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**USE OF INFORMATION TECHNOLOGY AND ARTIFICIAL INTELLIGENCE TO SOLVING TRANSPORT LOGISTICS PROBLEMS**

Modern business conditions are accompanied by a high level of dynamism, uncertainty and competition, which significantly complicates the processes of managing material flows and transport logistics in particular. Constant changes in cost indicators, instability of demand, delays in deliveries, unpredictable external factors - all these factors require the search for new, more flexible and technologically advanced approaches to planning and optimizing logistics processes.

Planning and optimization of transport flows play a central role in the management system of enterprises. Traditional methods for solving transport problems often do not take into account stochastic factors or have limited efficiency when processing large amounts of data. That is why the relevance of using modern information technologies, artificial intelligence and algorithmic methods for solving such problems in complex conditions of uncertainty is growing.

In addition, global logistics systems are increasingly facing challenges associated with crisis phenomena, such as pandemics, geopolitical instability, and disruptions in the supply of critical components. This creates an urgent need to create adaptive and resilient logistics solutions. The use of digital technologies, including artificial intelligence, allows not only to ensure the flexibility of logistics chains, but also to achieve a high level of transparency and predictability of operations.

The dissertation research is devoted to the development of models and methods of transport logistics under conditions of uncertainty using modern information technologies. The main attention is paid to the application of machine learning algorithms for forecasting demand, identifying potential delays in supply chains and developing adaptive transport flow management systems. Special emphasis is placed on solving multi-index transport problems that take into account several parameters simultaneously: costs, delivery time, risks of non-fulfillment of obligations, fluctuations in fuel prices and load on transport corridors.

The choice of tools for conducting the study is due to the need to process large amounts of data and flexibly configure models. The use of the Python programming language [1] in combination with the Pandas [2], NumPy [3], Scikit-learn [4], TensorFlow [5] and PuLP libraries provides high performance when working with data and efficient construction of optimization models. The Pyomo [6] and OptaPlanner [7] frameworks allow formalizing transport problems as linear or integer programming problems, as well as applying stochastic programming approaches to take into account random factors.

In addition to classical algorithms, the research actively uses artificial intelligence methods: genetic algorithms, particle swarm optimization, and multi-agent systems that allow modeling the behavior of a large number of autonomous agents in a transport network. The use of such approaches allows for the formation of strategies that are adaptive to changes in the environment, rapid response to supply chain disruptions, and optimization of transport route loading in real time.

Data-driven approach in the research plays a key role. It involves the use of real data from logistics operators to build more accurate models. Taking into account historical data allows us to take into account the specifics of previous periods and increase the accuracy of forecasting. Moreover, real-time flow analysis provides the opportunity to quickly detect deviations from planned indicators and timely adjust routes and vehicle loading using the Pandas [2] and NumPy [3] libraries, as well as machine learning tools available in Scikit-learn [4] and TensorFlow [5].

To build algorithms for optimizing routes under conditions of stochastic uncertainty, models implemented in Pyomo [6] are used, and for complex combinatorial problems, OptaPlanner [7] is used, which effectively copes with planning transport flows in real time. In addition, to work with large amounts of input and output data, the Python library [1] is effectively used, which provides flexibility in integrating system modules and high calculation performance. An important component of the software implementation is also a deep study of the Python language [8], which provided the possibility of creating scalable solutions for transport logistics.

Another important aspect of the study is ensuring information security in logistics systems. Since the processing of large volumes of sensitive data about routes, suppliers and customers is associated with potential risks of information leakage, the work pays attention to the implementation of data protection mechanisms. The use of encryption protocols, as well as the integration of cyber security tools into the infrastructure of logistics platforms, is considered, which allows ensuring the integrity and confidentiality of information.

The expected results of the research include the creation of a software module to support decision-making in transport logistics, which will reduce operating costs by 15–20% in test scenarios. Such a tool will help enterprises quickly adapt to changes in the market situation, improve the level of customer service and ensure the stability of supply chains in difficult conditions. From a scientific point of view, the research will contribute to the improvement of approaches to solving stochastic transport problems and the adaptation of artificial intelligence algorithms to conditions of uncertainty.

In the future, it is planned to expand the functionality of the developed software module through integration with IoT platforms, which will allow receiving data in real time from vehicles and logistics centers. The possibility of connecting the system to cloud services to scale computing power and expand analytical capabilities is also being considered. Further research involves improving information security mechanisms, which is critically important for data protection in modern digital logistics systems.

In conclusion, a comprehensive approach to solving transport logistics problems, which includes a combination of mathematical modeling, artificial intelligence, data-driven methodology and information security tools, allows not only to optimize logistics processes, but also to increase the overall resilience of business systems to external challenges. The results of the study have significant theoretical and practical significance, and the proposed models and methods can be integrated into real logistics systems to increase their efficiency, sustainability and competitiveness in a dynamic business environment.

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