EXPLORING THE DIGITAL LANDSCAPE:

INTERDISCIPLINARY PERSPECTIVES

EXPLORING THE DIGITAL LANDSCAPE: INTERDISCIPLINARY PERSPECTIVES

Monograph

Edited by Olha Blaha
and Iryna Ostopolets

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5.8. The influence of artificial intelligence on the digitalization of society

The digitization process involves converting text, graphic, audio, and video information into a digital format for use with modern gadgets. Modern computers, laptops, MacBooks, smartphones, and tablets allow you to digitize any information.

Digitization contributes to the transformation of all government and commercial services into convenient online services. This, in turn, promotes digital transformation in education, healthcare, management, finance and banking, industry, everyday life, etc. Assistant robots during operations, virtual assistants of medical staff, personnel management are confidently entering our lives.

In Ukraine state policy in the areas of digitalization, digital development, digital economy, digital innovations, development of digital skills and digital rights of citizens is implemented by the Ministry of Digital Transformation (Ministry of Digital Transformation).

Digital computers' computer technologies are effectively and rapidly introduced into various spheres of human life. Artificial intelligence technologies are actively considered as an auxiliary tool for professional, educational, and scientific activities.

Artificial intelligence is considered a new direction of scientific research in the field of computer science, which is engaged in the development of intelligent computer systems. Such systems have capabilities that connect with the human mind, namely: understanding of language, learning, the ability to reason, solve problems.

With current trends require the use of artificial intelligence systems in corporate applications – CRM sales management systems (Customer Relationship Management), enterprise resource management systems ERP (Enterprise Resource Planning): production, personnel management, finance, logistics processes, etc.

The rapid and dynamic development of artificial intelligence technologies is based on the achievements of other innovative fields of science, such as neural networks, machine learning, natural language processing, algorithmizing of deep learning and customer-oriented processes. Compiling new machines and deep learning algorithms allows for significant expansion capabilities of machines

in solving complex tasks and to ensure higher accuracy of provided forecasts and more accurate diagnosis. In addition, today, a simple artificial intelligence tool – ChatGPT – is widely used to solve various tasks in various fields, including education, hotel business, marketing and advertising, and real estate operations. The popularity of ChatGPT confirms the significant influence of artificial intelligence on the worldview.

In our time, the amount of information that needs to be collected, stored, processed, analyzed and made informed decisions has increased significantly. The processing of extremely large volumes of data can be more effective precisely with the use of artificial intelligence technologies, as it is aimed at optimizing time-consuming tasks.

Decree of the Cabinet of Ministers of Ukraine dated 02. 12. 2020 No. 1556-r «On the approval of the Concept of the development of artificial intelligence in Ukraine» defines the priority areas in which the tasks of the state policy of the development of the field of artificial intelligence are implemented: science, information security, cyber security, justice, economy, legal regulation and ethics, education, defense, public administration (Кабмін, 2020).

Among the modern technologies of artificial intelligence, the following should be noted, which are most often used in business processes:

- artificial intelligence control systems,
- intelligent applications,
- machine learning,
- chat bots,
- enhanced intelligence (augmented intelligence).

Companies can take advantage of artificial intelligence to adapt to their business processes, e-commerce, and digital market conditions, to provide consumers and customers with recommendations on the Internet about their products. Therefore, artificial intelligence can become a promising tool for ensuring competitive advantages in the modern market.

Research predicts that the global AI market could reach $1.35 trillion by 2030, reflecting the rapid growth of AI adoption in all industries. According to IBM, the global adoption rate of artificial intelligence technologies by 2023 was 39%, which is 4 percentage points higher than the previous year (Митник, 2024).

The Ministry of Digitization has developed a Roadmap for the regulation of artificial intelligence in Ukraine. The purpose of the Roadmap is to build the brand of Ukraine as a digital state in the field of artificial intelligence. Ukraine will also have to implement the AI Act of the European Union as one of the conditions of European integration in the digital sphere. The use of artificial intelligence in Ukraine is planned in various spheres of activity.

In addition, the Ministry of Statistics is developing a virtual assistant in Diya. The task of a virtual assistant is to quickly find answers to users' questions. It is also planned that artificial intelligence will help the State Statistics Service of Ukraine to process and analyze data.

«Diya» portal is a website of public services in Ukraine. Diya is a mobile application, web portal and brand of the digital state in Ukraine, developed by the Ministry of Digital Transformation of Ukraine. The action was first presented in 2019 and officially launched in 2020.

Action provides public services online. The most popular automated services are the following (Мінцифри, 2024):

- signing documents using a digital signature (the service is provided in three minutes);

- obtaining a certificate from the State Register of Individuals about paid incomes and taxes withheld from them (the service is provided in three minutes);

- preparation of documents for participation in the program «Provision of subsidized mortgage loans to internally displaced persons» (the term of providing the service is one working day);

- automated registration without the participation of the state registrar of a natural person by a private entrepreneur, while it is possible to immediately

choose a general or simplified taxation system (submission of an application takes up to a minute, registration takes place in one minute);

- generation of an international COVID vaccination certificate with a QR code for yourself, if the correct data is entered in the register (submitting a request takes less than a minute, the term of providing the service is up to 10 minutes);

- obtaining the status of unemployed and submitting an application for unemployment benefits (submission of the application takes up to 5 minutes, processing of the application takes up to three working days);

- a simplified application form can be submitted by internally displaced persons and persons from temporarily occupied territories and territories where hostilities are taking place, in which property and documents necessary for registration as unemployed have been destroyed;

- on the basis of an automated application, stop the registration of the unemployed status (submission of the message takes about one minute);

- notification of damage or destruction of one's real estate as a result of the military aggression of the Russian Federation for the purpose of assessment and compensation of property damage caused by the aggressor (submitting a notification within five minutes);

- filing an application for obtaining a grant for the creation or development of a processing enterprise to support business and create new jobs (submission of the application takes up to twenty minutes);

- drawing up an application for obtaining a grant for the development of greenhouse farming to support business and create new jobs (submission of the application takes up to twenty minutes, processing within fifteen working days);

- drawing up an application for obtaining a grant for the development of one's own horticulture, berry growing and viticulture to support business and create new jobs (submission of the application takes up to twenty minutes, processing of the application within fifteen working days);

- filing an application for a grant to create or develop your own business to support your own business and create new jobs (submitting an application takes up to twenty minutes, processing in stages);

- the application for a grant for veterans and their family members, the allocated funding will enable everyone who has a business plan, the necessary skills and desire to start their own business (submission of the application takes up to twenty minutes, processing is phased).

- you can send an online application for marriage registration in the state registration department of civil status acts (submitting the application takes up to ten minutes, providing the service in one working day).

Most online services are provided by the state for free. The action is called the state in the smartphone. A state in the center of which is a person.

IN you can get electronic court decisions in the «Action» application. It displays the outcome of the court case. The document has the same legal force as a paper counterpart. The electronic version is used in many life situations. In particular, the document can be submitted to the State Registry of Civil Status to confirm the dissolution of marriage, present to the notary for the opening of the inheritance, etc. Electronic court decisions are part of the global digitalization of the judicial system of Ukraine,

Through the «Action» application, you can pay fines for violations of traffic rules, issued with the help of cameras for automatic video recording of violations. As soon as the cameras detect a traffic violation on the road, a push notification is sent to the smartphone, the car owner can pay the fine in a few clicks and avoid administrative liability.

In the application, pensioners' certificates for various types of pensions, tickets of students of higher education institutions, ID cards (passports), driver's licenses, birth certificates, marriage certificates, death certificates, etc., almost most of the necessary legal documents, are available.

In the «Action» application, various life events and situations are provided, explained inIt is important to know where to go and how to act in case of expected or unexpected events and situations.

For the application and the portal to work stably, for the security of personal data of users, the state protects all its basic registers in cyberspace.

So, already today you can get government services online, which are listed in Table 1.

Table 1. Government services online

	State service	Content of the state service online
1.	Electronic work	the opportunity to apply for grants for the development of small and medium-sized businesses
2.	Pensions, benefits, and assistance	the opportunity to receive services related to receiving and transferring a pension, receiving benefits, or receiving assistance
3.	Family	the opportunity to use services at the birth of a child, there are services available for large families and in case someone decides to adopt a child
4.	Licenses and permits	licenses for fire-fighting activities, permits for construction works, certificate of acceptance of the facility into operation, issuance of permits for road transportation services
5.	Security and law and order	obtaining a certificate on the absence of a criminal record, viewing a map of checkpoints, or filing a claim with the court
6.	Transport	the opportunity to receive services related to driver's documents
7.	Land, construction, real estate	issuing permits for the start of construction, obtaining land management services, providing the necessary certificates or extracts, recommendations of the necessary specialists
8.	References and extracts	obtaining certificates and extracts for all occasions in life - pension, security, transport, taxes, health, or construction, obtaining any certificate in one place
9.	Environment	submitting a declaration on hazardous waste, issuing a permit for special water use
10.	Health	given the opportunity to create adult and child COVID certificates about vaccination, about a negative PCR test and about recovery from COVID-19
11.	Documents and citizenship	obtaining documents of a citizen of Ukraine, registration of citizenship, registration for elections, access to a personal account in the voter register
12.	Entrepreneurship	creation, amendment or termination of one's own business and service of signing registration documents

Let's consider the register of administrative services that can be obtained in the «Action» application, reflected in Table 2.

Table 2. Register of administrative services

№	Administrative service	Content of the administrative service online
1.	Protection of citizens during wartime	all about assistance from the state for internally displaced persons and victims of a full-scale war
2.	Social Protection	all information about the assignment of social assistance to socially vulnerable categories of citizens, pension services, guardianship, and care
3.	To war veterans	services for combatants, persons with disabilities because of the war, victims of the Revolution of Dignity and family members of fallen war veterans, defenders of Ukraine
4.	Construction and real estate	all services related to real estate
5.	Citizenship and migration	everything about passport services, registration of acts of civil status or place of residence
6.	Agriculture	all agricultural services
7.	Transport	everything about transportation, obtaining a transportation permit, driver's license, or registration (re-registration) of vehicles
8.	Life Safety	services with sanitary and epidemiological well-being, man-made and fire safety or with objects of increased danger
9.	Earth and ecology	services related to land use, subsoil use, water use or environmental safety
10.	Intellectual Property	all about services related to copyright and related rights, patent law
11.	Foreign economic activity	services related to import and export of goods, transit, as well as customs procedures
12.	Protection and security	services related to protection and security activities
13.	Activities of business and public organizations	services related to the registration of businesses and public organizations
14.	Professional activity	services that are necessary for engaging in professional activities
15.	Production and circulation of certain types of products	services related to the production and circulation of certain types of products, such as tobacco products, alcoholic beverages, fuel, medicinal or narcotic products, food products
16.	Informatization, space and electronic trust services	services related to telecommunications or space activities, information resources and electronic trust services
17.	Finance and taxes	financial, tax or securities related services
18.	Fuel and energy complex and water supply	services related to water supply and drainage, fuel, oil and gas or energy and energy conservation
19.	Education, sports and tourism, culture, and religion	services related to educational activities, tourism, physical culture and sports or cultural heritage sites and religious activities

Currently, the Ministry of Digitization is creating a virtual assistant based on artificial intelligence in the «Action» application. At the request of users in the state language, the chatbot with artificial intelligence will provide the voice services indicated in Tables 1 and 2.

The new chatbot will be called «Nadia» and will help not only answer users' requests, but also help solve their problems.

«Nadia» will be a new generation chatbot that will communicate in «human language». In this way, it can quickly and qualitatively answer the questions of users of the «Action» application. The main goal of creating Hope is to save the time and resources of the «Diya» technical support team.

During beta testing, users will be able to teach «Nadia» to respond more effectively to various requests (Пасічний, 2024).

Thus, artificial intelligence is gradually integrated into various spheres of society and significantly transforms them. In Ukraine and other countries, work is underway to introduce artificial intelligence into the education system.

An important advantage of artificial intelligence over human intelligence is unlimited repetitive tasks. At the same time, artificial intelligence never gets tired, makes mistakes, and never makes mistakes. Therefore, automation and implementation of artificial intelligence in repetitive requests and responses can replace officials, reduce the number of human errors and free up the time of employees for the same type of work, create conditions for creative work.

Starting from 2017, the market for virtual assistants is in a state of active development: interest is reviving both from the side of users and from the side of large companies. As a result, the functionality of assistants is constantly expanding, virtual assistants are part of mobile operating systems, and separate «smart» devices with an emphasis on voice interaction are entering the market.

Using the keyboard requires the user to be constantly in front of the display, and the voice interface eliminates the need to constantly interact with the keyboard.

At the core of such voice services are artificial intelligence and machine learning technologies that help them perform many tasks quickly and efficiently.

Virtual assistants, thanks to their high performance and multifunctionality, immediately gained popularity. Today, a wide selection of virtual assistants is available to users. Each of them has its own characteristics and advantages. The most popular such universal programs are Google Assistant from Google, Alexa from Amazon, and Siri from Apple. In the basis of the computer' of computer programs is a model of natural language processing (Natural Language Processing, NLP), which allows it to recognize voice commands (Андрєєв, 2024).

As you can see, these virtual voice assistants are developed by leaders in the field of IT – the world's largest technology companies, each of which has its own specifics and advantages.

With the help of Cortana – a virtual voice assistant with elements artificial intelligence for Windows, the user can dictate documents and e-mails in basic applications, launch and switch between them, manage the operating system, format documents, save documents, edit files, efficiently correct errors and fill out forms on the Internet.

It is advisable to choose the virtual assistant Google Assistant if you use devices from Google or with Android OS, and Siri – if you use software and hardware from Apple. Amazon Alexa offers today the best solution for integration with «smart» home systems, the Internet of Things. Alexa for Business is designed for enterprise administration, providing voice recognition to control the workplace and applications.

One of the key functions of modern VAs (virtual assistants) is the ability not only to recognize and process voice commands or questions, but also to respond to them using a voice synthesizer. New AI technologies significantly expand the capabilities of such programs with self-learning algorithms that make them more efficient and personalized. For example, the best virtual assistant can remember the user's preferences, most often used commands or questions or other data (Андрєєв, 2024).

Digitization is one of the main factors in the growth of the world economy in the next 5-10 years. In addition to the direct productivity gains that companies get from digital technologies, there is a chain of indirect benefits of digitalization, such

as saving time, creating new demand for new goods and services, new quality, and value, and more.

Digital technologies: Internet of Things, robotics and cyber systems, artificial intelligence, big data, paperless technologies, additive technologies (3D printing), cloud and fog computing, unmanned and mobile technologies, biometric, quantum technologies, identification technologies, blockchain, etc.

Everyone is a consumer of digital technologies – the state, business, citizens. A digital society is a society that intensively and productively uses digital technologies for its own needs (self-realization, work, recreation, education, leisure of everyone), as well as for the achievement and implementation of common economic, social, and public goals (Фіщук та ін., 2024).

The use of artificial intelligence is spreading to more and more spheres and branches of the economy. The number of companies using artificial intelligence to one degree, or another is growing exponentially. Countries are developing national strategies for artificial intelligence, defining ethical norms and limits of use.

Today, artificial intelligence combines many technologies, the main of which are machine learning (machine learning), computer vision (computer vision), deep learning (deep learning) and natural language processing (NLP) (Фіщук та ін., 2024).

Artificial intelligence based on the processing of large data samples makes it possible to optimize processes and improve the quality of digital products and services.

Accelerated automation of production processes, robotics, and the introduction of artificial intelligence technologies into business processes have given a powerful impetus to numerous innovations. For example, there are self-driving cars that use a combination of computer vision cameras, sensors, and artificial intelligence algorithms.

Using artificial intelligence to control smart things AIoT – artificial intelligence of things, «artificial intelligence of things» combines the capabilities of artificial intelligence and IoT, so it can find application in almost all areas of human activity. Artificial intelligence of things can be learned by collecting information that

it receives from users of the system or by performing their tasks. Such technologies include machine learning, natural speech processing, voice, and face recognition.

Artificial intelligence models learn from the answers and information they receive from the experts who train them. Content is automatically generated by an algorithm, so artificial intelligence is a toolkit for voice interface innovation and optimization. Digitization of business processes in society, creation of digital products, online services and provision of virtual services accelerates the digitization of society.

Thus, artificial intelligence can be used to create unique useful products and services that are fully adapted to the user's preferences. This has a positive effect on the processes of digitalization of society.

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