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THE TRANSFORMATIVE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) AND AUTOMATION ON THE LOGISTICS INDUSTRY

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Annotation. Our main goal in this article is that in today's digital age, artificial intelligence (AI) and automation technologies are making fundamental changes in the logistics industry. These technologies significantly accelerate the processes of cargo transportation, warehouse management, and delivery, contributing to increased efficiency.

Keywords. Artificial intelligence (AI), logistics managers, drivers, customers, optimization, algorithms, warehouses, technologies, competitor.

The logistics industry is not new to process-transforming innovations and changes. However, it's no exaggeration to say that nothing has had such a profound impact and innovation on the logistics industry as artificial intelligence (AI) and automation technologies. In today's digital age, artificial intelligence (AI) and automation technologies are carrying out fundamental changes in the logistics industry. These technologies significantly accelerate the processes of cargo transportation, warehouse management, and delivery, contributing to increased efficiency. Logistics managers, drivers, and clients - all are experiencing the influence of artificial intelligence (AI) and automation in logistics. While some companies have not yet adopted AI-based logistics, others are benefiting from increased efficiency, reduced costs, and improved customer experience. When considering the transformational power of artificial intelligence (AI) and automation in logistics, it turns from reactive, problem-solving operations to predictive and proactive operations of logistics and route planning. All thanks to artificial intelligence (AI) and automation[1].

1. Rational route planning for accuracy and delivery speed

Route optimization is the achievement of different levels of efficiency and accuracy with the introduction of artificial intelligence in logistics. The ability of AI-based route planners to provide the most effective routes in every task. Their algorithms are programmed to take into account several factors, such as the number of stops, priority stops, delivery windows, car capacity, etc. In addition, route planners based on artificial intelligence allow park managers to dynamically configure routes along the way. This is mainly done to rationally satisfy changes in the last minutes due to customer requests. Rational route planning promises accuracy and speed of delivery. This is the most effective formula for ensuring happy clients. In addition, route optimization based on artificial intelligence will reduce fuel costs and increase business profitability.

The main advantages of artificial intelligence (AI) and automation

1. Increased efficiency - Artificial intelligence (AI) accelerates logistics processes by analyzing data and determining optimal routes.
2. Reduction of errors - With the help of artificial intelligence (AI), cargo tracking and inventory processes are carried out more accurately.
3. Reduction of operating costs - Automated systems reduce labor costs by reducing the volume of manual work.

4. Quick and accurate decision-making - Artificial Intelligence (AI) processes data in real time and provides quick solutions.
5. Improved quality of customer service - Smart chatbots and automated systems can quickly respond to customer requests.

2. Predictive analytics: risk forecasting and mitigation

Route planners based on artificial intelligence are equipped with data processing capabilities for route analysis and forecasting to provide the most optimized routes. Machine learning algorithms allow route planners to analyze data accuracy and continuous route data. By combining these two concepts, these systems can anticipate and identify and prevent supply disruptions and risks. The rational use of forecasting analysis helps to prevent delays in delivery and unplanned detours. Fleet managers with the ability to predict disruptions and adapt to prevent delays can provide continuous operational updates to increase customer satisfaction.

3. Logistics automation: key to economies of scale

In the logistics industry, it is necessary to apply automation not only to the use of robots in warehouses, but also to other areas of logistics. Logistics automation helps create interconnected systems to regulate each aspect of the supply chain without excessive dependence on regular manual interventions. From automated planning to shipment coordination and invoicing, automation reduces manual workload and increases operational accuracy. Intelligent AI-based systems automate repetitive tasks such as driver appointment, dispatch planning, and even compliance documents. This eliminates obstacles, reduces errors, and accelerates the overall workflow. The application of automation in logistics processes allows for faster task completion and significant savings in labor costs. Automation allows park managers to focus on valuable tasks such as strategy and customer relationship management, while ensuring the smooth operation of the logistics mechanism based on artificial intelligence in practice[2].

The impact of artificial intelligence (AI) and automation on logistics directions.

- Warehouse management and automated systems. Robots and automated systems equipped with artificial intelligence (AI) optimize product sorting, placement, and delivery processes. For example, in Amazon warehouses, robots are performing the processes of efficient placement and collection of cargo.

- Transportation and Delivery Processes. With the help of artificial intelligence (AI), it is possible to optimize cargo routes. Autonomous trucks and drones reduce delivery time and fuel consumption.

- **Inventory and forecasting.** Artificial Intelligence (AI) prevents excess or shortage by forecasting the supply and demand for products. Also allows you to track product movements in real time.

- Improve customer experience. Artificial Intelligence (AI) can analyze customer behavior and offer personalized services. Chatbots based on artificial intelligence (AI) create a fast customer service system[3].

Real-time tracking and viewing: complete control of shipments.

Route planners based on artificial intelligence use real-time tracking, which consists of observing the object's location and route direction during the tracking process, and tracking dispatchers can access live data to obtain a second view of each delivery vehicle and monitor the development status. These concepts allow the accompanying dispatchers to make the necessary adjustments to the delivery routes if necessary. AI-driven real-time tracking and park visibility allows for instant communication with drivers and route change, ensuring that no delivery is delayed and customer demand is always prioritized[4].

Automated delivery to notify customers is - The customer must always be aware of every step of the workflow. The modern client hates the fact that the workflow is hidden and unclear. In the case of delivery, it is necessary to notify the client in advance of possible delays or delays. With AI-driven chatbots and automated delivery systems, these AI-based capabilities have completely changed the way businesses communicate with their customers. Chatbots based on artificial intelligence use Natural Language Processing (NLP) technology to understand and respond to customer requests[5].

Future trends - The role of artificial intelligence (AI) and automation in the logistics industry is expected to continue to grow. Autonomous vehicles, smart warehouse systems, and AI solutions integrated with IoT can usher in a new revolution in this field.

Conclusion

The impact of artificial intelligence (AI) and automation on the logistics industry cannot be ignored. Although traditional logistics doesn't speak of the error-prone nature of planning, hours of planning and manual work can be completed in minutes, which ensures ultimate accuracy.

Artificial intelligence and automation play an important role in transforming the logistics industry into a more efficient, economical, and precise system. Thanks to these technologies, it is possible to improve operational processes, reduce costs, and improve the quality of customer service. In the future, these technologies will develop further and lead to a radical change in the entire logistics system.

Logistics based on artificial intelligence will help you stay one step ahead of competitors and ensure that your clients never doubt the quality of service. However, it becomes clear and obvious that it is the right tool for route planning for enterprises to fully benefit from artificial intelligence-based logistics.

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