

DEVELOPMENT OF THE MOBILE SOFTWARE APPLICATION FOR DETERMINATION OF OPTIMAL AIR IONISATION MODES

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Problem setting. Recently, the use of intensive poultry production technologies has led to measures that ensure high efficiency and conservation of poultry in the new environment [4]. The conditions in which poultry is grown significantly are influenced by such important factors as light and infrared solar radiation, natural and physical factors, etc. It is therefore necessary to provide such equipment, which would create optimal conditions for poultry [1;2].

In our country in agroecosystems the risk of emergence and spread of infectious and bacterial diseases of poultry is increased, and this leads to microbial contamination together with reduced body resistance [3;4]. The environment in industrial complexes is significantly different from the natural conditions of the poultry, and as a result this reduces the body ability to actively resist adverse environmental factors.

For the fight with the negative phenomena mentioned above in the poultry house some technical devices of air saturation with negative ions, aeroionizers, are used.

At the present stage of development of computer technologies the best way to solve the problem of improving the welfare of poultry can be performed through the introduction of modern means of creating optimal micro-climatic conditions in the premises where poultry is kept, which work in an automatic mode. It is therefore proposed to develop an algorithm of the system for development of the best aeroionization mode in the poultry house, it is advisable to implement a specialized computer system.

Analysis of recent research. There are devices for saturation of the air with negative air ions, aeroionizers [4]. Aeroionizer location in the building where poultry is kept, usually occurs at random distribution without depending on the aeroionizer agroionic field. Leading researchers in agroionic distribution modeling A. Chizhevskiy, O. Strokan, A. Churakov developed the way to get a picture of concentration distribution of agroionic radiation, which is based on geometric modeling.

The purpose of this work is to develop an algorithm of functioning of the automated system and the creation of a computer system to ensure optimal parameters of aeroionization mode in the room that would allow support air

ionization indicators in the poultry house within the limits set by the State Sanitary Regulations.

Basic research. To solve the problem of automation of the design process of aeroionizer location in the poultry house we propose to design a computer system based on Android, operation of which should be aimed at automation of the calculation and construction of favorable contour concentration of negative ions for poultry according to set parameters of air ionization mode in a building or a given area.

The introduction of such a system based on Android allows us to control and regulate the microclimate ionization options, and the resulting contours concentration of negative ions will make it possible to determine zones of agroionic comfort and discomfort in the poultry house.


The computer system (CS) of development of an optimal air ionization mode in the poultry house must implement the following functions:

- analysis and processing of input data of the geometric dimensions of space and air ionizer radiation;
- issuing recommendations on the number of installed air ionizers;
- contact of a user with the system for collecting and processing information;
- decision making on a given algorithm;
- output of control actions in the management channel;
- message output to the display terminal;
- dialogue with the operator.

According to the established requirements the software algorithm for design of automation accommodation agroionic sources of radiation in areas (Fig. 1) shall include the following stages: work begins with the launch of a program that initializes the source data applications.

There is the initialization top menu (toolbar menu), and then the opportunity to build a room with ionizers and to create an ionizer object with pre-specified parameters is given.

Then the data validity is carried out (whether all the options for building images of room ionization are specified). Also, users are given the opportunity to carry on a plane ionizer, and depending on the position to change data x, y. It also provides an opportunity to remove or edit a particular ionizer. After working with the program a user may exit the program by clicking on «Back» at the closed side menu.

The program window allows you to enter the room settings (Fig. 2a) (width, length), after entering the room settings the button «» in the main window allows the user to select the ionizer type with the corresponding values (10kW, 15 kW, 20 kW).

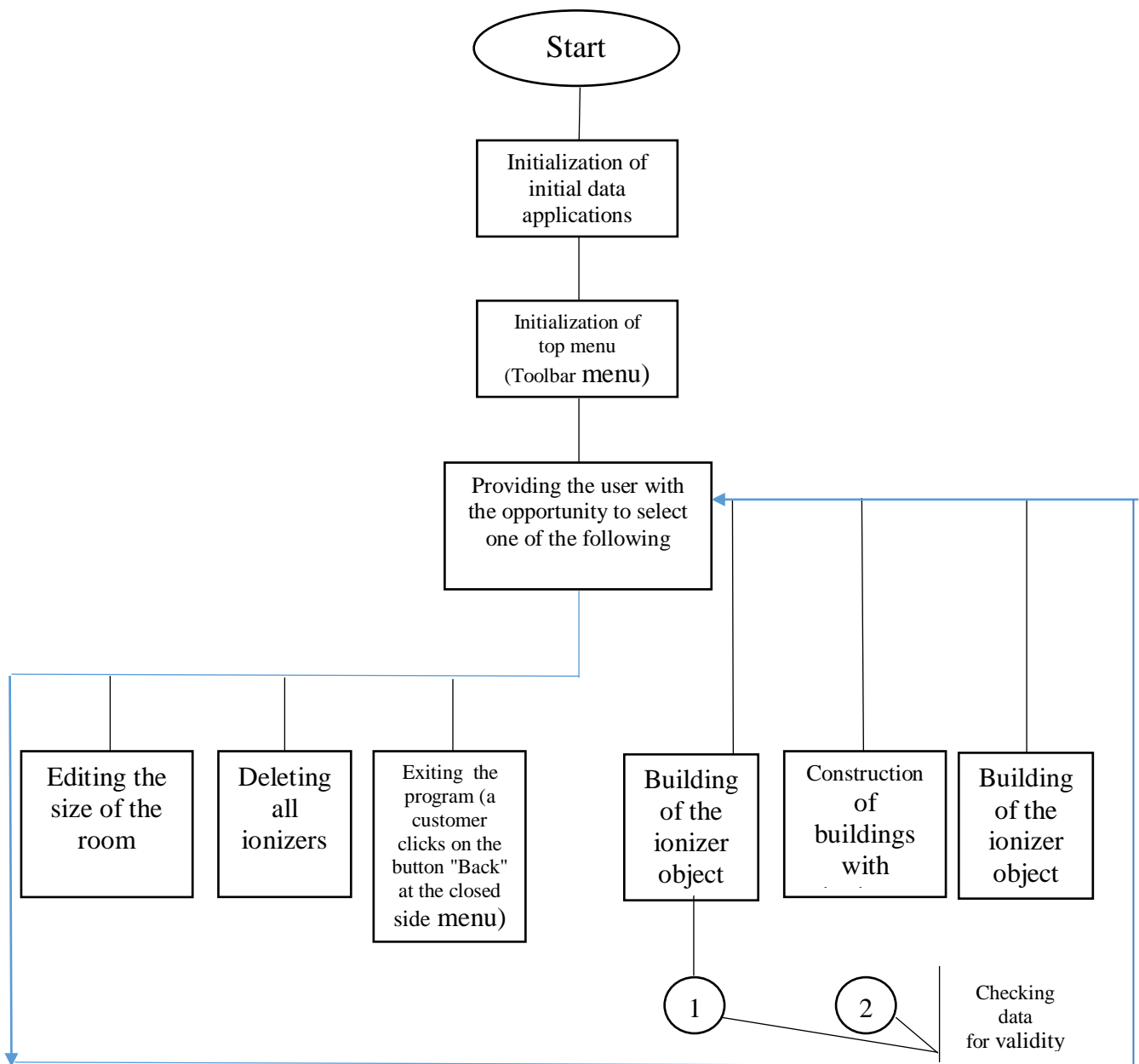
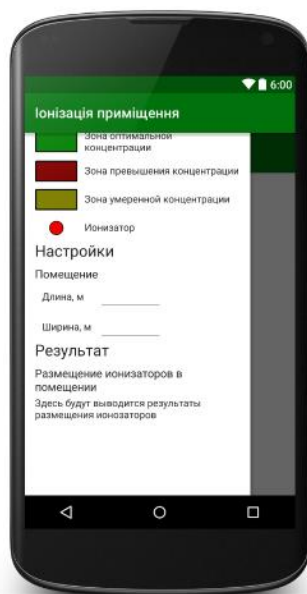
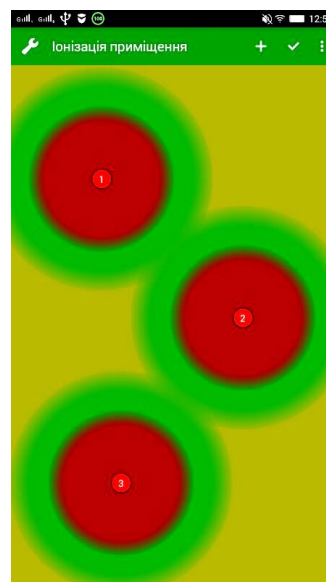


Figure 1 – The algorithm of an air ionization optimal mode in the room

After entering all necessary parameters the user taps «» to build indoors contours (Fig. 2b).



a)



b)

Figure 2 – The interface of the developed system (a) and the results of its work (b)

The main features of the proposed computer system are development of the optimal air ionization mode in the poultry house and its mobility. So, this computer system is planned to be installed on a mobile device, allowing, smoothly design the aeroionizer location directly in the poultry house and send reports via e-mail to the main workplace, where a report on paper can be printed out.

Conclusions. The computer system and algorithm determining the optimal air ionization mode in a room on Android will allow to determine the distribution pattern of air ion distribution in a room without using a PC, high investment and fulfill the design of technical system placement air ionization devices in a closed space based on geometric models.

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Анотація. Стаття присвячена питанню розробки програмного забезпечення, яке вирішує завдання, пов'язані зі створенням оптимального аероіонізаційного режиму у пташнику, а саме: створення геометричної моделі, яка залежить від параметрів приміщення та потужності іонізатора, і виведення графічних результатів на екран.

Ключові слова: аероіонізатор, Android, мобільний додаток, мікроклімат.

Аннотация. Статья посвящена вопросу разработке программного обеспечения, которое решает задачи, связанные с созданием оптимального аэроионизационного режима на птицеферме, а именно: создание геометрической модели, которая зависит от параметров помещения и мощности ионизатора, и вывод графических результатов на экран.

Ключевые слова: аэроионизатор, Android, мобильное приложение, микроклимат.

Summary. The paper deals with the problem of software development that solves the problems connected with creation of the optimum aerial ionization mode on a poultry farm, namely: creation of geometrical model which depends on parameters of the room and the ionizer power and output of graphic results to the screen.

Keywords: aerial ionizer, Android, mobile application, microclimate.