken keeping;

Recommendation No. 5: forecasting of received products.

The result of work of the logical conclusion system the expert system is given in the resulting test file saved on a disk which can be printed.

Figure 1 – The expert system of meat chicken breeding.

Conclusion. The developed expert system fulfills given tasks, namely: meets the cross-platform requirements; has a simple, convenient and intuitive interface; the knowledge base is created. Final recommendations can be saved to a pdf-file for further use.

Use of this system will allow a farm to save time by searching necessary information on agrarian technology of chicken breeding, in turn, it will raise all economic indicators of a farm and will make considerable profit.

The created expert system can be expanded both functionally (interface) and programmatically (for example, to increase the knowledge base volume).

As the prospect for development, it is possible to develop additional modules in the given expert system, namely to use it as a basis for creation of other expert systems for other animals. Therefore, the program system is quite multi-profile and will allow to use it for various farms in the future.

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Анотація. Стаття присвячена проблемі розробки сучасної експертної системи для вирощування птиці. Автор висвітлює основні особливості експертної системи: простий і зрозумілий інтерфейс, можливість формулювання запитів та винесення висновків з запитів, вибір вхідних даних, модуль рекомендацій.

Ключові слова: експертна система, тестування, програмне забезпечення, птахівництво.

Аннотация. Статья посвящена проблеме разработки современной экспертной системы для выращивания птицы. Автор освещает основные особенности экспертной системы: простой и понятный интерфейс, возможность формулирования запросов и создания выводов из запросов, выбор входных данных, модуль рекомендаций.

Ключевые слова: экспертная система, тестирование, программное обеспечение, птицеводство.

Summary. The article deals with the problem of development of the modern expert system for chicken breeding. The author highlights the main features of the expert system: the simple and clear interface, the ability to make queries and get conclusions, choice of input data, the module of recommendations.

Key words: expert system, testing, software, poultry farming.