iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** X **Month of publication:** October 2024

DOI: https://doi.org/10.22214/ijraset.2024.64713

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue X Oct 2024- Available at www.ijraset.com

Exploring Inventory Management System with Priority Sequencing

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Abstract: ***Effective inventory management is crucial for businesses to optimise their resources and meet customer demand. This abstract introduces an Inventory Management System (IMS) that utilises priority sequencing to enhance the control and organisation of inventory items. The system employs various prioritisation criteria, such as item demand, shelf life, or profitability, to determine the sequence in which items are received, stored, and dispatched.***
Prioritisation Criteria: The IMS allows businesses to set specific rules and criteria for prioritising inventory items. This includes factors like customer demand, product shelf life, or item profitability.
Real-time Monitoring: The system provides real-time visibility into inventory levels, allowing businesses to make informed decisions on restocking, order processing, and inventory allocation.
Automated Reordering: IMS can automatically generate reordering recommendations based on preset priorities, ensuring that essential items are always in stock.
Cost Reduction: By efficiently managing inventory based on priority sequencing, businesses can minimise holding costs, reduce wastage, and optimise working capital.
Enhanced Customer Satisfaction: Prioritising items based on customer demand ensures that popular products are readily available, leading to improved customer satisfaction and retention.
Forecasting Capabilities: The system can use historical data to predict future demand trends and adjust prioritisation accordingly.
Reporting and Analytics: IMS provides detailed reports and analytics to help businesses fine-tune their inventory management strategies.

I. INTRODUCTION

Inventory management is a topic handled and applied for years now. Though there have been improvements in major prospects in this region, there are still certain gaps to be filled. With the rise of AI, we got to apply these concepts in this region as well. After several research and analysis we found that there are several different times of these Inventory management software used in different levels of department in the industry, some use high level software while there are others that even work on their inventory by noting the data in notepad-like applications. Developers have included features like invoice print or aimed for efficient systems, but none have created one application that can be used by all. Inventory management system is a vast region and there can be major improvements in many such regions. In spite of creating one application for everyone there are different software for different levels of the department. These systems have also started gathering data and recommend the user by observing its previous purchases. We found a major gap in this region, where we opt to develop easy to use software for all sorts of departments.

II. LITERATURE SURVEY

1) The inventory management system proved instrumental in optimising stock levels, reducing costs, and enhancing supply chain efficiency. Its integration of advanced technologies streamlines processes and facilitates data-driven decision-making, ensuring better inventory control and improved business performance.
2) The research paper discusses an Inventory Management System designed to assist hardware stores in efficiently managing their sales and purchases. The system aims to eliminate paperwork, human errors, and manual delays, thereby speeding up processes. It enables tracking of sales and available inventory, prompts reorder timings, and helps determine the optimal purchase quantity. The study emphasises the importance of inventory management for businesses, especially smaller companies, and highlights its impact on cash allocation. The research methodology involved surveying construction professionals to gauge their views on stock management. The paper presents an invoice generator, print invoice, and view invoice modules as part of the proposed solution. The project's objectives include identifying the optimum inventory levels and studying inventory management in construction industries.

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3) The research paper focuses on the inventory management system of Linamar India Pvt. Ltd, an automotive parts manufacturing company. It classifies inventory into raw materials, work in progress, and finished goods. The study examines the significance of inventory control and its benefits. The research uses unstructured interviews, on-site study, and annual report analysis as the methodology. The paper highlights the challenges faced by the company in maintaining fair inventory levels and discusses various inventory management techniques like EOQ, ABC analysis, and safety stock level. The findings indicate that the company is efficiently managing its inventory, following EOQ, maintaining adequate safety stock, and adhering to ABC analysis.

III. COMPARISON TABLE

Sr. No.	Title Paper	Author	Year of Publication	Technology	Outcome	Gap
1.	**A Study of Inventory Management System of Linamar India Pvt. Ltd, Pune**	Anajali Mishra & Harshal Anil Salunkhe	2018	based on primary data collected by the finance executive of the Company and secondary data which are collected from the books	An efficient inventory management system helps in integrated functioning	Can not be used to store large data
2.	**Inventory management system**	Adhithyan Aravind	2022	This application will have different front ends for different kinds of users. The person who is sitting at the billing counter will have access to modify the quantity of any product	Can help us to set a minimum quantity of any product below which we can order the product from the manufacturer? And can reduce duplicate entries	Can not perform priority sequencing for the user
3.	**Research paper on inventory management system**	Punam Khobragade, Roshni Selokar,, Rina Maraskolhe, Prof.Manjusha Talmale	2018	clearer to contribute specifically to the effective consummation of the venture, are impacted by stock. administration framework	generating backup data is a critical process in a project for our shopkeeper. This work can be categorized as time time-consuming job and needs high accuracy	unable to create a management system that can be used by every level of department which allows the user to maximize the sales by analysing previous orders.

IV. METHODOLOGY

An inventory management system using priority sequencing methodology involves prioritising items within an inventory based on certain criteria, and then managing the inventory according to those priorities. Inventory management system is assembled and compiled using query language and priority sequencing and its sub regions are focused with the help of programming languages like python and java. Sub regions include classification of inventory, ordering or reordering, review for inventory demand and many more. Relational Database Management System is majorly used to store, organise and modify the data being collected. Table consists of columns such as products, suppliers, customers, order, stock levels and transactions taken place. This approach helps optimise resource allocation, restocking, and order fulfilment. Here's an overview of how such a system could work:

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A. Priority Assignment

Assign priorities to items based on various factors such as demand, lead time, profit margins, criticality, and availability. These factors can be assigned weights to create a priority score for each item.

B. Inventory Classification

Categorise items into different classes based on their priority scores. For example, high-priority items might be categorised as "A" items, medium-priority items as "B" items, and low-priority items as "C" items.

C. Replenishment Strategies

Determine appropriate replenishment strategies for each inventory class. High-priority items might require more frequent monitoring and faster restocking, while low-priority items can have more relaxed restocking schedules

D. Ordering and Reordering

Implement an automated system that generates purchase orders or replenishment requests based on inventory levels, reorder points, and priority classes. High-priority items trigger orders sooner to maintain stock levels.

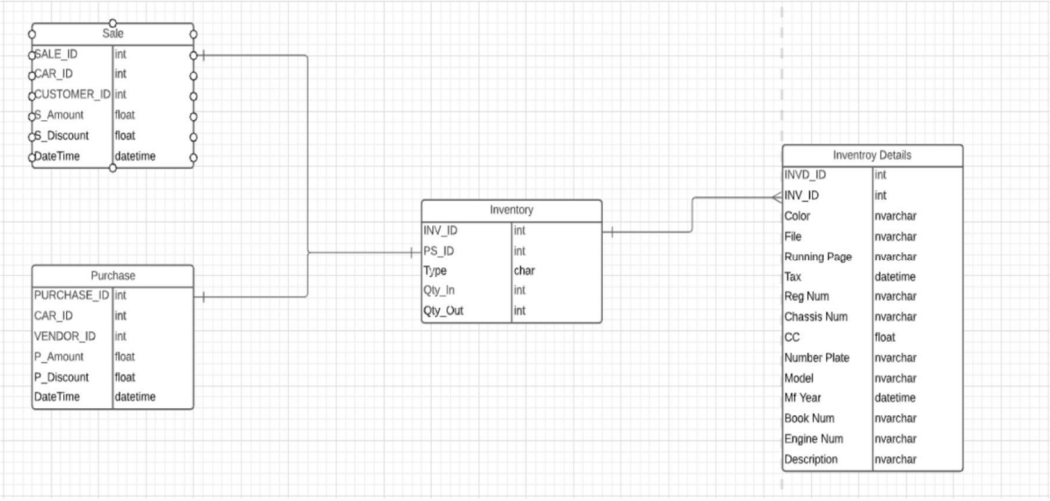
E. Demand Forecasting

Implement forecasting methods to predict future demand for each priority class. This helps in making more accurate replenishment decisions and adjusting priorities accordingly.

F. Regular Review

Continuously monitor and review the priority assignments and replenishment strategies. Adjust priorities based on changing market conditions, customer demand, and other relevant factors.

By using priority sequencing methodology in an inventory management system, businesses can optimise their resource allocation, improve customer satisfaction, and maintain efficient inventory levels for different classes of products.



V. RESULT AND DISCUSSION

Implementing a priority sequencing system within an inventory management system can offer significant benefits. Priority sequencing involves prioritising. the handling of orders or tasks based on predefined criteria, such as urgency, customer importance, or product value.

A. Improved Efficiency

Priority sequencing allows your system to focus on handling high-priority orders first, ensuring that critical orders are processed promptly. This leads to reduced order lead times and faster order fulfilment, improving overall operational efficiency

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B. Enhanced Customer Satisfaction

High-value or urgent orders receive preferential treatment, leading to improved customer satisfaction.Satisfied customers are more likely to return and recommend your business to others.

C. Optimised Resource Allocation

Priority sequencing helps allocate resources (e.g., warehouse staff, transportation) more effectively.It ensures that resources are dedicated to fulfilling orders that align with your business objectives.

VI. FUTURE SCOPE

The future of inventory management systems holds significant promise, especially when integrating advanced techniques like priority sequencing. As industries continue to evolve and consumer expectations rise, the need for efficient and intelligent inventory management becomes increasingly critical. Here's a glimpse into the future scope of inventory management systems employing priority sequencing:

A. Artificial Intelligence Integration

The integration of AI and machine learning will play a pivotal role in the future of inventory management. These technologies will enable more sophisticated predictive analytics for demand forecasting, allowing businesses to optimise their stock levels further.

B. Real-Time Data

With the advent of IoT (Internet of Things) devices and sensors, real-time data from warehouses and supply chain operations will become more accessible. This will lead to even more accurate decision-making based on current conditions.

C. Personalization

Future systems may incorporate personalization algorithms, tailoring inventory strategies to individual customer preferences. This could involve customising product recommendations, order prioritisation, and delivery options.

D. Sustainability

Sustainability concerns are on the rise. Future inventory management systems will likely include features for tracking the environmental impact of supply chains, helping companies make eco-friendly choices.

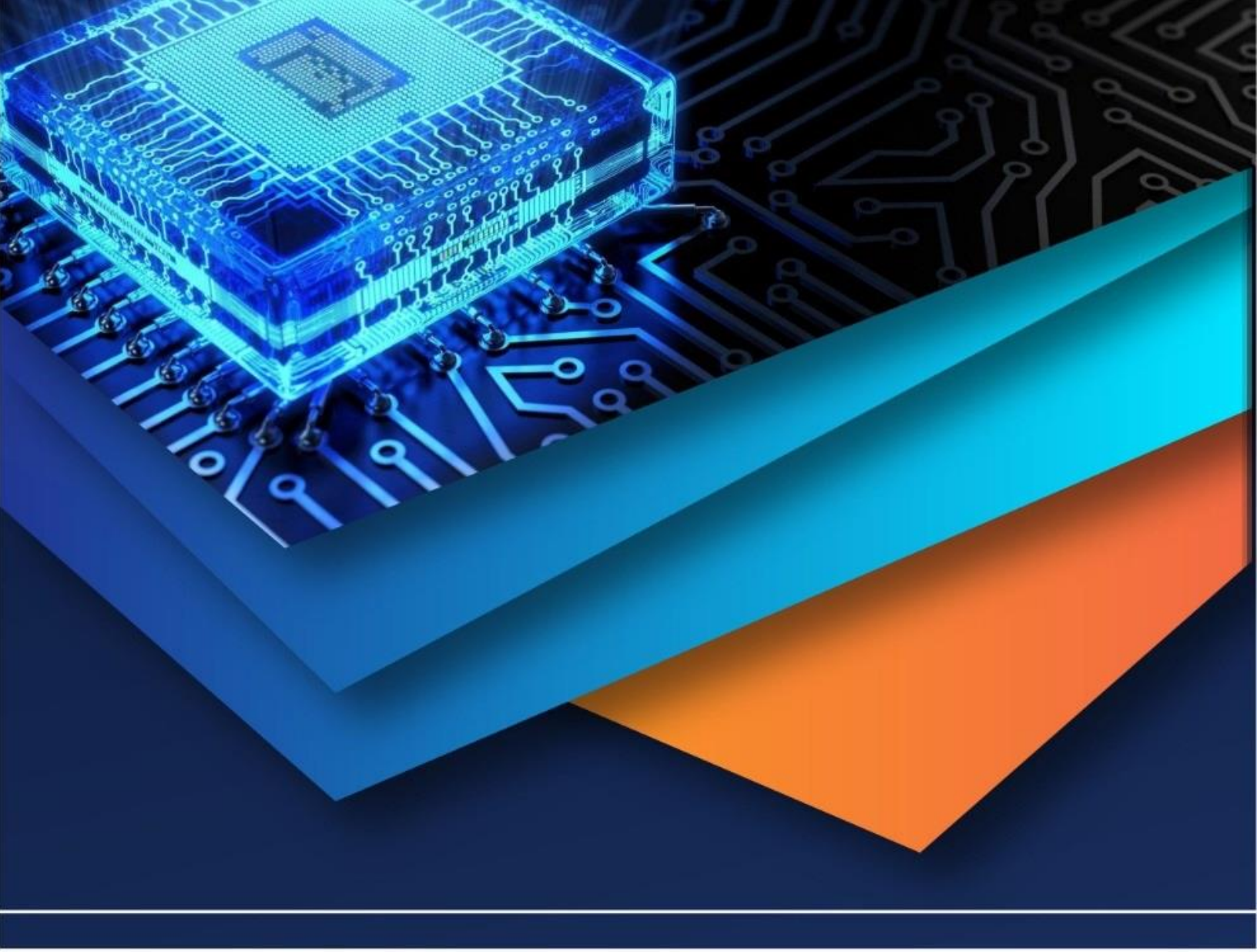
VII. CONCLUSION

In conclusion, the application of priority sequencing in inventory management systems is a transformative step toward achieving operational excellence and customer satisfaction. As businesses continue to adapt to dynamic market conditions, the benefits of prioritising orders and tasks based on predefined criteria cannot be overstated. By employing priority sequencing, businesses can optimise resource allocation, reduce operational costs, and enhance customer experiences. This approach is not only relevant today but also poised for continued growth and innovation in the future. To stay competitive and meet evolving consumer expectations, companies must embrace these advancements in inventory management. As technologies like AI, real-time data analytics, personalization, sustainability initiatives, and blockchain integration become more accessible, the future of inventory management holds immense potential for businesses seeking to thrive in a rapidly changing landscape.

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