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PROSPECTS FOR THE APPLICATION OF ARTIFICIAL INTELLIGENCE FOR PREDICTION AND ASSESSMENT OF THE STATE AND DAMAGE LEVEL OF BUILDINGS IN WAR AND POST-WAR TIMES

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The construction industry is one of the most important sectors of the country's economy, as it provides housing, office space and other buildings used in various areas of people's lives. However, buildings are often damaged during war or crisis, so it is important to have tools to assess and predict the level of damage. The topic of military conflicts and post-war reconstruction gained special relevance since February 24, when the Russians attacked our country.

Recently, artificial intelligence (AI) has become a widely used tool in the construction industry for predicting and assessing the level of damage to buildings. Artificial intelligence allows the collection, analysis and interpretation of large volumes of data and can be used to create accurate models that allow predicting the level of damage to buildings within Structural Health Monitoring (SHM) systems. The functionality of such systems includes prediction of remaining service life (RSL), during which the structural component is able to function in accordance with its intended purpose. The specificity of damages caused by war conflicts and natural disasters requires the use of different approaches to their assessment and RSL prediction. Assessment of the level of damage is necessary for making decisions about restoration or dismantling of the object and is a complex process that requires a lot of time and resources, while it is important not only to restore buildings, but also to ensure their safety and sustainability [1]. Traditionally, the process of dismantling buildings is based on the experience and knowledge of specialists who assess the condition of the building and develop a strategy for its demolition. However, this approach has its limitations and drawbacks. One of the possible solutions to this problem is the use of machine learning technologies. For example, neural networks [2] can be used to assess the condition of a building and predict destruction [3The use of such an approach will allow identifying problem areas and making a decision on their demolition with less time and money.

Among the main advantages of using artificial intelligence to predict and assess the condition and level of damage to buildings is the speed and accuracy of processing large volumes of data. Also, it allows to improve safety at construction sites and reduce the risk of loss of human lives in case of dangerous situations. However, there are several challenges

that must be addressed for the successful implementation of artificial intelligence in the construction industry. First of all, it is necessary to ensure the accuracy and reliability of the initial data used for modeling [4]. Also, it is necessary to resolve the issue of the availability and price of technical equipment to ensure the operation of intelligent systems. Therefore, it can be concluded that that the application of artificial intelligence to predict and assess the condition and level of damage to buildings in war and post-war times is a promising field that can help reduce risks and improve safety on construction sites. The methods of artificial intelligence should be used in particular to solve such tasks as: detecting the presence of damage on the structure, determining the types of damage and quantifying the severity of the damage. One of the most important aspects of this application is the use of data from satellites and drones to collect information about the condition of buildings and their damage. determination of types of damage and quantitative assessment of damage severity. One of the most important aspects of this application is the use of data from satellites and drones to collect information about the condition of buildings and their damage. determination of types of damage and quantitative assessment of damage severity. One of the most important aspects of this application is the use of data from satellites and drones to collect information about the condition of buildings and their damage.

The application of artificial intelligence systems to solve these problems provides increased accuracy and accelerates the detection of problems, which can help reduce risks and costs for their elimination. This is especially important in wartime, when rapid detection and repair of damage can be critical to the success of an operation. To achieve this goal, various machine learning models have been developed that are used to analyze data from satellites and drones, as well as other sources such as data from sensors and monitoring systems[5]. One of the most effective models is neural networks, which can detect complex relationships between various factors and predict the future state of a building. In addition, image processing and computer vision algorithms are used to improve the accuracy and efficiency of data analysis. Example,

Regarding approaches to train machine learning models to determine building damage levels, one of the most popular approaches is tutored learning. At the same time, data sets with known states of buildings and their level of damage are used, which are used to train the model. Another approach is unsupervised learning, which is used to detect differences in the structure of building objects and detect unusual anomalies that may indicate damage or defects. This approach can be useful for detecting damage that was unexpected or unknown at the time the model was trained. Deep learning can also be used to analyze videos and images of buildings, which provides detailed information about the condition of the building and its damage. Example, researchers in Japan used deep learning to analyze images of earthquake-damaged buildings and determined that this approach could be useful for assessing the level of damage and determining the need for repairs[6]. It is also advisable to use data analysis methods to check the presence of a relationship between various factors and the level of damage to buildings, in particular, the presence of correlations between the level of damage and the location of the building, the type of building, the type of damage and other factors.

In the future, we consider it necessary to study examples of post-war reconstruction in post-war countries using information technologies and develop a complex complex of neural networks to recognize the level of damage to buildings and predict the next plan of reconstruction or reconstruction[7].

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