International Journal of Engineering Science and Advanced Technology (IJESAT)

IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023

# WAREHOUSE MANAGEMENT SYSTEM

**Dr. Shameena Begum [1], Ch. Anvitha [2], A.Nihitha Sai [3], A. Sravani [4], B. Srinivasu [5]**

[1] Professor & HOD, Cyber Security, Department of CSE, Ramachandra College of Engineering, Eluru, A.P

[2,3,4,5] UG Student, Department of CSE, Ramachandra College of Engineering, Eluru, A.P

## ABSTRACT

This project is aimed at developing an Inventory Management System (IMS) for a departmental store. This system can be used to store the details of the inventory, update the inventory based on the sale details, produce receipts for sales, generate sales and inventory reports periodically etc. This is one integrated system that contains both the user component (used by salespersons, sales managers inventory managers etc) and the admin component (used by the administrators for performing admin level functions such as adding new items to the inventory, changing the price of an item etc). This system runs on multiple terminals, offers a GUI interface to its users and connects to a common database(s).

## 1. INTRODUCTION

The Warehouse Management System is a real-time warehouse database capable of handling large inventories of an organization. This can be used to track the inventory of a single store, or to manage the distribution of stock between several stores of a larger franchise. However, the system merely records sales and restocking data and provides notification of low stock at any location at a specified interval. The goal is to reduce the strain of tracking rather than to handle all store maintenance. Distribution companies use complex software systems called Warehouse Management System. Warehouse management is important for the development of enterprises.

The main goal of Warehouse Management System is to ensure consistent availability of supplies for consumers. Thus, Warehouse Management System is directed toward owners of small to large stores and stock managers who are responsible of maintaining sufficient goods on hand in a retail or manufacturing business. It can scale from a single computer running both client and server software up to multiple stores and warehouses.

The system is also capable of tracking In & Out transaction of single or multiple stores as well as also generates their billing details. The system generates monthly reports of sales from which a manager of a respective store would be able to know the monthly sales transaction done. Warehouse Management system is a Desktop application. WMS meaning: a warehouse management system is software that helps companies manage and control daily warehouse operations, from the moment goods and materials enter a distribution or fulfilment centre until the moment they leave.

A WMS, or warehouse management system, is software that helps companies manage and control daily warehouse operations, from the moment goods and materials enter a distribution or fulfilment centre until the moment they leave. WMSs software systems are a key component of supply chain management and offer real-time visibility into a company's entire inventory, in warehouses and in transit. In addition to inventory management, a WMS offers tools for picking and packing processes, resource utilization, analytics, and more. Warehouse operations are generally invisible to customers, but they play a vital behind-the- scenes role in ensuring on-time delivery. To achieve this goal, good

IJESAT (Enriching the Research)
Open Access Research Article
Volume: 23 Issue: 07
July, 2023

warehouse management ensures all warehouse processes run as efficiently and accurately as possible. For example, warehouse management involves optimizing the use of warehouse space to maximize inventory storage; making inventory easy for staff to find; ensuring adequate staffing; efficiently fulfilling orders; and coordinating communication with suppliers and transportation companies so materials arrive and orders ship on time. The benefits of good warehouse management—namely fast, high-quality service at low cost— can ripple out to the entire supply chain, strengthening relationships with suppliers as well as customers. But given the many elements involved, optimizing warehouse management can be a complex task. That's why many organizations are turning to warehouse management systems for help. Optimizing your warehouse operation involves fine-tuning each of these warehouse management processes. For example, when receiving goods, an organization can label items with mobile barcodes or attach RFID tags to make them easier to find when picking. During put-away, a well-managed warehouse operation stores items in the minimum amount of space to maximize the capacity of the warehouse. Other best practices for warehouse optimization include storing popular items in easily accessible areas and separating items that can easily be mistaken for one another.

## 2. LITERATURE SURVEY

Insights from previous literature reviews in the last two decades, several literature reviews have discussed some related topics of warehouse operations management, which may provide some insights to our research. To justify the research scope of "smart warehouse operations management" and derive the need for the content analysis, we summarize previous reviews that may relate to our research. The related literature reviews are then classified into two groups: Literature reviews before and after 2015, respectively. Table 1 summarizes these literature reviews. 2.1.1 Literature reviews before 2015 Given that smart warehouses have emerged in recent years, the earlier published reviews discussed less about current warehouse development and smart technologies. But the earlier reviews can still bring insights into the basic concepts related to warehouse operations management. In Rouwenhorst et al. (2000)'s review, warehouse design problems and models are presented at strategic, tactical, and operational levels. Gu et al. (2007) present a review of warehouse operation planning based on the classification according to the basic warehouse functions, including receiving, storage, order picking, and shipping. Gu et al. (2010) provide some comments on warehouse design based on the following warehouse design problems: Overall structure, sizing and dimensioning, equipment selection, operation strategy selection, and department layout. de Koster et al. (2007) stress the importance of the order picking process. Optimization problems related to layout design, storage assignment, routing, order batching, and zoning are reviewed. Automated Storage and Retrieval System (AS/RS) has attracted much attention from earlier reviews. Roodbergen and Vis (2009) provide an overview of the AS/RS literature for a range of issues, including physical design, storage assignment, batching, dwell-point location sequencing, and performance evaluation. Various models for AS/RS performance evaluation are surveyed in Gagliardi et al. (2012)'s work. Analytical models and simulations are the two types of models commonly used in research. 2.1.2 Literature reviews after 2015 Recent reviews focus more on the emerging warehouse technologies and new developing trends. IoT, Industry 4.0, and other emerging technologies influence the way of information exchange in warehouses. Ben-Daya et al. (2017) reveal the role of the IoT and its impact on supply chain management. Radio frequency identification (RFID) tags are the major IoT technology studied in previous warehousing research. Manavalan and Jayakrishna (2019) review IoT's role in achieving sustainable goals in supply chain management. The importance of digitalization and the influence of IoT in the overall supply chain management are analyzed. The criteria for achieving business readiness for Industry 4.0 transformation are concluded. Winkelhaus and Grosse (2020) propose a systematic literature review for

IJESAT (Enriching the Research)
Open Access Research Article
Volume: 23 Issue: 07
July, 2023

Logistics 4.0. The application of IoT, CPS, and other technologies related to Logistics 4.0 are summarized in the review. The rapid development of automation technology has dramatically improved the automation level of warehouse systems. In this development process, different concepts related to automated warehouses have emerged. Boysen and Stephan (2016) classify single crane scheduling problems in AS/RS in three perspectives: Layout, order characteristics, and objectives, and then survey crane scheduling problems. Jaghbeer et al. (2020) present an analysis of the literature related to automated picking systems and identify and study the link between design and performance. Custodio and Machado (2019) discuss flexible automation in warehouses and construct a framework for designing flexible automated warehouses. Fottner et al. (2021) investigate the definition and research framework of autonomous intralogistics systems, which enable self-contained, decentralized planning, execution, control, and optimization of internal material and information flows through cooperation and interaction with other systems and with humans. A typical autonomous warehouse system is a segment of autonomous intralogistics systems. Glock et al. (2021) provide a review of technical assistive devices for manual materials handling. Papers that discuss assistive devices on the warehousing system are identified in their systematic literature review. New warehouse concepts and applications have been derived in recent years. These concepts may be similar to smart warehouses we characterize. Boysen et al. (2019) survey relevant literature about warehouse systems for e-commerce warehouses. Warehouse systems need to cope with the requirements of e-commerce, including small orders, large assortment, tight delivery schedules, and varying workloads. The warehouse systems adopted in e-commerce warehouses are investigated in their review. Azadeh et al. (2019a) review the developments of
robotized and automated warehouse systems. Research on different warehousing systems is categorized into three categories: System analysis, design optimization, and operational planning and control. The systems identified in this review are essential for warehouse automation. The integrated models and systems are mentioned as the direction of future research for established systems. Fragapane et al. (2021) review the application of autonomous mobile robots (AMRs) in intralogistics and the corresponding planning and control problem. AMRs are industrial robots that evolve from AGVs and have been widely used in warehousing and other intralogistics operations. For the sustainability topic in warehouses, Bartolini et al. (2019) provide an exhausted macroscopic review about green warehousing. Existing literature about green warehousing is categorized into three macro-themes: Green warehouse management, the environmental impact of warehouse building, and energy saving in warehousing. To some extent, the concept of smart warehouses proposed in our review may overlap technical perspectives with the abovementioned reviews. Most of the existing reviews define and classify their research scope from the technical aspect. In other words, previous studies usually focus on a specific type of warehouse equipment or technology. In our opinion, smart warehouse is not limited to warehouse concepts like e-commerce warehouse and green warehouse. Smart warehouses should be a broader concept that concerns leading warehouse technology and applications and intrinsic principles of warehouse operations management. This broad meaning offers a wide space for the research of smart warehouse operations management, which could be the most promising trend in warehouse management. We develop a novel review framework based on the basic characteristics proposed above. Instead of classifying literature by technical aspect, the classification and analysis of literature in our review are based on the characteristics of smart warehouses. This classification framework provides a solution that covers both technical and operational aspects of smart warehouse operations management. This review's main innovation and contribution is that we provide a comprehensive literature review for smart warehouse operations management based on a novel review framework that reveals the existing inner links of smart warehouse operation. We expect that the novel framework of our review could provide some new insights into smart warehouse

IJESAT (Enriching the Research)
Open Access Research Article
Volume: 23 Issue: 07
July, 2023

operations management. 2.2 Literature search and selection strategy To conduct literature search and selection methodology systematically and transparently, we follow the guidelines presented by Durach et al. (2017). The sample is generated through the following steps: Step 1: Define the research scope. According to the topic, research on integration decision and optimization of smart warehouses is reviewed in this research. Based on the previous research, the research scope could be refined as suggested in Section 1. Step 2: Determine the required characteristics for primary studies. Based on Step 1, the inclusion and exclusion criteria should be established to determine if an article is relevant to the review: (1) Research related to smart warehouse operations management can be included. (2) Research related to warehouse operations management can be included. Research focusing on supply chain management, inventory management, and warehouse location should be excluded. (3) Research topics that are not relevant to the logistics section (e.g., data warehouse and knowledge warehouse) should be excluded. (4) Research in English with a publication date from January 2015 to December 2020 can be retained. (5) Research published in high-impact journals that meet all following criteria can be included to ensure focus on the research topic: a) The journals should be peer-reviewed. b) The journals should be cited by the Science Citation Index Expanded (SCIE) or Social Sciences Citation Index (SSCI) database. c) According to the 2019 Journal Citation Reports (JCR), the journals should rank in the first quartile in the related JCR category. (6) The research with a document type of article or review can be included. Step 3: Retrieve samples of potentially relevant literature. Web of Science Core Collection is used as the database in this review. To implement these criteria defined in Step 2, we restrict the period within the years range from 2010 to 2020 and select the options SCIE and SSCI in the search setting. We use the initial keywords set gathered from the topics of previous literature reviews as the starter of the search. The papers in the initial searching results are analyzed and some keywords are extracted from the initial search result to refine the keywords list. The refined keywords set are listed in Table 2. Step 4: Select pertinent literature. In this step, the inclusion and exclusion criteria listed in Step 2 are applied. Relevant literature is selected and classified according to the review framework. A total of 657 publications were selected. Step 5: Synthesize literature.

## 3. EXISTING SYSTEM

The Warehouse Management System is a real-time warehouse database capable of handling large inventories of an organization. This can be used to track the inventory of a single store, or to manage the distribution of stock between several stores of a larger franchise. Online Sales and Warehouse Management System deals with online communicating between all users in this system. In the existing manual system huge expenditure and a lot of time is spent in collecting the inventory information and doing the bill based on category he chooses. So, there is a need for an integrated automated system, which has some centralized control over the entire process. Many processes are integrated into a system - an error in one place entails errors in others. In this way, a human error can cause the whole system to be inaccurate. It requires many database scans. It has difficulty to capture accurate data. Warehouse operations have become more complex with an increasing number of items to be processed in a warehouse.

**DISADVANTAGES**

The following drawbacks of the existing system emphasize the need for online sales and inventory management system:

- Conventional system makes use of huge amounts of time for providing the information about the inventory to the manager.
- Difficulty in tracking and retrieving data from the related inventory. So, there is a need computerization. With computerized systems paper work drastically reduces, data retrieval becomes easy, duplication of work is avoided.

IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023

- Accuracy Issues: A computerized system alone does not ensure accuracy, and the warehouse data is only as good as the data entry that created it.

The control of inventories is complex because of the many functions it performs. It should be viewed as shared responsibilities

## 4. PROPOSED SYSTEM

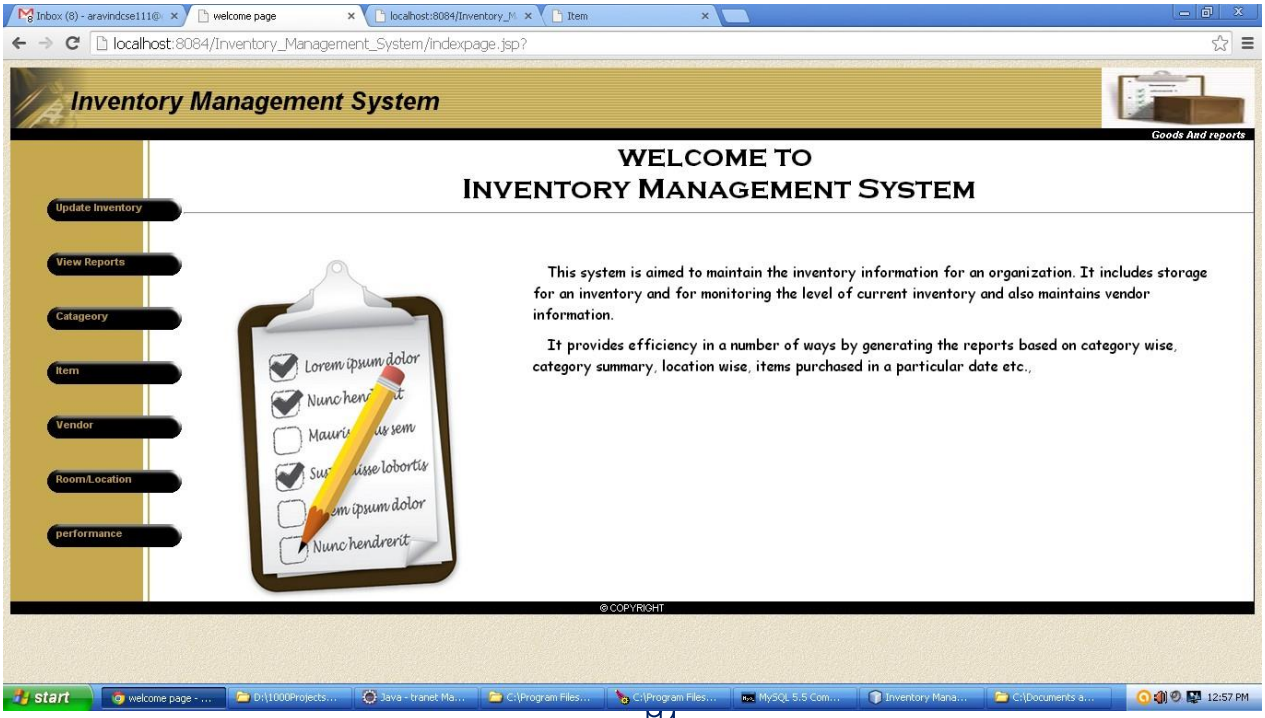
The proposed system consists of full on-line data entry with online validations on field and referential checking. The goal of this system is to bring down the workload with the increased efficiency and to speed up the activities. The major activity of Online sales and inventory management system is to provide online communication between the users of the system. Auto generation of emails as soon as the inventory manager or sales person or sales manager is required to send a mail to the administrator, intimating if any problem occurred due to their work.

### ADVANTAGES

- Availability of the information immediately after data captures.
- An integrated normalized relational database will be maintained for the process.
- Predefined queries for generation of any specific enquiry purposes.
- System is capable to provide reports on monthly basis.
- System allows admin to generate a bill for every In & Out transaction.
- Speed and Efficiency: The most effective warehouse system products raise your operating performance which leads to more productivity.
- It ensures smooth production operations by maintaining reasonable stocks of materials.

The objective of the Online sales and inventory management system is to provide better optimization and cost reducing for the users of this system.

### RESULT



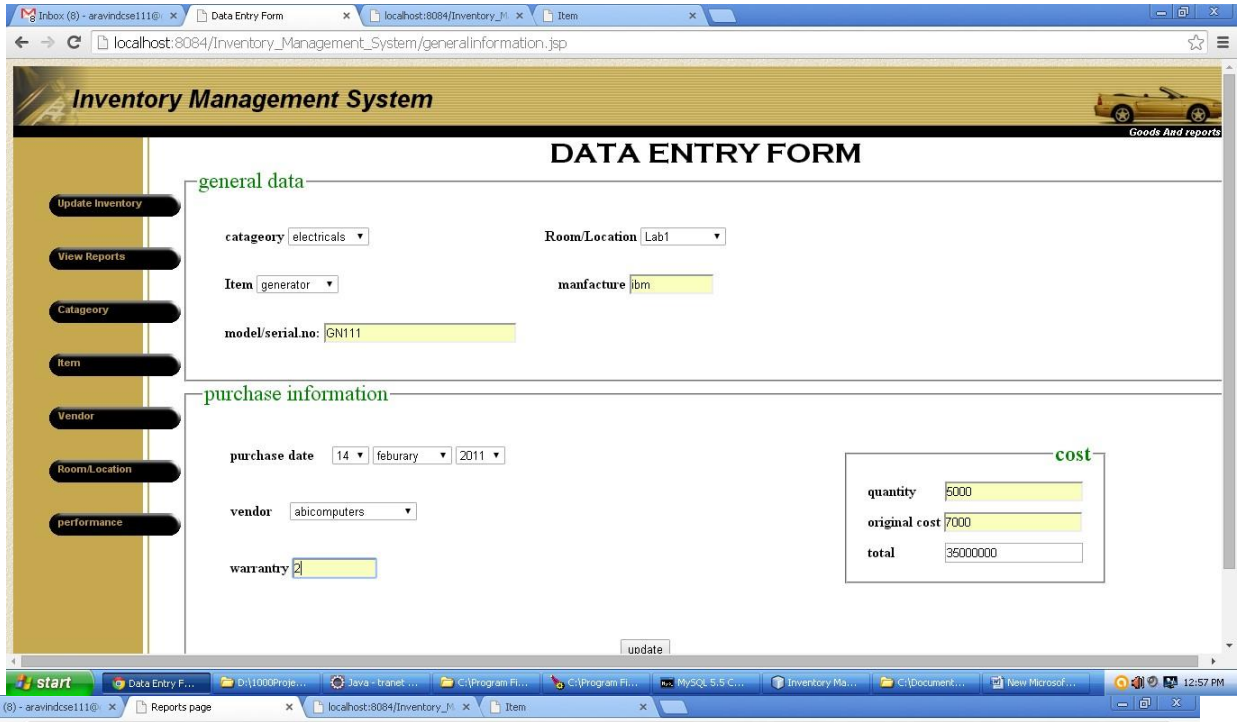
International Journal of Engineering Science and Advanced Technology (IJESAT)

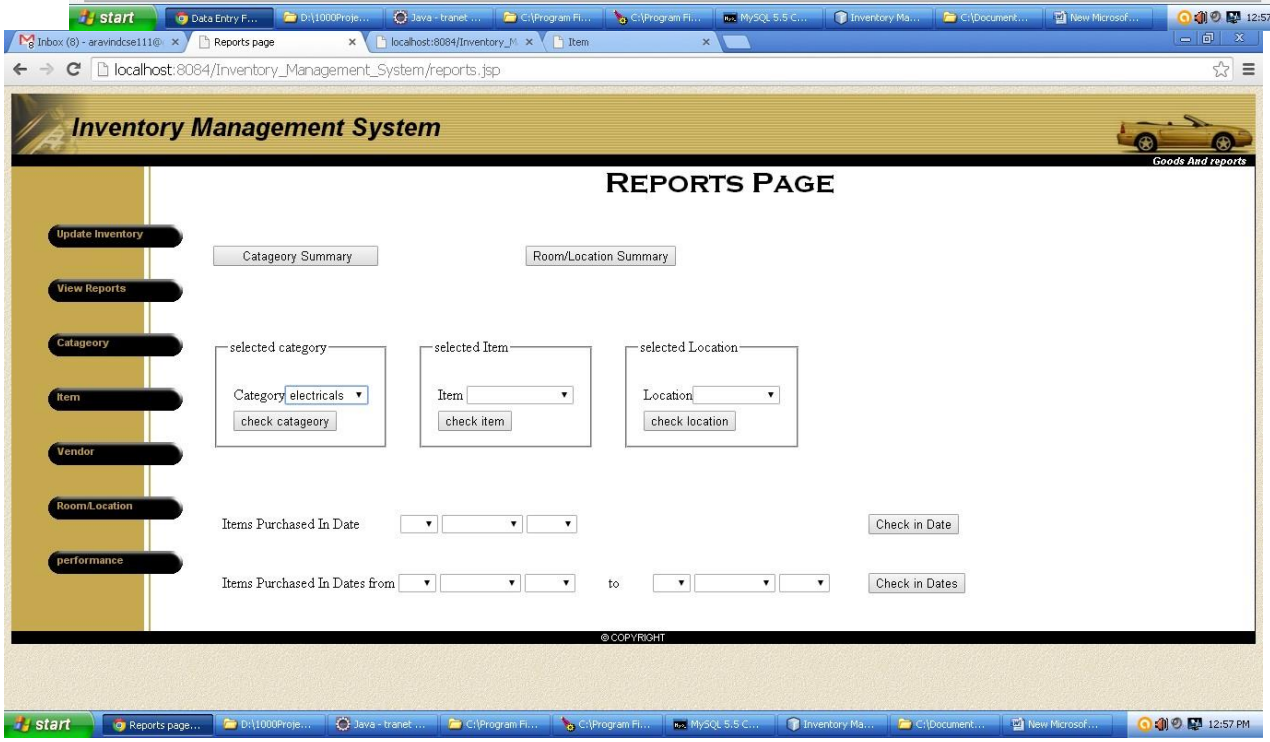
IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023



International Journal of Engineering Science and Advanced Technology (IJESAT)

IJESAT (Enriching the Research)

Open Access Research Article

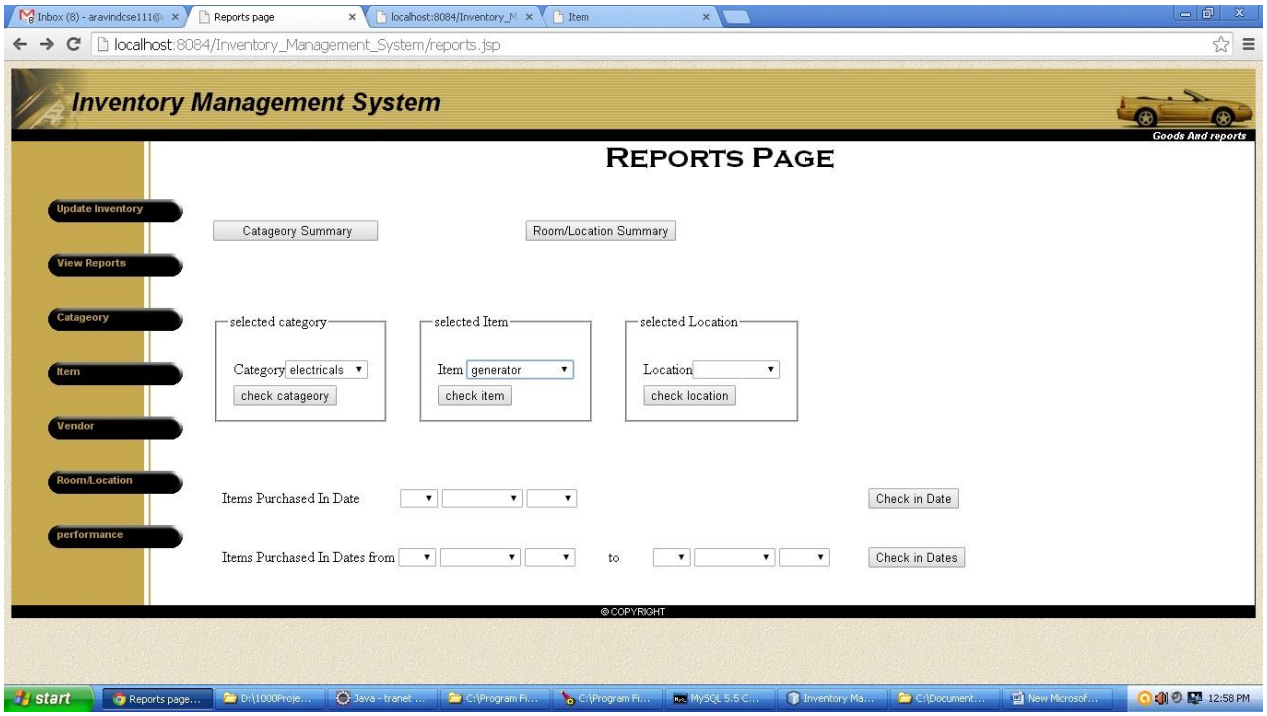
Volume: 23 Issue: 07

July, 2023

Selected Category Details

| Item | Location | Manufacture | Vendor | Quantity | Original Cost | Total Cost |
|---|---|---|---|---|---|---|
| fan | Lab1 | usha | sainadha | 20 | 2000.0 | 40000.0 |
| fan | drawing hall | usha | srinidhi enterprises | 40 | 1500.0 | 60000.0 |
| fan | R304 | usha | srinidhi enterprises | 7 | 1400.0 | 9800.0 |
| fan | R303 | orient | srinidhi enterprises | 7 | 1400.0 | 9800.0 |
| fan | R302 | rally | srinidhi enterprises | 6 | 1580.0 | 9480.0 |
| fan | R301 | orient | srinidhi enterprises | 7 | 1900.0 | 13300.0 |
| fan | Lab2 | usha | sainadha | 15 | 2000.0 | 30000.0 |
| generator | Lab1 | ibm | kiranmai computers | 5000 | 7000.0 | 3.5E7 |
| split a/c | Lab2 | BLUE STAR | sainadha | 6 | 300000.0 | 1800000.0 |
| window a/c | Lab1 | blue star | sainadha | 6 | 25000.0 | 150000.0 |

Total Quantity of electricals 's 5114



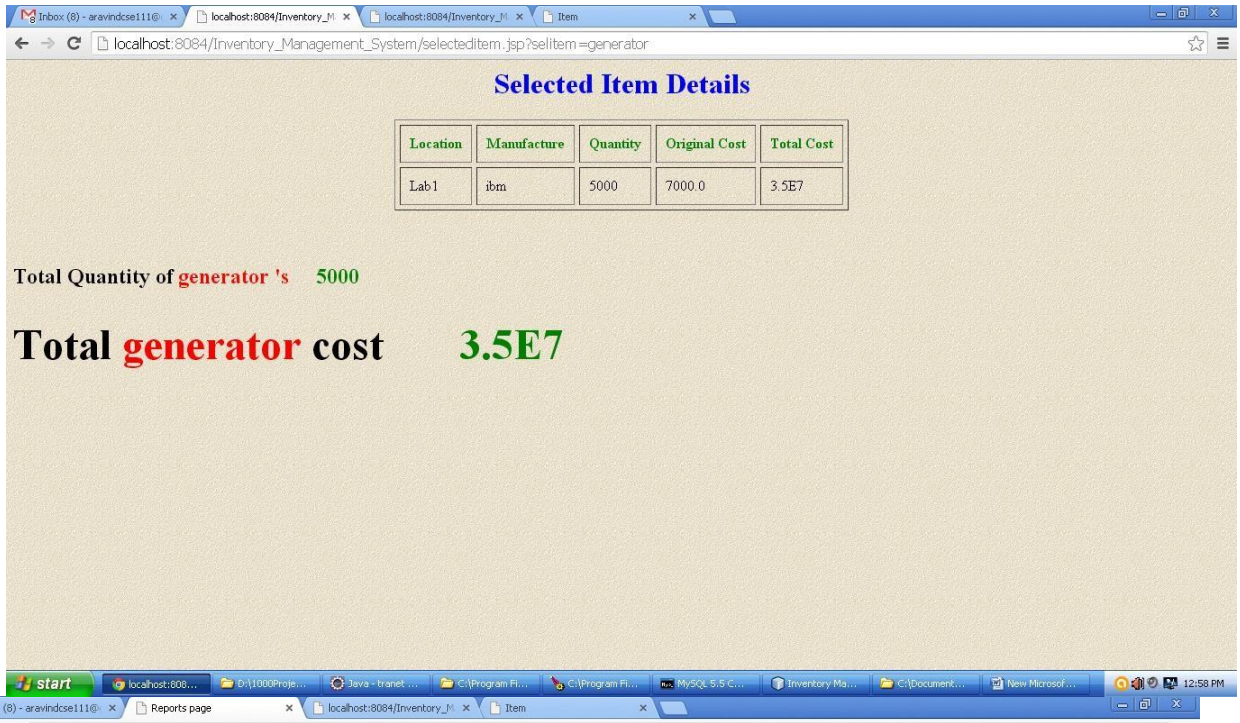
International Journal of Engineering Science and Advanced Technology (IJESAT)

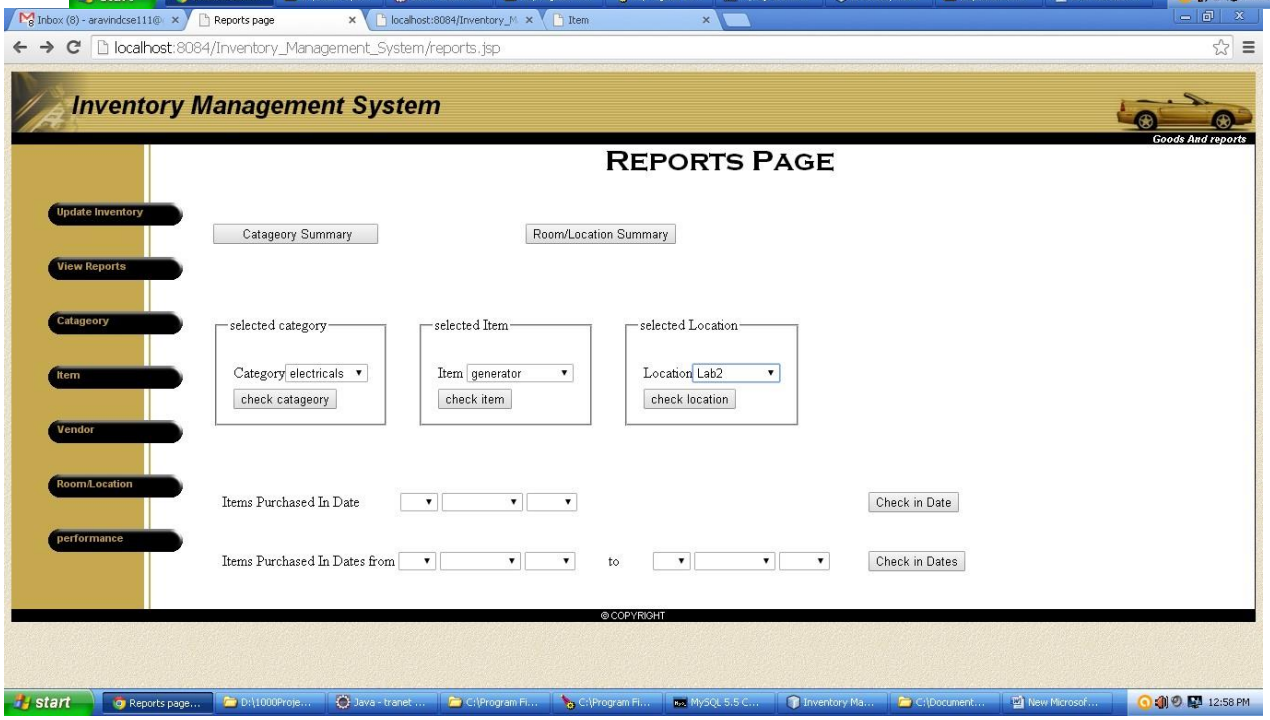
IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023



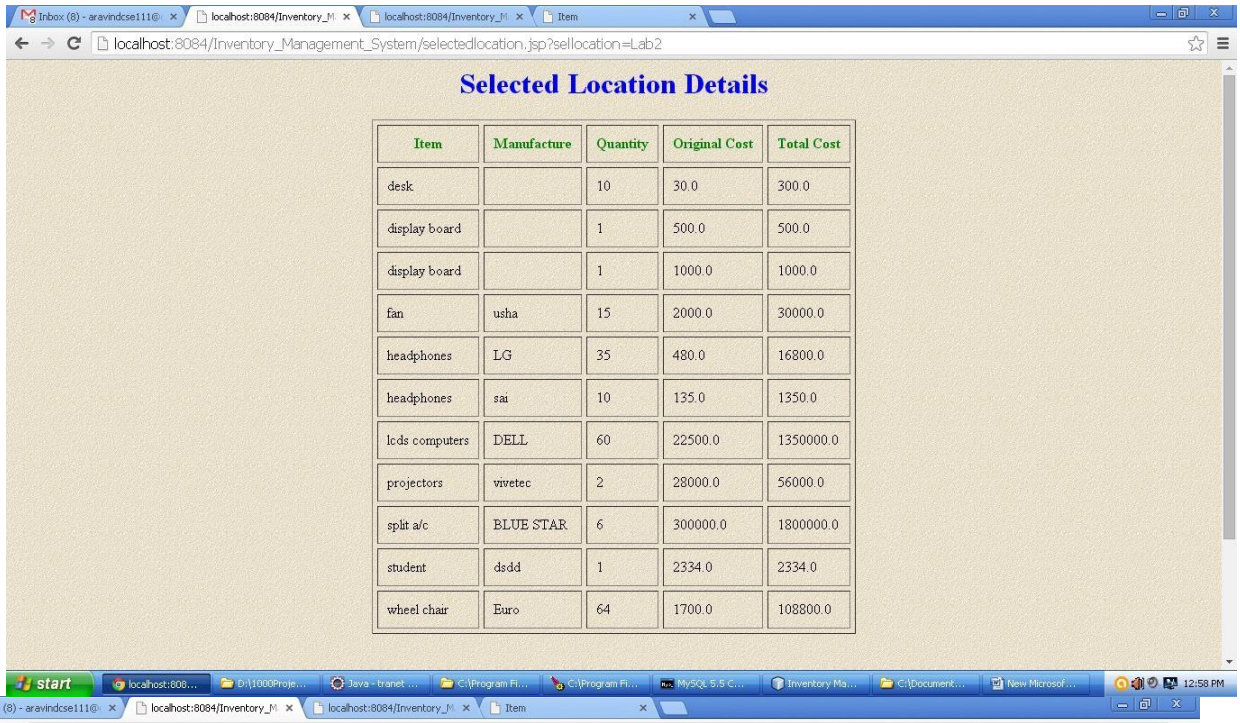
International Journal of Engineering Science and Advanced Technology (IJESAT)

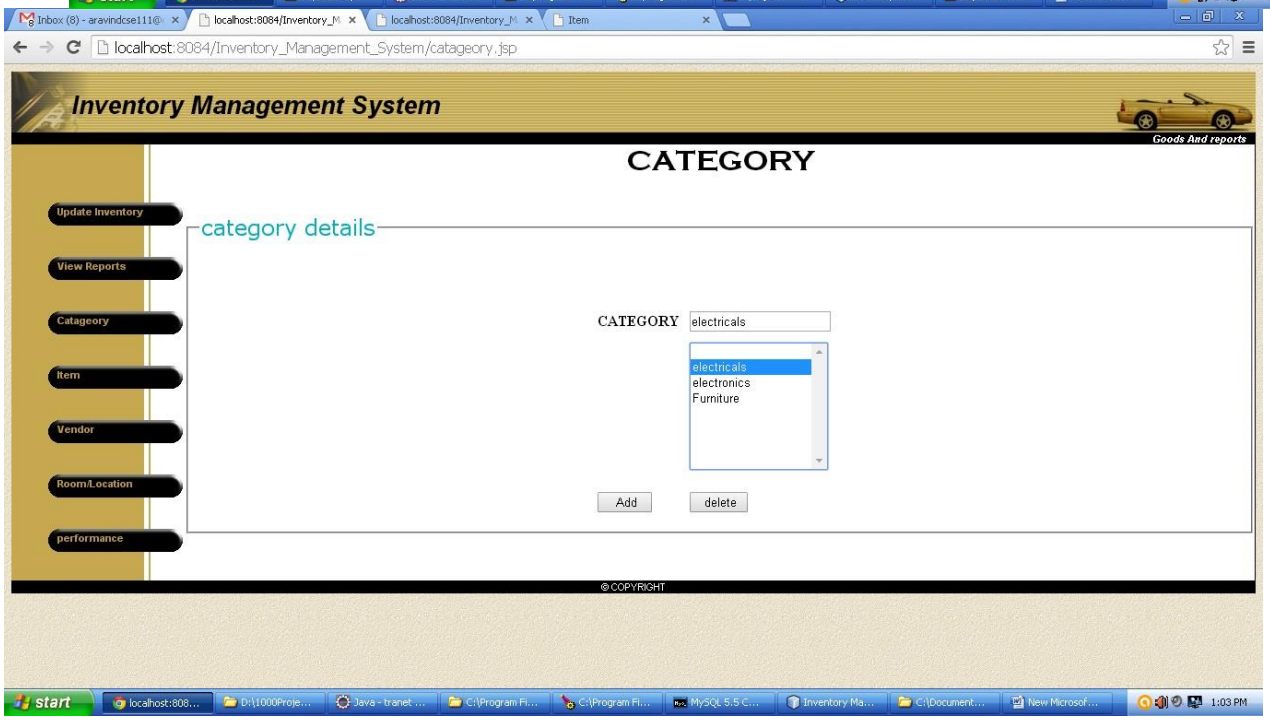
IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023



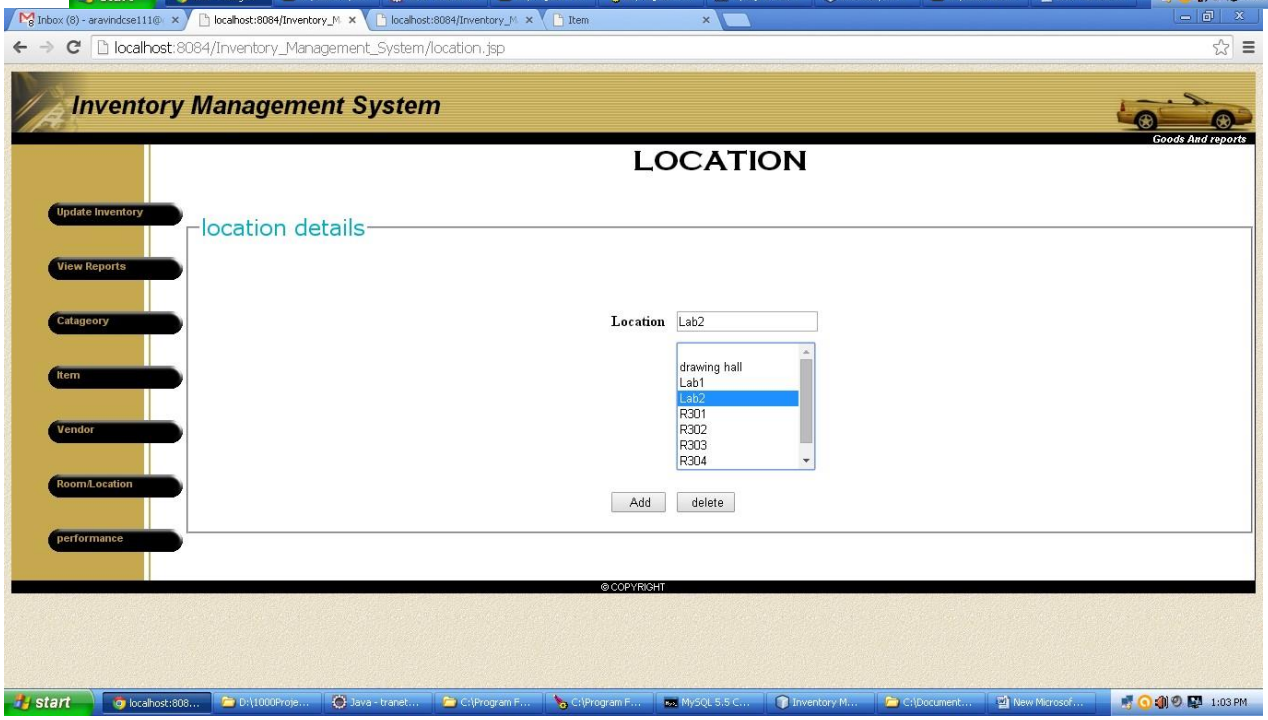
International Journal of Engineering Science and Advanced Technology (IJESAT)

IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023

IJESAT (Enriching the Research)

Open Access Research Article

Volume: 23 Issue: 07

July, 2023


## 6. CONCLUSION

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project. Automation of the entire system improves the efficiency. It provides a friendly graphical user interface which proves to be better when compared to the existing system. It gives appropriate access to the authorized users depending on their permissions. It effectively overcomes the delay in communications. Updating of information becomes so easier. System security, data security and reliability are the striking features. The System has adequate scope for modification in future if it is necessary.

## REFERENCES

1. ORACLE 8I THE COMPLETE REFERENCE By Oracle Press
2. SOFTWARE ENGINEERING By Roger S. Pressman
3. UNIFIED MODELING LANGUAGE By Gradi Booch, Ivar Jacobson, James Rambaugh
4. COMPLETE REFERENCE JAVA By Herbert Schildt
5. MSDN 2003 By Microsoft
6. IMAGES, Google Search
7. HTML PUBLISHING BIBLE, Alan Simpson.
8. JAVA NETWORK PROGRAMMING, RustyHarod.
9. WEBSITES: www.google.com