

THE ARTIFICIAL INTELLIGENCE IMPACT ON COMMUNITY RECONSTRUCTION

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Abstract. Ukraine, which suffered from large-scale destruction as a result of the war, is facing the challenge of post-war reconstruction. For this process, the effective use of limited resources is important, where artificial intelligence (AI) can play a key role. We have examined the role of artificial intelligence (AI) in the post-war reconstruction of Ukraine. The main areas of its application include infrastructure reconstruction, development of the agricultural sector, medicine, education and environmental protection. AI contributes to the automation of processes, optimization of resources and acceleration of community recovery.

Introduction:

The emphasis is on the need to combine technologies with human potential, as the successful implementation of AI depends on the qualifications of specialists and regulatory regulation. AI can become an important tool for modernization, creating a model of sustainable development that will serve as an example for other countries.

Ukraine is on the verge of huge changes. After a year of full-scale invasion, the country continues to face large-scale destruction. By 2024, the damage caused to Ukraine's infrastructure reached 155 billion US dollars. The world has not seen such a scale of destruction since World War II.

Ukraine's post-war reconstruction will require enormous resources, which are always limited. Therefore, automating routine processes becomes extremely important, because human participation can be minimized. Artificial intelligence (AI) can play a key role in this task, as its technologies allow you to quickly analyse huge amounts of data and make accurate forecasts based on existing knowledge.

The use of AI in community recovery is relevant due to the need for quick and effective solutions for rebuilding infrastructure and socio-economic life. Innovative approaches allow optimizing processes, increasing safety, and improving the quality of citizens' lives. The AI use can become an example for other countries facing similar challenges and contribute to the overall development of a technological society [2].

The main areas of AI use in community restoration are shown in Figure 1.

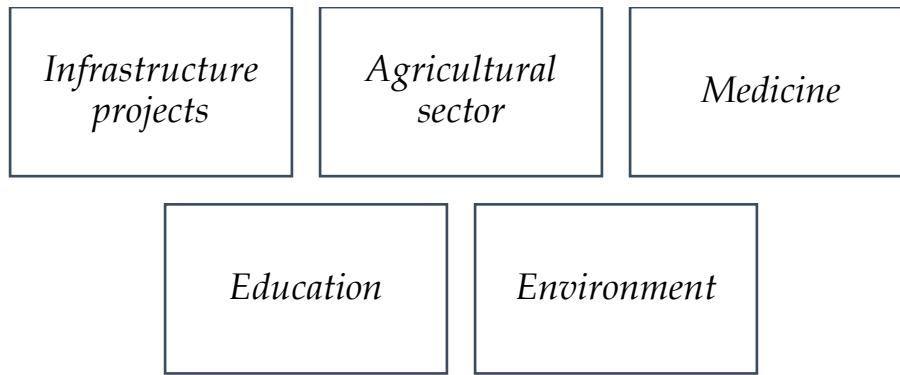


Fig. 1. *Main areas of using AI in community recovery*

Let's take a closer look at each of the main areas of use of AI in community restoration:

1. Infrastructure projects.

1.1. Planning for the restoration of destroyed buildings. Imagine a solution that receives drone footage of a destroyed building and provides a detailed analysis of the possibility of reconstruction. AI can plan material costs, create estimates, and calculate construction time. Automation of construction processes helps manage projects and optimize planning and resource management, which reduces delays and increases efficiency.

1.2. Damage assessment. A project by the Polish-American company Tensorflight demonstrates how AI can assess damage by analysing satellite images. This automates the damage assessment process, reducing the cost and time of inspections. An online waste assessment calculator also helps plan costs for dismantling, logistics, and waste storage.

1.3. Master planning of destroyed cities. AI can change the approach to urban planning, creating environmentally friendly, comfortable cities according to world standards. The technologies allow to draw up a plan for a settlement based on criteria and best construction practices. "Digital twins" - exact copies of physical objects in the virtual world - facilitate planning and the involvement of specialists.

1.4. Retraining. AI technologies help create knowledge bases for various professions, facilitating the retraining of designers, architects, surveyors and engineers. Virtual teachers help combine practice with theory, accelerating the learning and adaptation process of new specialists.

1.5. Augmented reality technologies for education. Augmented reality technologies are used in high-tech factories to create three-dimensional models of objects. This can also be applied in construction, where in augmented reality you can see a finished house with all floors and materials, which opens up almost limitless opportunities for education and reconstruction planning.

1.6. Worker Safety. Computer vision and AI ensure worker safety in the workplace. Sensors read worker movements and warn of potential hazards, reducing risks and increasing workplace safety.

2. *Agricultural sector.* AI helps analyse crop areas, black soil quality, and land restoration opportunities. Drones, satellites, and AI-powered sensors monitor plant health and soil quality. This allows for production planning, resource optimization, and meeting global demand for products.

3. *Medicine.* AI helps reduce patient admission times by automating medical record keeping. For example, the DeepScribe system uses AI to automate doctors' record-keeping. AI is also helping in surgery, using robotic instruments to improve surgical procedures, as well as in creating intelligent prosthetics that adapt to the user's movements.

4. *Education.* AI helps personalize the learning process by creating individualized lesson plans. For example, the NolejAI platform allows teachers to quickly create interactive lessons and teaching materials based on uploaded content.

5. *Environment.* As a result of the war, the environmental situation in Ukraine has become more complicated. AI can aggregate data on the quality of water, soil, and air and determine priorities for cleaning and demining territories. This allows for more efficient use of resources for environmental restoration [1].

Following the key areas where artificial intelligence can be useful for community recovery, it is also important to recognise that technologies alone is not a complete solution. They bring significant benefits, but they also come with certain risks and challenges.

Technologies will play an important role in the country's recovery, but it is not a panacea. The implementation of AI is accompanied by risks: issues of ethics and transparency of algorithms, protection of personal data, possible errors in systems and their consequences, dependence on technologies and its vulnerability to cyberattacks. The effectiveness of the use of technologies and minimization of risks depend on the qualifications of specialists. Therefore, the main resource remains people: engineers, scientists, and managers.

Ukraine needs a comprehensive recovery strategy that includes human resource development. Technologies can streamline processes in many areas, from construction to agriculture. Rebuilding the country is an opportunity to modernize existing systems, sectors, and industries. By bringing together talent and technological innovation, we can create a model of sustainable development that will serve as an example to the world. The experience gained during recovery can become a catalyst for the export of knowledge and practical skills [3].

Conclusions:

Therefore, artificial intelligence is a powerful tool for community recovery, capable of optimizing reconstruction processes and effectively using limited resources. For the successful implementation of AI, it is necessary to ensure a balance between technological capabilities and human expertise, create a regulatory framework and train qualified specialists. An integrated community recovery management system, where AI is an auxiliary tool for decision-making, can be the key to success.

Ukraine has a unique opportunity not only to rebuild what was destroyed, but also to create a model of sustainable community development using the latest

technologies, which will become an example for the world. The expertise gained during the reconstruction can become a powerful accelerator for the export of experience and knowledge. AI can significantly contribute to this process, but to achieve success it is necessary to ensure a competent combination of technological solutions and human skill.

REFERENCES

1. Economic Truth: Artificial Intelligence for the Reconstruction of Ukraine URL: <https://www.epravda.com.ua/columns/2024/10/17/720658/>
2. Center for Democracy and Rule of Law. How CSOs Can Use Artificial Intelligence to Rebuild Ukraine URL: <https://cedem.org.ua/news/shtuchnyi-intelekt-vidnovlennya/>
3. Tarasenko T. M., Certain aspects of the impact of artificial intelligence on the transformation of local self-government. Collection of materials of the international scientific and practical conference "Safe, comfortable and favorable territorial community" (October 11-13, 2023) Certain aspects of the impact of artificial intelligence on the transformation of local self-government. URL: http://repositc.nuczu.edu.ua/bitstream/123456789/19824/1/%D0%A1%D0%B1%D0%BE%D1%80%D0%BD%D0%B8%D0%BA_%D1%80%D0%B0%D0%B1_%D0%B2%D0%B0%D1%80%D0%B8%D0%B0%D0%BD%D1%82_29.12.23.pdf#page=210