ISSN 2010-720X

ILIM HÁM JÁMIYET

FAN VA JAMIYAT

2025 (№1/1)

ISSN 2010-720X
2004-jıldıń mart ayınan baslap shıǵa basladı

ÓZBEKSTAN RESPUBLIKASÍ JOQARÍ BILIMLENDIRIW, ILIM HÁM INNOVACIYALAR MINISTRLIGI

ÁJINIYAZ ATÍNDAǴÍ NÓKIS MÁMLEKETLIK PEDAGOGIKALÍQ INSTITUTÍ

ILIM hám JÁMIYET

Ilimiy-metodikalıq jurnal

Seriya: Tábiyiy hám texnikalıq ilimler. Jámiyetlik hám ekonomikalıq ilimler. Filologiya ilimleri

Ajiniyoz nomidagi Nukus davlat pedagogika instituti

FAN va JAMIYAT

Ilmiy-uslubiy jurnal

Seriya: Tabiiy va texnika fanlari. Ijtimoiy va iqtisodiy fanlar. Filologiya fanlari

Нукусский государственный педагогический институт имени Ажинияза

НАУКА и ОБЩЕСТВО

Научно-методический журнал

Серия: Естественно-технические науки. Социальные и экономические науки. Филологические науки

Nukus State Pedagogical Institute named after Ajiniyaz

SCIENCE and SOCIETY

Scientific-methodical journal

Series: Natural-technical sciences. Social and economic sciences. Philological sciences

№1/1

Jurnal 1992-jıldan «Qaraqalpaqstan muǵallimi» atamasında shıǵarıla baslaǵan. 2004-jılda «Ilim hám jámiyet» atamasına ózgertilip, 01-022-sanlı gúwalıq penen Qaraqalpaqstan Respublikası Baspasóz hám xabar agentligi tárepinen dizimge alınǵan.

2020-jılı 7-avgustta Ózbekstan Respublikası Prezidenti Administracyası janındaǵı xabar hám ǵalaba kommunikaciyalar agentligi tárepinen qayta dizimge alınıp, 1098-sanlı gúwalıq berilgen.

«Ilim hám jámiyet» jurnalı Ózbekstan Respublikası Ministrler kabineti janındaǵı Joqarı Attestaciya Komissiyası kollegiyasınıń qararı menen tómende kórsetilgen ilimler boyınsha ilim doktorı dárejesin alıw ushın maqalalar járiyalanıwı tiyis bolǵan ilimiy basılımlar dizimine kirgizilgen:

- ***01.00.00 – fizika-matematika ilimleri;***
- ***03.00.00 – biologiya ilimleri;***
- ***05.00.00 – texnika ilimleri;***
- ***07.00.00 – tariyx ilimleri;***
- ***10.00.00 – filologiya ilimleri;***
- ***11.00.00 – geografiya ilimleri;***
- ***13.00.00 – pedagogika ilimleri;***
- ***19.00.00 – psixologiya ilimleri.***

Xulosa va takliflar. Isikava diagrammasining afzalligi shundaki, mahsulot sifatiga ta'sir etuvchi aniqlangan nuqsonning kelib chiqsh sabablarini aniqlash uchun batafsilroq shaklda tasvirlash, o'rganilayotgan muammoga taalluqli barcha omillarni aniqlash va tahlil qilish imkoniyatini beradi. Shuningdek faktorlarni tartibga solish va bog'lashda yordam beradi. Ushbu digramma bizga nuqsonlarni miqdor jihatdan baholab bermaydi, ammo ammo ularning kelib chiqish sabablarini keng ko'lamda tahlil qilish imkoniyatini taqdim etadi, bu esa mehnat va vaqt talab etadi. Ushbu diagramma foydalanish va tushunish uchun qulay va oson [8].

Biz quyidagi takliflarni berib o'tmoqchimiz:

- ishlab chiqarish korxonalarida nahsulot sifati nazorati bilan shug'ullanuvchi mas'ul shaxslarga Isikava diagrammasi, shunindek, sifat nazoratining statistik usullari va ularning ahamiyati haqida seminar-treninglar tshkil etish maqsadga muvofiq bo'lar edi;
- sifat nazoratining statistik usullari va ulardan foydalanish bo'yicha uslubiy yo'riqnomalar ishlab chiqish lozim.

Maqolamiz so'nggida, shuni aytmoqchimizki, mahsulotlardagi nuqsonlarni aniqlash, ularning zarar miqdorini baholash va so'ngra uning oldini olish choralarini ishlab chiqishdan ko'ra, nuqsonlarni keltirib chiqaruvchi omillarni qidirish, tahlil qilish va ularni bartaraf etish muhimroqdir.

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REZYUME. Ma'lumki, mahsulotni ishlab chiqarishdagi asosiy maqsad sifatli va raqobatbardosh mahsulotni ishlab chiqishdir. Bu maqsadga erishsish uchun ishlab chiqaruvchilar turli ko'rinishdagi sifat nazorati usullaridan foydalanishadi. Ushbu maqolada mahsulot sifatini nazorat qilishning statistik usullaridan biri bo'lgan Isikava diagrammasi, uning tuzilishi va mazmuni, qo'llanilishi va ahamiyati o'rganilgan.

РЕЗЮМЕ. Как мы знаем, основной целью производства продукта является разработка качественного и конкурентоспособного продукта. Для достижения этой цели производители используют различные методы контроля качества. В этой статье описывается диаграмма Ишикавы, один из статистических методов контроля качества продукции, ее структура и содержание, применение и значение.

SUMMARY. As we know, the main goal of product manufacturing is to develop a high-quality and competitive product. To achieve this goal, manufacturers use various quality control methods. This article describes the Ishikawa diagram, one of the statistical methods for product quality control, its structure and content, application and significance.

ISSUES WITH ARTIFICIAL INTELLIGENCE TECHNOLOGY APPLICATION IN THE AGRICULTURAL-INDUSTRIAL COMPLEX

D.T.Muhamediyeva – *doctor of technical sciences (DSc), professor*
Tashkent institute of irrigation and agricultural mechanization engineers -National Research University
M.Raupova – *senior teacher*
Chirchik state pedagogical university

Tayanch so'zlar: yuqori mahsuldor ekin navlari, tuproq unumdorligi, hosildorlik, yer unumdorligi, blokcheyn texnologiyasi, sun'iy intellekt, qishloq xo'jaligini optimallashtirish.

Ключевые слова: высокоурожайные сорта сельскохозяйственных культур, плодородие почв, урожайность сельскохозяйственных культур, продуктивность земель, технология блокчейн, искусственный интеллект, оптимизация сельского хозяйства.

Key words: high-yielding crop varieties, soil fertility, crop productivity, land productivity, blockchain technology, artificial intelligence, agriculture optimization.

The general definition of artificial intelligence (AI) is the ability of computer systems to carry out tasks that call for human thought. There are three types of deep learning: machine learning, deep learning, and human-made algorithms. The yield of a specific crop and variety is one of the primary indicators of soil fertility. The kind of soil

and its moisture content determine the yield. As a result of climatic factors, soil types are also somewhat compatible with air temperature and humidity. In this case, using arcane mathematical techniques is advised because productivity, weather, and water content all present numbers that are difficult to understand.

It is well known that the yield of agricultural crops has a major influence on the volume of agricultural production. Given the variations in soil, crop production is therefore extremely important from a socioeconomic standpoint. As a vital sector of the national economy, agriculture and the agro-industrial complex give people the food they need to survive. The issue of guaranteeing the high quality of finished agricultural goods for all customers is becoming more pressing in the context of expanding populations and constrained geographies.

These days, soil salinization is a major issue. Over 80% of fields that are irrigated are salinized. Applying mineral fertilizers to salty soils is not advised. Due to salinization, or the mineralization of soil, fertilizers are saline. Furthermore, mineral fertilizers in saline soils not only exacerbate the stress effect on plants, but are also absorbed by them. Among the most pressing issues is the application of cutting-edge, contemporary artificial intelligence technology to solve this one.

The package of 2019 UN Artificial Intelligence Activities has been revised by the UN. It lays out guidelines for cooperation, the use of AI, and its development in the areas of combating hunger, ensuring food security, reducing the effects of climate change, attaining excellent health results, and many other areas.

The study’s objectives are to create guidelines for cultivating high-yield crop types while accounting for soil fertility and to create a platform for evaluating crop yields and land productivity via blockchain technology and artificial intelligence in conjunction with global accomplishments. The application of artificial thinking, which is a fundamental component of information technology, is one of the more successful avenues in this field. In addition to helping to handle the issue of bettering soil quality, contemporary information technology techniques also assist in resolving the issue of managing economic operations optimally in the processing of agricultural raw materials and the creation of end goods.

An analysis conducted by the Irish company "Accenture," which offers consulting services in more than 120 countries in the areas of information technology, strategic engineering, and many other areas, indicates that by 2035, the growth rate of artificial intelligence in the G20 (the United States, the United Kingdom, Germany, France, Japan, and Korea) could potentially double. The business is aware that artificial intelligence is a vital instrument for these nations' economic growth and better governmental administration.

By early 2020, there will be ten times as many countries announcing AI development strategies as there were in 2017. Canada, Singapore, the UAE, Finland, Japan, and China were among the nations that created AI strategies in 2017. By 2019, a large number of other nations have joined that list. Specifically, Kenya, Denmark, France, Australia, Republic of Korea, India, Germany, Italy, Tunisia, UK, USA, Sweden, Mexico, and European Union. An examination of international experience demonstrates that all planned actions and advancements in AI technology are intended to safeguard and ensure a nation's social, economic, and political security through the advancement of AI technologies.

Another essential component and participant in the globalization process is Uzbekistan. A primary goal of the Republic of Uzbekistan's 2019-2021 Strategy for Innovative Development is to rank among the top 50 nations globally in terms of innovation, science, and technology by 2030. It will take significant changes to the nation's legal, social, and economic structures to accomplish these aims. Specifically, all changes ought to be grounded in the broad use of artificial intelligence and information technology in the digitization of the economy, and they ought to be aimed at resolving particular issues facing the republic's social and economic sectors.

Good agricultural products are essential to people's health today and for the rest of their lives since food is produced by the agro-industrial complex and is used by the body as a building block. As a result, there is an increasing need to enhance the quality of agricultural products. Artificial intelligence technologies play a multifaceted role in addressing these issues by optimizing economic and management processes such as planting, crop monitoring and assessment, soil cultivation, feed mixture composition, pest control, and automation of animal feeding, among other activities [1].

The declaration of 2020 as the Year of Science, Enlightenment, and Development of the Digital Economy by the President of the Republic of Uzbekistan suggests that the nation places particular emphasis on the advancement of information technologies and the shift to a digital economy. This is a revolutionary change for the better, serving the needs of the people. Within the framework of the National Development Action Strategy on Five Priority Areas 2017-2021, legal documents have been elaborated [2] to develop the digital economy by promoting the widespread use of information technologies in the nation, introducing innovations in every field, and removing existing administrative, regulatory, and other barriers.

Using mathematical computer algorithms based on the construction of specific mathematical models known as "artificial neural networks," the study consists of a qualitative assessment of soil fertility taking into account data imperfections and employing "smart" functions in the learning and adaptation process. Many issues are effectively resolved by this technology, such as the early detection of plant and animal diseases based on a qualitative evaluation of soil fertility, which enables us to promptly and precisely combat illnesses and stop them from happening. Images captured at both the macro and micro levels (such as crop fields, animal populations) can be used to analyze these kinds of events. It is possible to identify increasing diseases in both situations, and then take the appropriate action to eradicate them [3].

Computer vision and machine learning algorithms are used in satellite picture analysis. The discipline of field conditions monitoring encompasses the development of unmanned vehicles and computer vision algorithms for the purpose of tracking objects on the ground. Yields are predicted using machine learning in the field of crop and soil health analysis. The primary goal of the agro-industrial complex, which is to supply the population with high-

quality food, can be successfully solved by generalizing and systematizing knowledge about promising artificial intelligence technologies in agriculture. In the short term, this will give agriculture new competitive advantages.

As part of the analysis, mathematical computer algorithms are created based on the construction of certain mathematical models known as artificial neural networks, whose interaction of constituent parts is comparable to that of biological neural networks seen in living things. This technology is effective in resolving several issues, such as determining land fertility.

The effectiveness of advanced technology generalization and organization of information regarding innovative agricultural artificial intelligence technologies.

Suggestions for the development of high-yielding agricultural varieties that consider soil fertility, efficient methods for their production, and the creation of the best possible economic solutions by drawing on global accomplishments. One of the most productive applications in this field is the application of artificial intelligence, which is a fundamental component of information technology.

The high degree of variety in land fertility assessment problems and the approaches used to solve them is demonstrated. Thus, natural and climatic conditions, the kind of land, fertility, rate of return, the plot's location in relation to agricultural product markets, production, and the enterprise's social infrastructure all have an impact on the market value of agricultural land. The pricing strategy differs according to the type of land. Therefore, it is essential to ascertain the specifics of land use, including the kind of land use (arable land, hayfields, perennial plantations, etc.) and the degree of soil fertility, in order to calculate the market value of agricultural land.

Elements of relief that are physical. This group includes the contour, shape factors, height above sea level, normalized impact, terrain slope, and area that define agricultural land as three-dimensional surfaces in the global coordinate system.

The kind and primary directions of agricultural activity, as well as the selection of the best or most lucrative crops for a given region, are determined by natural and meteorological conditions.

The revenue generated from the site and the investments made there determine the economic aspects of land use.

Soil properties: these have an impact on the soil's fertility and yield.

Through the technological advancements discussed in the study piece, AI development currently enables the business entity to acquire priority competitive advantages and related economic benefits. Subsequently, a thorough examination of diverse artificial intelligence techniques and technologies will be conducted to identify the most suitable applications in various domains of human endeavor (agribusiness and agriculture), ascertain the most efficient amalgamation of these techniques, and validate the most optimal internal framework (software and mathematics). (Programming code and maths).

There are three steps involved in interpreting the soil cover. In the first step, areas lacking in soil cover or vegetation are identified in order to carry out the spatial limiting of the decoded area. By applying the masking technique, processing is not performed on other areas. In the subsequent phase, the gradient image is chosen by directly calculating the index. The most effective technique to depict soil continuity and the gradual change across soil types is with gradient visualization. Smoothing based on the median filter is done prior to choosing the gradient image of the soil sections. The gradient image is transformed into a discrete one via quantization in the third stage. At this point, the soil subtype plot boundaries are drawn out and the subtypes are identified.

On the basis of experimental data, it is possible to obtain a quantitative expression for the relationship of soil fertility [4-10]

$$y = a_0 + a_1x_1 + a_2x_2 + ... + a_7x_7 + a_8x_8.$$

In this problem, the content of humus in soil, %, is the state y of the system;

x_1 - volumetric mass of soil;

x_2 - plowing depth;

x_3 - dose of phosphorus application;

x_4 - dose of potassium application;

x_5 - content of nitrogen in soil;

x_6 - content of organic carbon in soil;

x_7 - average daily temperature;

x_8 - soil moisture content;

For the first phase of development of agricultural crops, one can obtain the following equation

$$z_1 = b_0 + b_1x_{11} + b_2x_{12} + ... + b_7x_{17} + b_8x_{18},$$

where x_{11} - is the dose of phosphorus application;

x_{12} - dose of nitrogen application;

x_{13} - irrigation rate;

x_{14} - sum of effective temperatures;

x_{15} - soil surface temperature;

x_{16} - relative humidity;

x_{17} - soil moisture content;

x_{18} - planting density;

z_1 - the number of fruits on the plant.

The second phase is described by the following equation

$$z_2 = c_0 + c_1x_{21} + c_2x_{22} + c_3x_{23} + ... + c_7x_{27},$$

here z_2 - is the number of fruits on the plant;

x_{21} - dose of nitrogen application;

x_{22} - dose of phosphorus application;

x_{23} - irrigation rate;

x_{24} - sum of effective temperatures;

x_{25} - soil surface temperature;

x_{26} - relative humidity;

x_{27} - planting density;

The state of agricultural crops during the ripening period corresponds to the following expression

$$z_3 = d_0 + d_1x_{31} + d_2x_{32} + ... + d_7x_{37},$$

where z_3 - is the number of ripened fruits on the plant;

x_{31} - planting density;

x_{32} - dose of nitrogen application;

x_{33} - dose of phosphorus application;

x_{34} - irrigation rate;

x_{35} - sum of effective temperatures;

x_{36} - soil surface temperature;

x_{37} - relative humidity;

Crop yield as the final state of the plant, depending on the states at the previous stages, is described by the following equation

$$z_4 = f_0 + f_1 y + f_2 z_1 + f_3 z_2 + f_4 z_3 .$$

Therefore, a key component of every socio-economic system is agriculture and the agro-industrial complex. This can be attributed to the fact that these industries and management domains supply food to people, which is a necessary prerequisite for human survival and meets their basic needs [1]. Furthermore, it should be mentioned that as food is produced by the agro-industrial complex and serves as a building block for human bodies, there is a direct correlation between high-quality agricultural products and people's present health and lifespan [2; 3]. The issue of food shortages will only worsen due to the expanding global population and the widespread need for judicial justice.

As per the authors' perspective, artificial intelligence technologies play a major role in automating various tasks related to economic and management processes. These tasks include optimizing sowing work, harvesting, monitoring crop conditions, correctly composing feed mixtures, eliminating pests, automating animal feeding, and other related tasks. This article's goal is the aforementioned. It entails organizing and generalizing information about potential artificial intelligence applications in agriculture. These applications can be effectively applied to both the fundamental duties of the agro-industrial complex—namely, supplying the population with wholesome food—and to gain new farming competitive advantages over rivals in the near future.

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REZYUME. Maqolada tuproq unumdorligini hisobga olgan holda yuqori mahsuldor ekin navlarini etishtirish bo‘yicha ko‘rsatmalar yaratish hamda global muvaffaqiyatlarga tatbiq etiladigan blokcheyn texnologiyasi va sun’iy intellekt mexanizmlari asosida ekinlar va yer unumdorligini baholash dasturini yaratish muhokama qilinadi. Bundan tashqari, zamonaviy axborot texnologiyalari tuproq sifatini yaxshilash, xomashyoni qayta ishlash va mahsulot ishlab chiqarishni optimal boshqarish masalalari tahlil qilinadi.

РЕЗЮМЕ. В статье рассматривается создание методических рекомендаций по выращиванию высокоурожайных сортов сельскохозяйственных культур с учетом плодородия почвы, а также создание программы оценки урожайности сельскохозяйственных культур и земель на основе технологии блокчейн и механизмов искусственного интеллекта, которые имеют глобальные успехи. Кроме того, анализируются вопросы современных информационных технологий улучшения качества почвы, переработки сырья и оптимального управления производством продукции.

SUMMARY. The article discusses the creation of guidelines for the cultivation of high-yielding crop varieties, taking into account soil fertility, and the creation of a program for assessing crop and land productivity based on blockchain technology and artificial intelligence mechanisms, which are applied to global successes. In addition, issues of modern information technology are analyzed improvement of soil quality, raw material processing and optimal management of product production.

COMPARISON OF BOUNDARY AND VOLUME BASED REPRESENTATION TYPES IN 3D GRAPHICS APPLICATION AREAS

P.B.Nurimov – *doctor of philosophy in technical sciences*
I.O.Isakov – *master’s student*
Tashkent university of information technologies Nukus Branch

Tayanch so‘zlar: 3D grafika, chegaraga asoslangan tasvirlash, hajmga asoslangan tasvirlash, polygon to‘rlar, NURBS, voksellar, konstruktiv qattiq jism geometriyasi, kompyuter grafikasining qollanilishi, CAD, tibbiy tasvirlash.

Ключевые слова: 3D графика, представление на основе границ, представление на основе объема, полигональные сетки, NURBS, воксели, конструктивная твердотельная геометрия, применения компьютерной графики, САПР, медицинская визуализация.

Key words: 3D graphics, boundary-based representation, volume-based representation, polygon meshes, NURBS, voxels, constructive solid geometry, computer graphics applications, CAD, medical visualization.

Introduction. Computer graphics is a dynamic field where professionals from various disciplines collaborate to create visual "windows" into digital worlds. These visual representations, displayed on devices like monitors and

M A Z M U N Í

TÁBIYIY HÁM TEXNIKALÍQ ILIMLER

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Tariyx. Huqıqtanıw. Ruwqıylıq tiykarları

TIL BILIMI HÁM ÁDEBIYATTANÍW

Til bilimi

Ádebiyattanıw