Azərbaycan Respublikası Elm və Təhsil Nazirliyi
Lənkəran Dövlət Universiteti

"BİOLOJİ MÜXTƏLİFLİYİN QORUNMASI VƏ EKOLOJİ CƏHƏTDƏN DAYANIQLI SOSİAL-İQTİSADİ İNKİŞAFA DOĞRU" MÖVZUSUNDA BEYNƏLXALQ ELMİ KONFRANSIN

MATERİALLARI

Lənkəran, 22 dekabr 2023-cü il

AZƏRBAYCAN RESPUBLİKASI ELM VƏ TƏHSİL NAZİRLİYİ
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studies of possible consequences are needed. For example, possible activation of underground karst makes additional engineering and geological studies necessary. The metro construction planned according to the General Plan on the watershed of the Volga and Samara rivers and its slopes will be carried out in a favorable area in terms of engineering and geological conditions. It is composed of a continuous cover of cheesic and deluvial loams with thickness from 5 to 25 meters. The underlying rocks are limestones, dolomites with lenses of gypsum and anhydrite of the Kazan Stage of the Upper Permian, as well as red-colored clays of the Tatar Stage. There is no permanent aquifer here. The presence of carbonate rocks may contribute to the development of karst, so the areas with clays of the Tatar layer are more favorable.

Conclusions. Firstly, the underground construction history in Samara has already more than 200 years, and nowadays there is a need to increase its volumes to solve the problems of territory shortage and transportation infrastructure development. Secondly, underground construction contributes to the activation of engineering-geological processes and in complex engineering-geological and hydrogeological conditions can lead to the deterioration of the geo-ecological situation in the city. Therefore, it requires additional research and expertise of specialists in the field of foundation engineering and geotechnics.

Elena Sidyakina
associate professor
Alexander Shevchenko
master student
Kherson State Agrarian and Economic University, Ukraine
gamajunovaal@gmail.com
alex.shevchenko.2001.1978@gmail.com

Methods and systems of operational management of agriculture and farming as an aspect of socio-economic development of Ukraine

In the 1950s and 1960s, agriculture was intensified to meet the growing demand for food in developing countries after World War II. The main mission of this "green revolution" was food security, and its goal was to achieve sufficient production volumes at affordable costs.

The intensification of food production was made possible by extensive research and development of high-yielding varieties of crops, agrochemicals (biocides, chemical fertilizers), mechanization, breeding and regulated water supply. The Green Revolution may have saved billions from starvation, while greatly increasing human well-being.

The gradual development of agriculture creates the latest methods of its management, one of which is the creation of a prognostic system. Such a model can be obtained in several different ways depending on the type of information available. A first principle model (also known as a mechanistic model, white box model, or process-based model) consists of biological, chemical, or physical principles. Examples of first-principle models include plant and animal reactions to nutrients and the environment, hydrodynamics (e.g. to describe climate dynamics in greenhouses and sheds or to describe fluid transport in algae reactors), actuator dynamics (e.g. in greenhouse technologies, irrigation). Population dynamics (e.g. for fish and pests) and classical mechanics (e.g. to describe the movement of tractors, robots and drones) describe data-based processes. Examples of descriptive models include linear regression models, neural networks, and autocorrelation models.

In this review, we make no assumptions about the type of models used for model-based surveillance and control methods. Although, models can be both mechanistic and non-mechanistic.

Agricultural processes are characterized by a dynamic response. For example, the effects of crop growth irrigation are not immediately apparent, but over several days or even weeks. This makes scheduling input over time a non-trivial task. In addition to controlled factors, other resources may not be controlled, but should be expected (e.g. precipitation, solar radiation).

In the model of prognostic systems, process dynamics and different types of input data are systematically formulated. One of the basic principles of systems theory is that each system has certain limits, input, and state. The boundary of the system is determined by determining the state variables within the system and the input variables entering the system from the outside and affecting the state dynamics.

Organisms (such as animals and crops) are inherently complex. Within the body, physiological, chemical, and physical processes at the level of tissues, cells, and molecules form large networks of interactions that drive input reactions that are almost always nonlinear (for example, doubling the feeding ration does not usually result in doubling milk production). While the physical processes (e.g., mass and heat transfer) are often relatively linear, while the chemical processes underlying physiological reactions (e.g., photosynthesis, digestion) are usually nonlinear.

Model complexity is a design aspect that is an important compromise. Very simple models are easy to obtain and require little computational effort to develop a control system. However, at the same time, oversimplification can lead to model errors that adversely affect the accuracy of forecasts. Although the development of more advanced and complex models may improve the accuracy of predictions, it may also require significant experimental and field work, acquisition of knowledge and modeling experience. Not all state evaluators and control algorithms are designed to work with high-level models. On the other hand, increasing complexity usually increases computing needs. Another possible disadvantage of high model complexity is associated with a large number of parameters, which increases the likelihood that some parameters will be difficult to determine.

When the parameter value is unknown or uncertain, the generally accepted method of decision is to estimate the maximum likelihood based on the available data. This technology allows you to automatically and dynamically measure the states of the system of interest to the manufacturer during farming and agriculture. However, it is important to note that not all states can be measured directly.

Therefore, based on the above, the possibility of observing the state of the system (for example, the climate in the greenhouse, the state of animals, the state of crops) is of great importance for accurate control. The accuracy of predicting future state trajectories largely depends on the accuracy of estimating the current state. Current states can be estimated using models, using sensor technology or a combination of these methods, and the state of the agricultural system can be estimated by data streams obtained using an impirical. Information can be combined with model predictions in a process known as data assimilation. The reason for this process is that both model predictions and measurements contain errors. Combining model and sensor information results in higher estimation accuracy than is only possible with measurements or predictions.