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V МІЖНАРОДНА НАУКОВО-ТЕХНІЧНА КОНФЕРЕНЦІЯ

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Збірник містить тези доповідей науковців вищих навчальних закладів України та інших країн, підприємств транспортної та машинобудівної галузей за чотирьма напрямками: розвиток інтелектуальних технологій при управлінні транспортними системами; транспортні системи та логістика; інтелектуальне проектування та сервіс на транспорті; функціональні матеріали та технології при виготовленні та відновленні деталей транспортного призначення.

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ОСОБЛИВОСТІ ЗАСТОСУВАННЯ ГЕОІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ У РОЗВИТКУ МУЛЬТИМОДАЛЬНИХ ТРАНСПОРТНИХ СИСТЕМ

SPECIFIC FEATURES OF THE GEOINFORMATION TECHNOLOGIES APPLICATION IN DEVELOPING MULTIMODAL TRANSPORT SYSTEMS

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The growing role of information in multimodal transport systems emphasises the need for uninterrupted interaction and effective communication between transport companies and their customers. Information exchange, backed by common standards, is crucial to ensure the smooth functioning of these complex networks. GIS can be used to plan and develop transport infrastructure, such as roads, railways and ports, ensuring efficient connections and resource allocation.

Although the geoinformation market in developing countries is still in its early stages, its potential to revolutionise various industries is undeniable. Developed countries have long recognised the value of GIS-technologies and have been widely using them in various fields. The under-utilisation of geoinformation data management systems is primarily due to two factors: limited public awareness of their capabilities and benefits, and financial constraints associated with their implementation amidst existing economic problems [1].

At present, there are two vectors for determining the peculiarities of the sub-process characteristics of modern geographic information technologies in the multimodal transport system: researches that are focused exclusively on the issues of further development and improvement of GIS to meet transport applications; and researches that addresses the use of GIS in terms of facilitating and improving transport research. The future of multimodal transport will largely depend on the synergistic development of both GIS technologies and transport research. Both of these vectors, especially as smart cities and intelligent transport systems become more prevalent, will be widely used to model various aspects of transport systems, from traffic flow dynamics and congestion models to transport demand forecasting, as an example.

Subprocess characteristics of modern geographic information technologies can be divided into groups and described as following [2]:

1) The ability to determine an analytical assessment of the location. Maps are used to see where the object of interest to the GIS user is located and what it looks like.

2) Satisfaction of spatial conditions. The simplest query about the location of an object is based on one condition. To get an answer, it is enough to perform one standard

operation. A more complex query about the location of an object may include a certain set of conditions.

3) Possibility to quantify the time space where multimodal transport is carried out. The answer to this question is an attempt to determine the changes that have occurred in space and time, as well as the trends of these changes in a certain territory. By storing and comparing maps obtained in different periods, GIS allows o conduct a temporal analysis, in other words, to identify the dynamics of changes.

4) The ability to characterise the structure. Identifying spatial structures is a complex issue that requires a set of powerful spatial analysis tools.

5) The ability to qualitatively assess various scenarios. In such and similar cases, the user uses the model to predict and map potential impacts.

As multimodal transport systems continue to grow and evolve, the integration of GIS technologies with artificial intelligence, big data, predictive analytics and environmental monitoring is crucial to assess system performance, optimize resource use, predict environmental impact and ensure effective management. These technological advances will not only make transport systems more efficient and sustainable, but will also contribute to the development of smart cities and integrated urban mobility solutions in the near future. In addition, the use of predictive modelling and big data for performance evaluation allows for better forecasting of development needs and optimization of multimodal transport systems based on large amounts of historical data on current transport activities.

Despite the significant benefits of using such technologies, there are challenges that need to be overcome. These challenges include the need for advanced data processing approaches, integration of data from different sources, and ensuring that data is accessible and shared among stakeholders. In addition, the integration of socio-economic factors and the involvement of interested parties is crucial for integrated management of resources [3].

It should be noted that these problematic characteristics of the multimodal transport system are also dominant for applied remote studies of other types of transport systems and its functional components as well. The growing interest has been significantly stimulated by the desire to utilize existing remote sensing data for both scientific and practical purposes, including commercial applications.

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