

METHODS AND APPLICATIONS OF USING ARTIFICIAL INTELLIGENCE IN SOLVING PROBLEMS OF THE DIGITAL ECONOMY

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ABSTRACT

This article will study the theoretical foundations, practical methods and areas of application of the use of artificial intelligence technologies in solving current problems in the field of digital economics. The application of artificial intelligence is analyzed in the areas of financial analysis, trade, production, agriculture and public administration. In Uzbekistan's digital economy, artificial intelligence opportunities and application barriers are assessed. Practical recommendations for accelerating national digital transformation will be developed.

KEYWORDS

Artificial intelligence, digital economy, machine learning, natural language processing, big data, neural networks, digital transformation, economic forecasting, automation.

Introduction

Annotatsiya

Ushbu maqolada raqamli iqtisodiyot sohasidagi dolzarb muammolarni hal etishda sun'iy intellekt texnologiyalaridan foydalanishning nazariy asoslari, amaliy usullari va tatbiq yo'nalishlari o'rganiladi. Moliyaviy tahlil, savdo, ishlab chiqarish, qishloq xo'jaligi va davlat boshqaruvi sohalari bo'yicha sun'iy intellekt tatbiqi tahlil etiladi. O'zbekiston raqamli iqtisodiyotida sun'iy intellekt imkoniyatlari va qo'llash to'siqlari baholanadi. Milliy raqamli transformatsiyani tezlashtirish bo'yicha amaliy tavsiyalar ishlab chiqiladi.

Kalit so'zlar. sun'iy intellekt, raqamli iqtisodiyot, mashina o'qitish, tabiiy til qayta ishlash, katta ma'lumotlar, neyron tarmoqlar, raqamli transformatsiya, iqtisodiy prognozlash, avtomatlashtirish.

Аннотация

В данной статье изучаются теоретические основы, практические методы и направления применения технологий искусственного интеллекта при решении актуальных проблем в области цифровой экономики. Анализируется применение искусственного интеллекта в сферах финансового анализа, торговли, производства, сельского хозяйства и государственного управления. Оцениваются возможности и барьеры внедрения искусственного интеллекта в цифровой экономике Узбекистана. Разрабатываются практические рекомендации по ускорению национальной цифровой трансформации.

Ключевые слова. искусственный интеллект, цифровая экономика, машинное обучение, обработка естественного языка, большие данные, нейронные сети, цифровая трансформация, экономическое прогнозирование, автоматизация.

In the current era, artificial intelligence technologies are radically changing all areas of the global economy. Large language models and computer vision systems such as ChatGPT, Gemini, Copilot are actively used not only in scientific laboratories, but also in everyday economic life. PwC estimates that artificial intelligence is expected to add \$ 15.7 trillion in added value to global GDP by 2030. Uzbekistan is also not excluded from this global process. The strategy "digital Uzbekistan — 2030", the development of a network of technoparks and IT parks, national platforms such as "one ID", "My Gov", "e-services" clearly demonstrate the country's aspiration for a digital economy. However, in terms of the scope and depth of the application of artificial intelligence, our country is still lagging behind the advanced states. This article is devoted to the development of practical recommendations aimed at reducing this difference.

Digital economy is understood as economic activity based on digital technologies. It consists of three main layers: digital infrastructure (internet, cloud computing, 5G), digital platforms and services (e-commerce, fintech, EdTech), and digital data economics (Big Data, IoT, blockchain). Artificial intelligence plays an important role in all of these three layers. Artificial intelligence technologies used in the digital economy cover several main areas:

Machine learning (machine Learning)-pattern recognition and prediction based on historical data

Deep Learning(Deep Learning) - solving complex problems through multilayer neural networks

Natural Language Processing (NLP) - understanding, translating, analyzing text and speech

Computer vision (Computer Vision)-automatic analysis of image and video data

Reinforcement learning (Reinforcement Learning) - teaching optimal decision making based on the reward system

Large language models (LLM) are systems that can communicate as human beings, learning from a wide range of textual data

The financial sector is one of the areas that most actively applies artificial intelligence technologies.

The following methods of application are common here:

Credit scoring: machine learning algorithms (Random Forest, Gradient Boosting, neural networks) estimate a client's credit ability 30-40% more accurately than traditional methods. Not only financial indicators are relied on, but also unconventional information such as social network activity, shopping history. Fraud detection: detecting suspicious transactions by analyzing millions of transactions in Real time. Systems like Visa and Mastercard check 65,000 transactions per second using artificial intelligence. Algorithmic trading: making automatic trading decisions by analyzing market trends within milliseconds. In Global stock markets, 60-70% of transactions fall on algorithmic trading systems. Robo-consultants: automatic formation and management of the investment portfolio, depending on the financial goals and risk tolerance of customers. In the field of e-commerce, artificial intelligence is widely used in the following areas:

Recommendation systems: 35% of Amazon product recommendations, 75% of Netflix Watch recommendations are formed through artificial intelligence algorithms. The combination of collaborative filtering and content-based filtering methods gives the best results. Price optimization: real-time price matching (Dynamic Pricing) depending on demand, competitors ' price, seasonality and other factors. Airlines are known to have increased their revenue by 5-8% through this method. Warehouse and logistics optimization: pre-allocation of reserves, predicting orders. Amazon has reduced delivery time by 40% through its " anticipatory shipping " technology. Virtual assistants and chatbots: customer service in 24/7 mode, automatic resolution of up to 80% of requests.

The fourth industrial revolution (Industry 4.0) is based on the integration of artificial intelligence and IoT: preventive maintenance (Predictive Maintenance): analyzing Sensor data to predict equipment failure. This method reduces the production deadlock by 50%. Quality control: computer vision systems check hundreds of products per second to detect defects 10 times more accurately than the human eye. Production optimization: reduce energy consumption, adapt production volumes to demand, reduce emissions. Digital twin technology (Digital Twin): safely test different scenarios by creating a virtual copy of a factory or equipment. The application of artificial intelligence in the agrarian sector is of particular importance for Uzbekistan: Yield forecast: forecast of yield based on weather data, soil analysis and satellite imagery. This will help farmers get a rich harvest and minimize damage. Pest and disease detection: detection of diseases at an early stage, analyzing plant images obtained through drone and smartphone cameras. Irrigation optimization: reducing water use by 30-50% using IoT sensors and artificial intelligence algorithms is strategically important in arid regions. Automated techniques: increasing agricultural labor productivity using Autonomous tractors, combines and drons.

Comparative analysis of artificial intelligence application by area

Area	Basic artificial intelligence method	Expected effect	Status in Uzbekistan
Finance/banking	ML, LLM, NLP	Cost reduction of 25-30%	Initial stage
E-commerce	Recommended systems, CV	Income growth of 15-35%	Developing
Production	IoT + ML, Digital Twin	20-40% increase in efficiency	Weak application
Agriculture	CV, sensor analysis	Yield growth of 10-20%	Pilot projects
Public administration	NLP, analytical artificial intelligence	Corruption decline 30-50%	Developing

Uzbekistan has a number of advantages in order to significantly benefit from the application of artificial intelligence. First, the young and growing population of the country is able to quickly master technologies. The young workforce also makes it possible to train quality personnel in the field of artificial intelligence. Secondly, there is a strong political will and support from the State Strategy "Digital Uzbekistan-2030" and the network of IT parks are clear evidence of this. Thirdly, sectors such as agriculture, textiles and tourism are sectors that can have great effect through artificial intelligence. In addition to opportunities, there are several serious obstacles. The lack of quality data has not yet fully formed a large amount of structured data that is "fuel" for artificial intelligence. The shortage of highly qualified personnel the number of AI specialists is only slightly lower than the demand. Infrastructure restrictions broadband internet coverage is still insufficient. Legal regulatory loopholes special legislation regulating the activities of artificial intelligence is still at the stage of formation. Problems in financing many enterprises are not able to allocate investments for the introduction of artificial intelligence. The successful implementation of an artificial intelligence application for an enterprise or state organization should include the following stages:

Stage 1. Problem identification: which business processes can be more efficient through artificial intelligence? What are the main CPI indicators? How is success measured?

Stage 2. Data assessment: size, quality and completeness of available data. The need to collect more information.

Stage 3. Technology selection: choosing a suitable artificial intelligence method depending on the nature of the problem (supervision training, unsupervised training, RL or ready-made LLM).

Stage 4. Pilot project: small-scale testing, evaluation of results, error correction.

Stage 5. Scaling: extensive system implementation and integration after successful pilot result.

Stage 6. Monitoring and improvement: continuous monitoring of Model performance, retraining with new data.

This methodology is a universal approach that works effectively for any organization, from a small startup to a large public institution.

Estonia is one of the most advanced countries in the world in the E-state and digital economy. The "X-Road" information sharing platform connects all public registers and allows citizens to provide 99% of public services online. The artificial intelligence-based tax system processes tax returns in an average of 5 minutes. Sabaq for Uzbekistan: investment in infrastructure and data integration is of primary importance.

Singapore has introduced AI-based urban governance under the Smart Nation programme. Artificial intelligence is widely used in the areas of traffic management, flood pre-detection, medical diagnostics and labor market analysis. 3.5% of the country's GDP is spent on science and innovation. Sabaq for Uzbekistan: consistent financing and structural reforms are a necessary condition for the implementation of artificial intelligence.

India is a good example of solving economic problems through artificial intelligence in the context of large populations and limited resources. The biometric identification system "Aadhaar" covers 1.4 billion citizens and provides financial integration. In agriculture, artificial intelligence-based crop prediction systems are helping millions of farmers. Sabaq for Uzbekistan: cooperation between the public and private sector (PPP model) accelerates the application of artificial intelligence.

Artificial intelligence has become the locomotive of the digital economy. It is strengthening its place as a universal tool that optimizes production, increases sales efficiency, reduces financial risks and modernizes public administration. Artificial intelligence for Uzbekistan is not only an opportunity, but also a necessity to maintain competitiveness. In the near future, there is no other way to stand in competition with the economies of the country, which have mastered artificial intelligence technologies. However, to achieve success, it is necessary to fulfill three conditions: the formation of a quality database, the training of qualified personnel and the creation of a favorable legal environment. Artificial intelligence technologies are not only for large corporations with the right approach, both small enterprises and rural farmers and local government bodies can take their share of this revolutionary transformation. To do this, however, it is enough to take the first step: identify your problem, collect your data and do not be afraid to experiment.

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