# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

## IN COMPUTER & COMMUNICATION ENGINEERING

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

**Impact Factor: 8.165**

# Inventory Management for Retailer Cloud Based Application

## Mr.M.Venketasan[1], D.Somasundaram[2], B.Surya Prakasam[3], J.Thirunaukarsau[4], S.Ranjith[5]

Associate Professor, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering,

Hosur, Krishnagiri, Tamilnadu, India[1]

U.G. Student, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering,

Hosur, Krishnagiri, Tamilnadu, India[2-5]

**ABSTRACT-**Essential details related to the stock. They can view details of the current inventory. The System will automatically send an email alert to the retailers if there is no stock found in their accounts. So that they can order new stockRetail inventory management is the process of ensuring you   carry  merchandise  that  shoppers  want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply.In practice, effective retail inventory management results in lower costsand a better understanding of sales patterns. Retail inventory management tools and methods give retailers more information on which to run their businesses. Applications have been developed to help retailers track and manage stocks related to their own products. The System will ask retailers to create their accounts by providing essential details. Retailers can access their accounts by logging into the application. Once retailers successfully log in to the application they can update theirinventory details, also users will be able to add new stock by submitting

**KEY WORDS–** stocks, Demand, Email alert, Sales pattern.

## I. INTRODUCTION

Retail inventory management is  the process  of  ensuring  you carrymerchandise that shoppers want, with neither too little nor too much on hand. By managing inventory, retailers meet customer demand without running out of stock or carrying excess supply.Inventory management is the  process of tracking and managinginventory   in   a   retail environment. It includes the tracking of inventory levels, orders, and sales. It also involves the management of stock levels, pricing, and promotions.Inventory management is a critical part of retail operations.It helps retailers to keep track of their inventory, ensure that they havethe right products in stock, and manage their stock levels.It also helps retailers to optimize their stock levels and pricing. Inventory management is a complex process. It requires the use of multiple software applications and data sources.Retailers need to have a clear understanding of their inventory levels andthe products they sell.They also need to be able to track and manage their inventory in real-time. The first step in inventory management is to track inventory levels.This  can  be  done  manually  or  through  the  use of an inventorymanagement system. Inventory management systems are designed to track and manage inventory in real-time.They provide retailers with the ability to view their inventory levels, stocklevels, and sales. They also allow retailers to manage their stock levels and pricing. Inventory management systems can be used to track inventory in a number of ways.

## II.OBJECTIVE

Retail inventory management is the process of ensuring you carry merchandise that shopper.Retailers meet customer demand without running out of stock or carrying excess supply .Applications have been developed to help.

## III.LITERATURE REVIEW

1.Development of Inventory management System.This paper introduces Agent technology into domestic storage management.JADE directory service agent.Java.The improved contract net protocol is favorable for not only optimizing task allocation scheme but also increasing task allocation success rate and task completion quality.
2.Effects of Consumers' Strategic Behavior and Psychological Satisfaction on the Retailer's Pricing and Inventory Decision.It studies the purchase behavior of strategic customers based on their psychological satisfaction and analyzes its impacts on the optimal pricing and inventory decisions.Decision making. Algorithm.Artificial Intelligence.Retailer

revenue management, most studies only consider the economic payoff of strategicconsumers on their purchase decisions, based on which the optimal pricing and inventory decisions of the retailer can be analyzed.

3.A Study on Inventory Management.This paper ideation for shopkeeper keep the records of purchase and to track sales and available stock.EOQ Analysis and Data interpretation.Data Analytics.The relationship between the retailer's profit and product cost or the salvage price depends on other parameters.

4.A review of inventory management research in major logistics journals.A review of inventory management research in major logistics journals.Traditional Inventory control models. Supply chain management.Identify the future direction for inventory management research published in logistics journals.

5.Determinants of Effective Inventory Management a study of Consumer Durable Retailers.The Ideation of this paper is service levels for a retailer can be linked to availability and variety and maintained through a healthy inventory.Reliability analysis,Data Analysis.Lead to complexities are variety, and growing customer demands. Supplier relation and information sharing among supplier and retailers.

6.Multi-criteria inventory classification for retailers using Artificial Neural Network.This paper provides classification of multi-criteria inventory for retailers and they control of large inventory items.NeuralNetwork System.Artificial Intelligence.They are used for profit per unit, demand of the item, shelf-life, of the item and lead time to the store.

### The Common Management Model for Commodities in Retail Stores

There are diverse characteristics of demands among the commodities in a retail store. For instance, some commodities with seasonal characteristic of demand sell well in certain months while the others with random characteristics have a stable level of demand throughout the year. Different levels of demand in different stages will directly affect the commodity inventories in a retail store. Wrong decisions in ordering will cause either higher or lower inventory, result in unnecessary cost. The sufficient inventory will force the manager naturally to reduce the next batch orders while too many orders will cause the additional cost in their inventory. Hence, the problems above are chiefly due to the empirical and traditional forecasting models that fail to reflect various characteristics of demand.
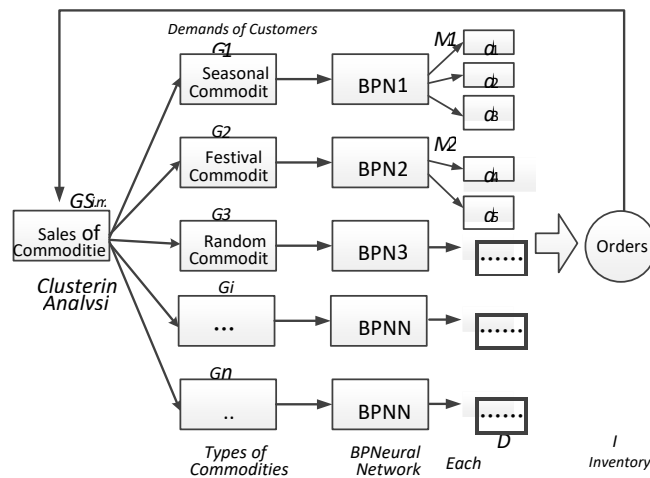


Fig 1: Block Diagram

The determination of each order is based on the last forecasting results which have been merged into the neural network. Thus, the prediction each time will update the data of BP neural network which makes forecasting more precise, improving the whole quality of inventory in the store. After we acquire the demand next month based on the proposed model above, the next process of order management becomes more easily as in Figure 2 shown.
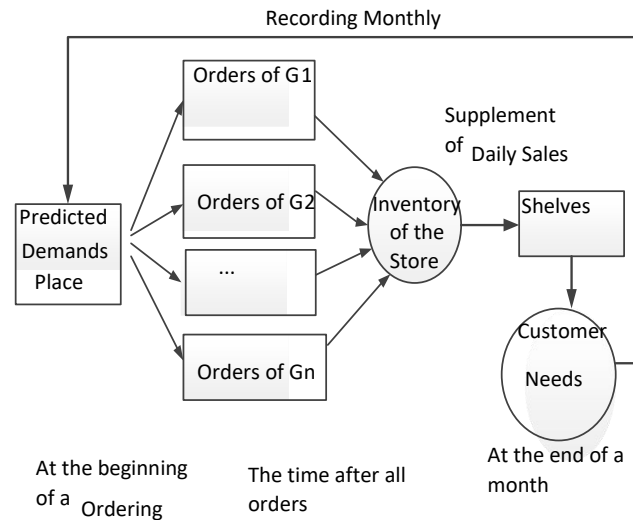
Fig 2:Demand Prediction

### Connection With Operation Management

BDA is the key driver that helps retailers to position and approach their potential customers through various channels, like social media and interactive websites. The online retail market has become more and more ubiquitous and hence has generated an enormous amount of data associated with customers' purchase, interactions, comments, reviews and browsing history. This information is precious inputs for predictive models to understand the needs, interest better and eventually forecast their future demands.

The study examines the case study of Amazon investigating the correlation between review volume and rating on sales performance with the aid of BDA. 2939 records of data have been collected from the Amazon website of a basket of various products to ensure product preferences are excluded from the model. Customer reviews are assumed to be the crucial factor explaining customers purchase decision as online customers ranked peer reviews are the second most trustworthy information source (Chong et al., 2016). The result shows that the more amount of feedback given by previous customers, the higher the probability of purchase decision made by potential consumers.

Hence managers and practitioners are encouraged to adjust their supply to customers' demand for particular product category and pattern of online review for a product before placing replacement orders.

Additionally, the predictive analytics also enable retailers to investigate the product assortment plan to improve their sales. The tools allow retail managers to converse in-store customers' tracking data together with purchase history from POS to uncover the likelihood of product kinds are collected together. This information then becomes a key driver for retailers to decide product sets and product placement in stores

BDA plays a growing pivotal role in determining the optimal stock level and minimising operation costs for retailers. The critical inputs for BD optimisation models are data hidden in logs, sensors, electronic devices and monitors. The application of machine learning and artificial intelligence system, such as in "Amazon Go" of Amazon or "Shelf Scanning Robots" of Walmart, has introduced a continuously updated inventory system, thus enhance inventory visibility.

Moreover, the transparency in data sharing between retailers and suppliers would reduce misunderstandings and uncertainty in the supply chain, hence positively contribute to better inventory management. With the aid of cloud bases and big data sharing technologies, BDA will not only enable retailers to better understand their clients, but also give a reliable indicator for suppliers about future demands of ending customers, hence streamline the variation in inventory capacity of the whole supply chain, lessen the probability of stock-out and increase the seamless logistics services.

### The Clustering Analysis of Commodities in Retail Stores

In inventory management, generally, a method called Activity Based ABC Classification is used to determine the different ways to manage the things. Using this method, we need to sort all the commodities according to the overall profit of each commodity and divide all commodities into 3 types. They are namely Type A, Type B, and Type C. The value of Type A is highest, which need to be focused cautiously by the manager. Clearly, using ABC will have many problems when applying to demand forecasting in retail stores because of the various characteristics of demand like the characteristics in festival, random, and season. How to quickly classify the commodities with different characteristics

and establish the forecasting model for each type of characteristics so as to implement the same strategies of ordering for each type is very important.

Here we propose an improved K-means clustering method with a concept of weight of diversity to quickly cluster the commodities with unknown characteristics of demand. It will establish a foundation for the forecasting model later.

Based on the Clustering analysis, we can build a forecasting model and make some strategies for the commodities with the same demand characteristics so as to improve the commodity management in retail stores. In order to reduce the complication, we will choose some typical characteristics of demand to analyze in detail.commodities. Hence, it is not realistic to establish the forecasting model for each individual commodity manually, which shows the potential value of what we try to study in this paper.

Based on data in Table 1, we implemented the standard K-means clustering analysis with a parameter 5 as the number of clustering in Origin 9.0. The monthly demand in a year is

normalized by dividing the maximum monthly demand to remove their dimensionless. Finally, the results of analysis are shown in Figure 4. We found that the possible characteristic of commodities in sub graph (c) is seasonal. And sub graph (a) has the characteristic of random while sub graph (b) shows characteristic of stable demand. There are three main types of clustering in Figure 4. As we described previously, using the K-means clustering methods was much more useful and detailed than that in ABC.

However, the standard K-means clustering method uses the Euclidean distance to compare two samples mathematically. It will cause unexpected problems in practical applications. For instance, in sub graph (a), we noticed that the curve of the commodity G13 has huge variation compared with the curves of other commodities. Intuitively, G13 should be classified into sub graph (c) instead. The reason for the problem is that the Kmeans clustering method uses the Euclidean distance directly, not the fuzzy calculation to calculate their similarity. Hence, an improved way that modifies the function of distance calculation by importing the weight factor of variation is proposed in the followed. In other words, it rewrites the function of calculating Euclidean distance.
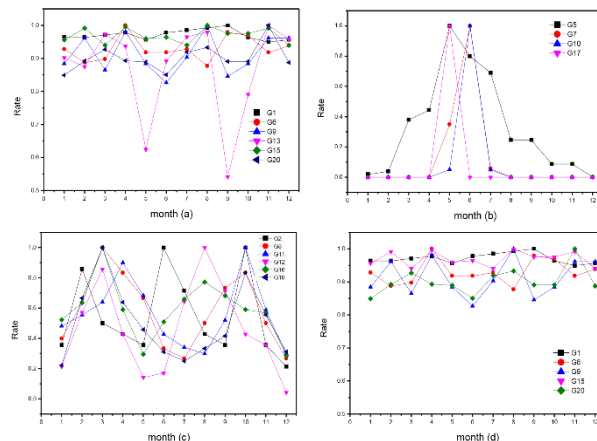


Fig.3 comparative clustering

Figure 3 The Comparative Clustering Results of Commodities variety of pixels within the feature image. once that's done, the ultimate worth obtained is placed at the middle of the filtered image. Move this filter around and therefore the same is continual at any constituent within the image. Similarly, move the feature to each different position within the image and determine the feature that matches that space. Therefore when this, we'll get the output as:

**The Demand Forecasting Model Based on BP Neural Networks**

By the modified clustering analysis above, we can get a good classification of commodities. However, based on the clustering results, how to establish an intelligent forecasting model to reduce the complication of prediction for each commodity in retail stores is also the key in this paper.

As mentioned in Section 2, artificial neural network can solve more complicate problems than that in traditional methods. At the same time, the intelligent of this method makes it unnecessary for the manager to care about the details in prediction. The BP neural network in this paper is one of the most powerful artificial networks. Theoretically, if there are enough hidden layers and trained data, BP neural network can unlimitedly approach the real not-linear mapping relationship, whereas establishing the analytic equations can't work better. The BP neural network's result is calculated by finding the relationship between the input and the output by training and learning, instead of depending on prior knowledge and rules.

Here a forecasting model for the demand of a commodity is based on the BP neural network and grey theory. BP neural network is denoted as BPNN. Suppose the input vector set is X, the expected output vector is Y and the number of attributes of X is n. The samples of X and Y can separately be defined as X1, X2…, Xn and Y1, Y2, Y3,…, Yn (n equals 12 months). The number of hidden layers and the number of neurons in each layer rely on the case itself.

Maximum Pooling (or liquid ecstasy Pooling): Calculate the most worth for every patch of the feature map.

The results of employing a pooling layer and making down sampled or pooled feature maps may be a summarized version of the options detected within the input. they're helpful as little changes within the location of the feature within the input detected by the convolutional layer can end in a pooled feature map with the feature within the same location. This capability accessorial by pooling is termed the model's unchangingness to native translation.

## IV. SOFTWARE

VSD may be a dedicated Python Integrated Development setting (IDE) providing a good vary of essential tools for Python developers, tightly integrated to make a convenient setting for productive Python, web, and knowledge science development. to start out developing in Python with VSD we'd like to transfer and install Python from python.org betting on our platform.

VSD supports the subsequent versions of Python:
- Python two: version 3.1
- Python three: from version 3.6 up to version three.10.
- Flask, docker, IBM cloud, IBM DB2.
- Kubernetes cluster, Sendgrid.

Besides, within the skilled edition, one will develop Django, Flask, and Pyramid applications. Also, it absolutely supports HTML (including HTML5), CSS, JavaScript, and XML: these languages area unit bundled within the IDE via plugins and area unit switched on by default. Support for the opposite languages and frameworks may be more via plugins (go to Settings | Plugins or VSD | Preferences | Plugins for macOS users, to seek out a lot of or set them up throughout the primary IDE launch)

## V. RESULT

Inventory Performance is a measure of how effectivelyandefficiently inventory is used and replenished. The goal of inventory performance metrics is to compare actual on-hand dollars versus forecasted cost of goods sold.

Weeks on Hand. ...
Inventory Turnover Rate. ...
Days on Hand. ...
Stock to Sales Ratio. ...
Sell-through Rate. ...
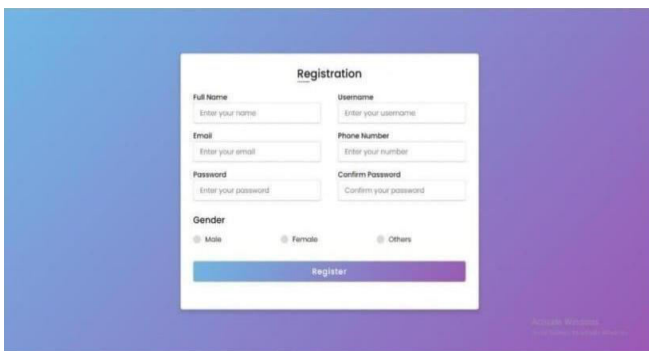Backorder Rate. ...
Accuracy of Forecast Demand.
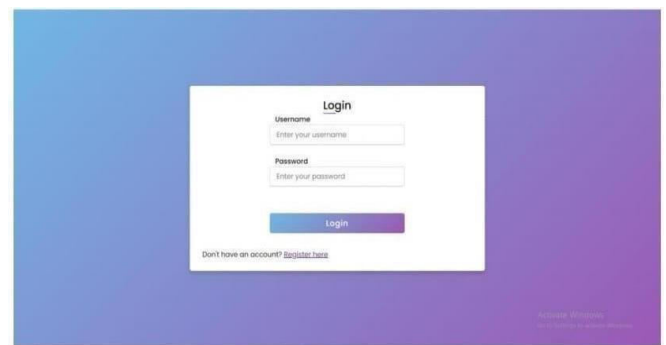Rateof Return.



Fig 4. Registration page



Fig 5.login page

## VI. CONCLUSION

In conclusion as you can see the importance of inventory management isvery serious, it is one of the most important aspects of any business. The aspect of this part of the business is whether or not you can satisfy the demand of your customers if you aren't sure if you have all the materials available to make the final product Without having the proper inventory management, they would not be able to supply their customers with their ordered ambulance. And this product is what their entire business is based on, so it is of great importance When they are choosing from the different types of programs or automated systems to help with keeping records accurate, needs to keep in mind that the customer is not concerned with which materials are needed to complete the finished product, but the product is operating as promised based on the contract. In addition, the plans for the maintenance of having proper inventory levels need to be in place and also adjusted when the company grows and as the business dictates implements the new suggestions, they will be on the right track to having a wellestablished business.

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## BIOGRAPHY

Mr M. Venketasan M.E,
Assistant Professor,
Electronics and Communication
Engineering Department,
Adhiyamaan College of Engineering,
Anna University.

D.Somasundaram,
Bachelor of Engineering (student),
Adhiyamaan College of Engineering,
Anna University

B.SuryaPrakasam,
Bachelor of Engineering(student),
Adhiyamaan College of Engineering,
Anna University

J.Thirunaukarasau,
Bachelor of Engineering(student),
Adhiyamaan College of Engineering,
Anna University


S.Ranjith
Bachelor of Engineering(student),
Adhiyamaan College of Engineering,
Anna University

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