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THE USE OF THE INTERNET OF THINGS (IOT) IN LOGISTICS

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Анотація

В доповіді досліджено використання Інтернет речей (Internet of Things) в логістиці. Виділено та проаналізовано переваги використання IoT – системи трекінгу в логістичній галузі.

Ключові слова: логістика, Інтернет речей.

Abstract

The report examines the use of Internet of Things (IoT) in logistics. The advantages of using the IoT tracking system in the logistics industry are highlighted and analyzed.

Keywords: logistics, Internet of Things.

Introduction

The internet of things (IoT) transforms ordinary objects into new devices, creating both smart watches and smart cities. It connects previously disconnected objects to the internet, providing them with new functionalities.

The term “Internet of Things” was first created at the end of the 20th century, in 1999. It represents the concept of objects (“things”) communicating with each other and with the environment using technologies. This concept also involves devices performing certain actions without human intervention. Thus, all devices in users’ houses and cars process information, analyze it and exchange it among themselves and, depending on the results, make decisions and perform certain actions.

The IoT sphere is one of the major global trends. Traditional devices become part of the internet network and perform new functions. It’s no wonder that this field is considered the driver of the ongoing 4th industrial revolution worldwide. An IoT expert is someone who will definitely change the future [1].

Research Results

The Internet of Things (IoT) encompasses a wide range of devices capable of interacting and communicating with each other through the internet. Today, this concept finds application in all spheres of human life. Statistics show that the number of internet-connected devices has long overtops the world's population, and their using provides comfort and produces productive solutions in business.

IoT logistics includes a lot of devices such as “smart” plugs, energy meters, activity trackers, and more. Indoor navigation and monitoring systems can also be considered as IoT elements and effectively used in logistics companies. With help of this platform, managers can save on equipment maintenance, gather data on the condition of vehicles, and monitor staff activities at the enterprise [2].

In addition to the mentioned devices and IoT systems, logistics integration may include smart device integration in warehouses and storage yards. For example, automated warehouse systems using IoT-controlled workplaces can speed up the processes of storing and shipping goods.

Furthermore, with the use of monitoring and analytics applications based on IoT, management can provide detailed analysis of work processes, allowing them to improve and increased productivity. For example, analyzing staff movement data can aid in determining the optimal placement of equipment and materials in the warehouse, reducing time spent on searching and preparing for shipment [3].

In logistics, there are always risks associated with theft, irrational use of funds and spoilage of goods due to improper storage or weather conditions. The use of an IoT tracking system in the logistics industry allows you to avoid such problems and get many advantages:

1. Operations Automation:

– Automating operations using “smart” IoT devices opens up a wide range of possibilities for rising efficiency and reducing energy costs across various spheres of life and business.

– Utilizing “smart” sockets and devices allows automating the shutdown of electrical appliances in places where necessary, such as turning off lights or electronics in rooms when they are not in use. This helps avoid unnecessary electricity consumption and reduces utility bills.

– With the help of “smart” thermostats, temperature regulation in rooms can be automated according to weather conditions or the schedule of the day. This ensures comfortable living and working conditions while also helping to efficiently utilize energy without overheating or overcooling the rooms.

– Automating the opening and closing of doors using “smart” locks or access control systems not only provides convenience but also improving security. Owners can remotely control access to their property and set schedules for door opening and closing.

– Using “smart” lighting systems in the office can help reduce energy consumption and provide optimal working conditions for employees.

– “Smart” IoT devices typically provide the capability to collect data and analyze it to understand patterns of energy consumption, room utilization, etc. This enables better managerial decisions to enhance efficiency and resource savings.

2. Inventory Monitoring:

– Utilizing IoT devices allows the automation of inventory monitoring processes, making them more efficient and accurate. Collecting data on the level of stocks in real time allows enterprises to quickly respond to changes and avoid shortages or excesses of goods.

– Analysis of data collected through IoT devices can help businesses forecast demand for products. This allows for inventory optimization, reducing risks associated with excess or shortage of goods.

– Inventory monitoring allows businesses to better manage warehouse space, product placement, and rotation. This can improve warehouse space utilization efficiency and reduce costs associated with its maintenance.

– Increased accuracy of inventory monitoring helps to avoid loss of goods due to delay, damage or theft. With the help of IoT devices, security and tracking systems can be installed, which allows you to quickly respond to potential problems.

– Optimizing inventory management through IoT helps businesses reduce inventory holding costs and optimize their use, which allows you to quickly respond to potential problems.

3. Space Optimization:

– Internal navigation systems allow to make it possible to use the available space in the warehouse as efficiently as possible. They help to identify optimal storage locations for goods and rationalize their placement, reducing minimal empty spaces and maximizing warehouse capacity.

– With internal navigation systems, the precise location of goods in the warehouse can be determined, significantly facilitating the processes of locating and selecting items during order picking. This speeds up order processing and reduces the likelihood of errors.

– With accurate information about the placement of goods in the warehouse, companies can optimize logistic processes and ways of moving goods. This helps to reduce delivery times to customers and improve inventory turnover.

– Increased employee productivity: Internal navigation systems enable the optimization of employee movement routes in the warehouse, increasing their productivity and reducing the time spent on movement.

– Internal navigation systems typically provide the capability to collect data on the movements of goods and employees in the warehouse. This information can be used for process efficiency analysis, pattern identification, and improvement of inventory and logistics management strategies.

4. Enhancing Safety:

– Trackers can be programmed to remind workers about safety while performing specific tasks or being in certain zones. For example, when a worker approaches a dangerous area, a tracker can automatically send warnings about potential risks and necessary safety measures.

– In case of emergencies such as accidents or safety threats, trackers allow for the prompt tracking of workers’ locations and providing them assistance. This helps reduce response time to events and minimize the risk of injuries.

– By analyzing data collected from trackers, areas in the workplace where accidents occur more frequently or where the risk is highest can be identified. This allows measures to be taken to improve security in these specific areas.

– Some trackers can be equipped with sensors that track workers' physical conditions, such as pulse or stress levels. This allows for timely detection of cases of overexertion or poor worker health and reacting to them.

– Using trackers for activity tracking can also contribute to raising workers' awareness of the importance of safety at work. Knowing that their movements are being tracked and assistance is provided in case of danger may encourage them to behave more responsibly in the workplace.

5. Analytics and Process Optimization:

– Data from IoT devices can provide information about various aspects of manufacturing processes, such as cycle time, production quality, energy consumption, etc. By analyzing this data, it is possible to identify opportunities for process optimization, identify problematic aspects, and implement appropriate improvements.

– Data from IoT devices can help track the movement of goods, inventory levels, and demand in real-time. Analyzing this data allows for inventory optimization, avoiding shortages or excess, reducing inventory holding costs, and increasing turnover.

– Data from IoT devices can be used to analyze customer behavior, preferences, and purchasing habits. Based on this data, you can develop personalized approaches to customer service, increase their satisfaction and loyalty.

– By analyzing data from IoT devices, areas where costs can be reduced, resource utilization optimized, and employee productivity increased can be identified.

– Data analytics from IoT devices can assist in forecasting market trends, demand for goods, and other factors affecting business. This enables companies to develop more effective strategies and development plans [4].

Therefore, the implementation of IoT technologies in logistics companies can help not only reduce costs and improve efficiency but also ensure greater safety and control over processes.

Conclusion

The implementation of the Internet of Things (IoT) in logistics opens up numerous opportunities for process optimization and improving business efficiency. With the use of smart devices, monitoring systems, and analytics, companies can reduce costs, improve safety, optimize space, and ensure greater process control. Therefore, the implementation of IoT represents a crucial step for modern logistics companies in supporting their development and competitiveness.

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