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Збірник включає матеріали доповідей учасників конференції, які об'єднані за тематичними напрямками конференції.

Збірник буде корисним як для фахівців і працівників фірм, зайнятих в області IT та автоматизації, так і для викладачів, магістрів і студентів вищих навчальних закладів, які навчаються за напрямами і спеціальностями програмного забезпечення, обчислювальної техніки і автоматизованих систем, прикладної математики та обробки інформації, буде корисним професіоналам з комп'ютерного моделювання та розробки комп'ютерних ігор.

Результати досліджень у збірнику представляють собою своєрідний зріз сучасного стану справ в перерахованих галузях знань, який може допомогти як фахівцям, так і студентам університетів скласти загальну картину розвитку інформаційних технологій та пов'язаних з ними питань.

Наукові праці згруповані за напрямками роботи конференції та наведені в алфавітному порядку прізвищ авторів.

Матеріали (тези доповідей) друкуються в авторській редакції. Відповідальність за якість та зміст публікацій несе автор.

Матеріали подано українською та англійською мовами.

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The collection includes materials of reports of conference participants, which are united by thematic areas of the conference.

The collection will be useful for professionals and employees of companies engaged in the field of IT, as well as for teachers, masters and students of higher education institutions studying in the areas and specialties of computer software and automated systems, applied mathematics and information processing, will be useful to professionals on computer modeling and development of computer games.

The results of research in the collection are a kind of slice of the current state of affairs in these areas of knowledge, which can help both professionals and university students to get a general picture of the development of information technology and related issues.

Scientific papers are grouped by areas of the conference and are listed in alphabetical order of the authors.

Materials (abstracts) are published in the author's edition. The author is responsible for the quality and content of publications.

Materials are submitted in Ukrainian and English.

Editor-in-Chief of the collection Sergii Kotlyk.

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DESIGN OF A WEB-BASED INVENTORY MANAGEMENT MODULE FOR A COMPANY

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This publication justifies the need for the digital transformation of warehouse logistics within the Industry 4.0 framework. It examines the design of a web-based inventory management module to facilitate the transition from paper-based document flow to a unified information space. The architectural features of the system are identified, including integration via a REST API with ERP/WMS, automated inventory tracking, and inventory control. The module’s development prospects are outlined: a transition to microservice architecture, the use of barcoding, mobile terminals, and machine learning methods for demand forecasting. The implementation of the module will ensure scalability, cost optimization, and improved effectiveness of management decisions.

The current development of the Industry 4.0 concept necessitates the digital transformation of enterprises’ logistics processes, a key component of which is warehouse automation. In this context, inventory management information systems serve as the foundation for building a digital enterprise, ensuring the integration of material, information, and financial flows within a unified information environment. The use of web-based technologies enables scaling software solutions, centralized administration, and real-time access to information regardless of the user’s location.

In today’s rapidly digitizing economy, effective management of warehouse resources is a critically important factor in a company’s competitiveness. The warehouse is no longer merely a place for storing

goods; it has become an information and logistics hub where the speed of data collection and processing directly influences the quality of management decisions.

The design of a web-based inventory management module provides centralized, real-time access to up-to-date information, automates key business processes, and increases transparency into the movement of physical assets. The use of web technologies enables users to access the system from any device without installing specialized software, simplifies administration, and facilitates integration with other corporate information systems.

One of the promising areas for the development of warehouse information systems is the integration of the software module under development with ERP-class corporate information systems and specialized warehouse management systems (WMS). Such integration ensures synchronization of data across procurement, production, sales, and logistics, significantly reducing data duplication and improving the reliability of management data.

The relevance of this study stems from the need to transition from paper-based document flow and isolated spreadsheets to modern web-based information systems that minimize the human factor, ensure data accuracy, and support timely decision-making.

The subject of this study is the process of managing warehouse inventory at a manufacturing and trading enterprise. The study examines methods and tools for designing a web-based module to automate warehouse accounting.

During the pre-project analysis, the following typical problems were identified: slow data entry, high risk of errors, delays in updating inventory levels, the complexity of conducting inventory counts, the lack of a unified information space, and insufficient analytical support.

The proposed module provides for maintaining product, supplier, and warehouse directories; recording receipts and shipments; automatically calculating inventory balances; monitoring minimum stock levels; generating reports; maintaining an audit log of user actions; and assigning access rights based on roles.

Future development prospects for the system include integration with barcode and QR code scanning, the use of mobile data collection terminals, inventory demand forecasting using machine learning, integration with ERP and CRM systems, the creation of management dashboards, and the visualization of warehouse areas on a 2D map.

Further development of the software can be achieved by transitioning to a microservices architecture, in which individual functional modules (inventory management, user management, reporting, analytics, and notifications) operate as independent services (Fig. 1). This approach increases the system's fault tolerance, simplifies software maintenance, and ensures effective horizontal scaling in response to workload.

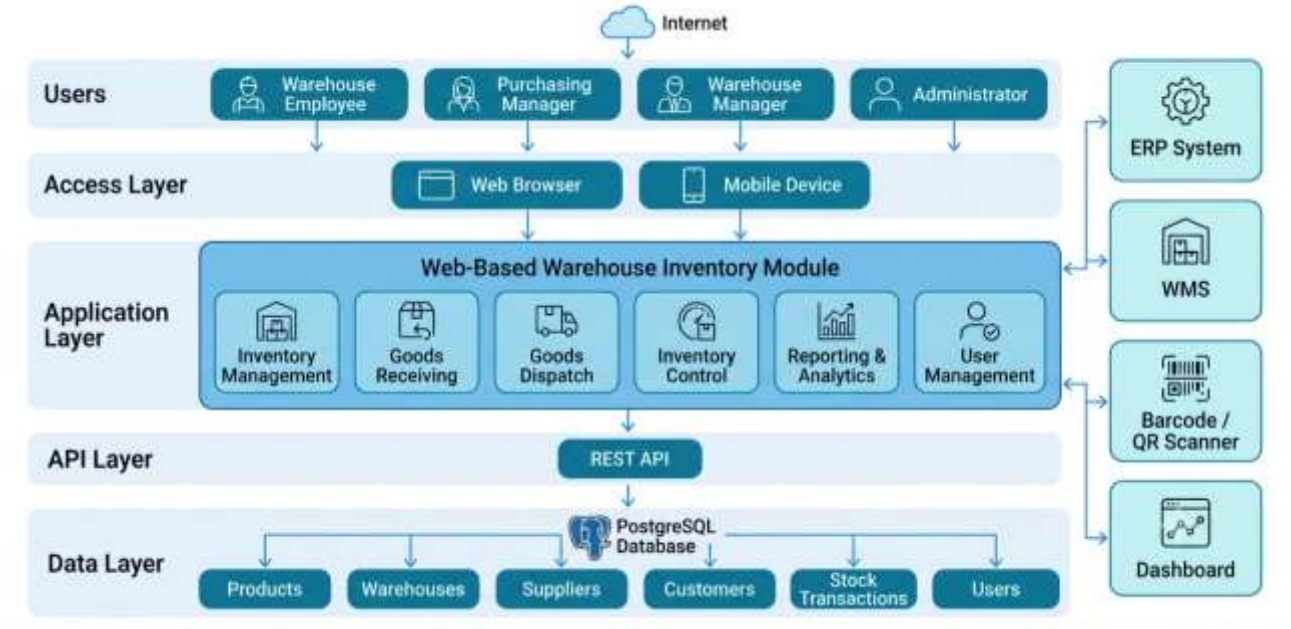


Fig. 1. Architecture of a web-based warehouse inventory management module

An important area of development for the system is the use of data analytics and demand forecasting methods to support managerial decision-making. Analyzing historical data on the movement

of goods enables forecasting inventory needs, determining optimal reorder points, and minimizing the risk of shortages or excess inventory. In the future, these capabilities can be implemented using machine learning and intelligent data analysis methods.

The proposed web-based inventory management module aligns with current trends in enterprise digital transformation and the principles of building next-generation information systems. The use of web technologies, integration via REST APIs, support for interaction with ERP and WMS systems, and the possibility of a future transition to a microservices architecture lay the groundwork for a scalable, reliable, and efficient software solution. The practical implementation of the developed module will improve the efficiency of material resource management, reduce operating costs, and enhance information support for management decision-making.

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УДК 004.4

METHODS AND ALGORITHMS FOR AUTOMATED SELECTION OF DATA VISUALIZATION TYPES

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Abstract. *This paper examines methods and software tools for automated data visualization. A generalized algorithm is proposed that involves data loading and preprocessing, identification of variable types and statistical characteristics, generation of a set of valid graphical representations, their evaluation, and automatic visualization generation. Rules for selecting appropriate chart types according to the data structure and analytical task are described. The use of Python, Pandas, Matplotlib, Seaborn, Plotly, and Altair as components of a software system for automated data analysis and visual representation of information is substantiated.*

Keywords: *data visualization, automation, algorithm, data analysis, Python, Pandas, Matplotlib, Plotly.*

The growing volume of digital information requires tools for the rapid identification of patterns, trends, deviations, and relationships. Data visualization facilitates the interpretation of complex datasets, but its effectiveness depends on selecting a chart appropriate to the variable types, data distribution, sample size, and analytical objective. Manual selection relies heavily on user expertise, while an unsuitable chart may distort the results: line charts are appropriate for temporal dynamics, whereas scatter plots reveal relationships between quantitative variables but are less effective when points overlap. Therefore, developing algorithms that automatically analyze dataset structures and generate appropriate visualizations remains an important research objective.

The aim of this study is to formalize the automated data visualization process and substantiate the selection of software tools for its implementation. To achieve this aim, it is necessary to identify the principal stages of data preparation, formulate rules for selecting an appropriate chart type, propose criteria for evaluating potential visualizations, and define the architecture of a corresponding software solution.

Contemporary approaches to automated visualization can be divided into three groups: rule-based, constraint-based, and machine-learning-based approaches. In systems belonging to the first group, the