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SUN'IY INTELLEKT ASOSIDAGI AQLLI ARXITEKTURA YECHIMLARI ORQALI AGROTEXNOLOGIK JARAYONLARNI AVTOMATLASHTIRISHDAGI DOLZARB MUAMMOLAR

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Annotatsiya Mazkur maqolada muhandislik va agrotexnologiyalar sohasida sun'iy intellekt (SI) asosidagi aqlli arxitektura yechimlari orqali texnologik jarayonlarni avtomatlashtirishning dolzarb muammolari tahlil qilinadi. Qishloq xo'jaligi inshootlari arxitekturasi, raqamli muhandislik tizimlari, aqlli sensorlar va sun'iy intellekt texnologiyalarining integratsiyasi ko'rib chiqiladi.

Kalit so'zlar Sun'iy intellekt, avtomatlashtirish, agrotexnologiya, muhandislik, tizim arxitekturasi, robototexnika, raqamli transformatsiya,aqlli ferma, avtomatik boshqaruv.

CURRENT ISSUES IN AUTOMATING AGROTECHNOLOGICAL PROCESSES THROUGH INTELLIGENT ARCHITECTURAL SOLUTIONS BASED ON ARTIFICIAL INTELLIGENCE

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Abstract This article analyzes the current problems of automating technological processes in the field of engineering and agrotechnology through intelligent architectural solutions based on artificial intelligence (AI). The integration of agricultural building architecture, digital engineering systems, smart sensors, and artificial intelligence technologies is considered.

Keywords Artificial intelligence, automation, agrotechnology, engineering, system architecture, robotics, digital transformation, smart farm, automatic control.

АКТУАЛЬНЫЕ ПРОБЛЕМЫ АВТОМАТИЗАЦИИ АГРОТЕХНОЛОГИЧЕСКИХ ПРОЦЕССОВ С ПОМОЩЬЮ ИНТЕЛЛЕКТУАЛЬНЫХ АРХИТЕКТУРНЫХ РЕШЕНИЙ НА ОСНОВЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА.

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Абстрактный В данной статье анализируются современные проблемы автоматизации технологических процессов в области машиностроения и агротехники посредством интеллектуальных архитектурных решений на основе искусственного интеллекта (ИИ).

Рассматривается интеграция архитектуры сельскохозяйственных зданий, цифровых инженерных систем, интеллектуальных датчиков и технологий искусственного интеллекта.

Ключевые слова Искусственный интеллект, автоматизация, агротехнологии, инжиниринг, системная архитектура, робототехника, цифровая трансформация, умная ферма, автоматическое управление.

Introduction. Today, global climate change, resource scarcity, and population growth are driving the need for increased efficiency in agriculture. Therefore, the automation and digitalization of agrotechnological processes has become an urgent issue. Smart architecture solutions, especially those developed using artificial intelligence, are playing a key role in ensuring energy efficiency, productivity, and environmental sustainability in agricultural facilities.

Smart greenhouses, automated farms, and agro-complexes with digital control are shining examples of modern architectural and engineering solutions.

Smart architecture and the integration of agrotechnologies refers to the operation of buildings and structures through artificial intelligence, IoT (Internet of Things), sensors, and automated control systems. In the field of agrotechnologies, this architecture is used in the following areas: automated irrigation systems; smart greenhouses with microclimate control; energy-efficient agribusinesses; digital monitoring and forecasting systems.This integration not only optimizes technological processes, but also takes architectural solutions for agricultural buildings to a new level.

Smart architecture () is an architectural approach based on the use of modern ICT, artificial intelligence, automation systems, sensors and energy efficient solutions in the design, construction and management of buildings and structures. Its main goal is to create a comfortable, safe, environmentally sustainable and cost-effective living and working environment for humans.

In the 21st century, as urbanization accelerates, energy resources become limited, and environmental problems intensify, the concept of smart architecture is rapidly developing worldwide. This approach views buildings not as simple construction objects, but as complex systems that can independently manage their own operations.

The essence of smart architecture.Smart architecture is a modern concept formed by the integration of architecture, engineering, computer science, and ecology. In this case, all engineering systems within a building are controlled through a single control center.

Advantages of artificial intelligence-based automation artificial intelligence provides the following opportunities in the automation of agrotechnological processes:real-time data analysis;forecasting productivity;reducing water and energy consumption;minimizing errors related to the human factor;creating a stable architectural environment.

SI systems combined with smart architecture increase the functionality of agricultural facilities and serve to maintain ecological balance.

Smart architecture is an approach based on the integration of modern information and communication technologies, automation systems, artificial intelligence, sensors, and energy-efficient solutions into architectural and construction processes. Its content consists in ensuring that buildings and structures are not only aesthetically and functionally perfectly designed, but also effectively manage the process of their operation. In such buildings, lighting, heating, cooling, ventilation, safety, water supply and energy consumption are controlled through a single control system. The result is the possibility of rational use of resources, reduction of operating costs, and a high level of convenience for users.

Despite the current challenges in automation, there are a number of problems in the process of automation based on artificial intelligence: Technical problems include the high cost of high-tech

equipment; inflexibility of sensors and software; and data security issues.Economic problems include limited financial resources for small farms; long investment payback periods.

In conclusion, artificial intelligence-based intelligent architecture solutions have great potential in automating agrotechnological processes. However, the elimination of technical, economic and personnel problems is important for the effective implementation of these technologies. In the future, smart agroarchitecture is expected to be one of the key factors in sustainable development.

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