

# Advanced Inventory Management System based on Big Data

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**Abstract**— Inventory Management System is package that's helpful for the businesses operate hardware stores, where storeowner keeps the records of sales and get. Mismanaged inventory suggests that discomfited customers, Associate in nursing excessive quantity of cash betrothed in warehouses and slower sales. This project eliminates the paper work, human faults, manual delay and speed up technique. Inventory Management System will have the ability to trace sales and accessible inventory, tells a storeowner once it's time to reorder and the way a lot of to shop for. Throughout this paper, we have a tendency to gift intelligent system, to facilitate managing monumental inventory data. We've got Associate in nursing inclination to utilize distributed computing resources to technique the massive volume of inventory data and incorporate the foremost recent advances in process technologies. It provides comprehensive support for conducting several inventory management tasks, like prediction inventory, police investigation abnormal things, and analyzing inventory aging.

**Key words:** Inventory Management System, Big Data

## I. INTRODUCTION

Inventory management is that the method of watching the merchandise storage. A decent inventory management is vital to the thriving operation of most businesses and provides chains. Operating, inventory management has functionalities to avoid product overstocks and outages so to cut back the carrying prices. In promoting, inventory management affects client satisfaction. In finance, inventory investment could be a company's largest plus. With additional demanding customers and rising operation prices, it's far more necessary for retailers to use inventory management technology to manage business transactions and business choices. Therefore, the power to rework inventory information into pregnant and unjust insight could be a important issue of competitive advantage for big retailers. Developing intelligent inventory management system is sort of difficult. First, inventory management involves many various aspects of the retailers' business, such as, warehouse management, retail loss interference, and inventory count. Second, within the current merchandising market, an outsized quantity of information regarding equipped merchandise must be processed instantly. as an example, in one in every of our studies, the merchandising vender has 251,874 things in total, 1321,400 transactions per day on the average, and over 600 million records per annum, that results in over ITB information. Most existing inventory management systems and ways, such as flow, Inventoria, Inform ERP, and Fishbowl Inventory1, ar demand-driven and can't satisfy the requirements in mining business massive information. These ancient package tools solely offer basic applied mathematics functionalities, such as, trailing wherever product are equipped, that suppliers they are available from, and how long they need been keep. They need restricted capability

and unable to support intelligent management, like large-scale inventory information management, statement item demand mechanically, and sleuthing abnormal patterns of item inventory transactions. It's a challenge for researchers to explore new ways to fulfill future needs of inventory management. To address the restrictions of existing systems and assist massive merchandising business in with efficiency activity inventory management, we design, implement, associated deploy an intelligent inventory management system, named as iMiner.

## II. LITERATURE SURVEY

*A. Paper 1: FIU-Miner (a fast, integrated, and user-friendly system for data mining) and its applications*

In this paper, we have a tendency to style and implement FIU-Miner, a Fast, Integrated, and User-friendly system to ease knowledge analysis. FIU-Miner permits users to chop-chop assemble a posh knowledge analysis task while not writing one line of code. It conjointly helps users handily import and integrate completely different analysis programs. Further, it considerably balances resource utilization and task execution in heterogeneous environments. Case studies of real-world applications demonstrate the effectualness and effectiveness of our projected system.

*B. Paper 2: Estimation of Consumer Demand with Stock-Out Based Substitution: An Application to Vending Machine Products*

We develop a model of client arrivals and selection between goods that expressly permits for attainable product substitution and lost sales once a client faces a stock-out. The model is developed within the context of retail marketing, an industry that accounts for a large a part of the retail sales of many client products. We tend to contemplate the knowledge set available from 2 styles of inventory following systems. In the best case situation of a perpetual inventory system in which times of stock-out prevalence and accumulative sales of all products up to those times area unit ascertained, we tend to derive most Likelihood Estimates (MLEs) of the demand parameters and show that they're particularly easy and intuitive.

*C. Paper 3: A Static Approximation for Dynamic Demand Substitution with Applications in a Competitive Market*

In this paper, we have a tendency to develop a static approximation of dynamic customer demand substitution behavior by representing customer selections with a fluid network model, in which nodes represent merchandise and flows represent client demands. With this network, we have a tendency to outline a service-inventory mapping and approximate effective demand and market share for every product in AN equilibrium sense. Because of its static kind, our approximation is immensely less complicated than previous dynamic representations (e.g., Mahajan and van Ryzin 2001a, b), and so permits inclusion of demand

substitution behavior in models of product evaluation, stocking, and selection.

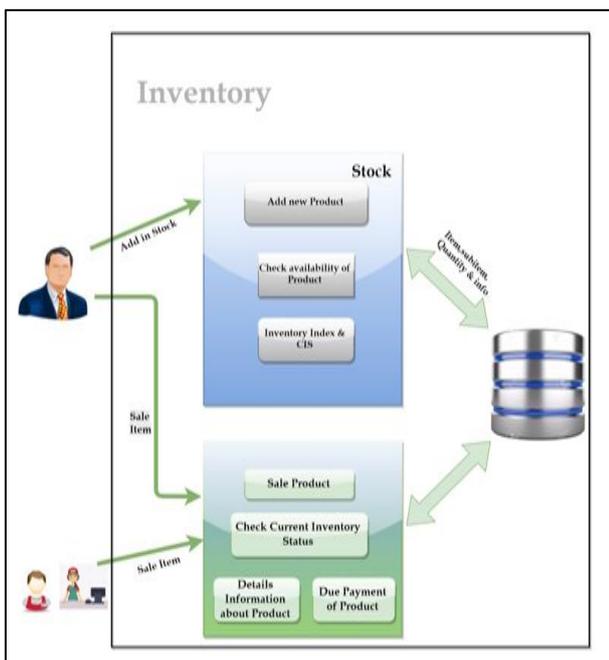
*D. Paper 4: Retail inventory management with stock-out based dynamic demand substitution*

This paper studies a list management drawback in an exceedingly retail setting with stock-out based mostly substitutions and multiple items in an exceedingly in a very product class and proposes an approximate answer to see the order-up-to levels to maximise the expected profit subject to service level constraints. The method uses demand parameters together with the substitution possibilities estimated from the point-of-sales information. As a result, the method provides a sensible tool for retailers to manage their inventory.

*E. Paper 5: iMiner: Mining Inventory Data for Intelligent Management*

Inventory management refers to tracing inventory levels, orders and sales of a marketing business. within the current marketing market, an amazing quantity of information relating to furnished goods (items) in a list are going to be generated every day. Due to the increasing volume of dealing information and therefore the correlated relations of things, it's usually a non-trivial task to with efficiency and effectively manages furnished merchandise. In this demo, we have a tendency to gift associate degree intelligent system, known as iMiner, to ease the management of huge inventory information. We utilize distributed computing resources to method the large volume of inventory information, and incorporate the newest advances of data mining technologies into the system to perform the tasks of inventory management, e.g., statement inventory, detecting abnormal things, and analyzing inventory aging. Since 2014, iMiner has been deployed because the major inventory management platform of ChangHong electrical Co., Ltd, one of the world's largest TV commerce firms in China.

III. PROPOSED SYSTEM



To address the constraints of existing systems and assist massive merchandising business in with efficiency playing inventory management, we design, implement, Associate in Nursing deploy an intelligent inventory management system. A lot of significantly, our system provides a collection of key functionalities that facilitate the companies convenience through economical analysis of the big scale inventory knowledge. Main knowledge analysis algorithms planned in our system have additionally been extended to alternative application fields (e.g., the anomaly detection formula has additionally been applied in condition observance and fault no sology for hydropower plants, and the and therefore the and additionally the joint prediction formula has also been employed in a web business management).

A. Advantage of propose system

- 1) Efficient support of large-scale inventory data analysis.
- 2) Effective management of complex analysis tasks.
- 3) Intelligent decision support of potential knowledge mining.

IV. ALGORITHMS

A. Algorithm 1: The Apriori Algorithm

- Join Step:  $C_k$  is generated by joining  $L_{k-1}$  with itself
- Prune Step: Any  $(k-1)$ -itemset that is not frequent cannot be a subset of a frequent  $k$ -itemset

1) Pseudo-code:

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 $C_k$ : Candidate itemset of size  $k$ 
 $L_k$ : frequent itemset of size  $k$ 
 $L_1 = \{ \text{frequent items} \};$ 
for ( $k = 1; L_k \neq \emptyset; k++$ ) do begin
 $C_{k+1} =$  candidates generated from  $L_k$ ;
For each transaction  $t$  in database do
Increment the count of all candidates in  $C_{k+1}$ 
That are contained in  $t$ 
 $L_{k+1} =$  candidates in  $C_{k+1}$  with  $\text{min\_support}$ 
end
return  $\cup_k L_k$ ;

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B. Algorithm 2: K-Means Clustering Algorithm

- 1) Clusters the data into  $k$  groups where  $k$  is predefined.
- 2) Select  $k$  points at random as cluster centers.
- 3) Assign objects to their closest cluster center according to the Euclidean distance function.
- 4) Calculate the Centroids or mean of all objects in each cluster.
- 5) Repeat steps 2, 3 and 4 until the same points are assigned to each cluster in consecutive rounds.

V. CONCLUSION

It improves the inventory management from demand-driven to data-driven, and addresses the challenge of massive information and sophisticated dealings method. Additional significantly, our system provides a group of key functionalities that facilitate the companies convenience through economical analysis of the big scale inventory information.

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