

PREDICTION OF SUPPLY USING MACHINE LEARNING TOOLS

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ABSTRACT:

The main aim of this paper is to find supply in supply chain process. To find supply of the product required quantity and quantity sold is analyzed and predicted. From the present dataset future supply can be predicted and analyzed. This can be done using machine learning tools like K-Means and Linear regression.

KEY WORDS: Machine learning, Supply, Prediction, K-Means, Linear regression.

I.INTRODUCTION

Python is object oriented and high level programming language which helps to analyze and predict. The datasets are imported in jupyter notebook . The algorithms used are k-means, and linear regression. K-Means shows the similarities between two attributes. Linear regression shows the relationship between the two attributes. The attributes are taken to find the future supply of the product. This helps the manufacturer to make profit.

Supply chain management is the management of the flow of goods and services and includes all processes that transform raw materials into final products.

- Plan:Planning involves a wide range of activities. Companies must first decide on their operations strategy. Whether to manufacture a product or component or buy it from a supplier is a major decision.
- Source:When sources have been selected and vetted, companies must negotiate contracts and schedule deliveries.
- Make:This stage is concerned with scheduling of production activities, testing of products, packing and release. Companies must also manage rules for performance, data that must be stored, facilities and regulatory compliance.
- Deliver:The delivery stage encompasses all the steps from processing customer inquiries to selecting distribution strategies and transportation options. Companies must also manage warehousing and inventory or pay for a service provider to manage these tasks for them.
- Return:Return is associated with managing all returns of defective products, including identifying the product condition, authorizing returns, scheduling product shipments, replacing defective products and providing refunds.

II.REVIEW OF LITERATURE

Increasingly, supply chain management is being recognized as the management of key business processes across the network of organizations that comprise the supply chain. While many have recognized the benefits of a process approach to managing the business and the supply chain, most are vague about what processes are to be considered, what sub-processes and activities are contained in each process, and how the processes interact with each other and with the traditional functional silos. In this paper, we provide strategic and operational descriptions of each of the eight supply chain processes identified by members of The Global Supply Chain Forum, as well as illustrations of the interfaces among the processes and an example of how a process approach can be implemented within an organization. [1]

As the twenty-first century begins, supply chain management has become a significant strategic tool for firms striving to improve quality, customer service and competitive success. This article surveyed senior managers in various industries to study the prevalent supply chain management and supplier evaluation practices. The study reduced these practices to a smaller set of constructs and related the constructs to firm performance. The results show that many constructs were correlated with firm performance and that some constructs were found to adversely affect performance.[2]

To investigate the construct of Supply Chain Management and its antecedent construct of a Supply Chain Orientation, reliable, valid scales of each are needed. In this study, we developed measurement scales for a supply chain orientation (SCO) and supply chain management (SCM). Validity and reliability of the developed scales were established and the relationship between a SCO, SCM, and business performance was also established, providing evidence of nomological validity. The implications of these findings for managers and researchers are discussed.[3]

III.METHODOLOGY

K-MEANS

k-means clustering tries to group similar kinds of items in form of clusters. It finds the similarity between the items and groups them into the clusters. This can be done in simple steps like selecting the k values followed by initializing the centroids and finally selecting the group and finding the average.

LINEAR REGRESSION

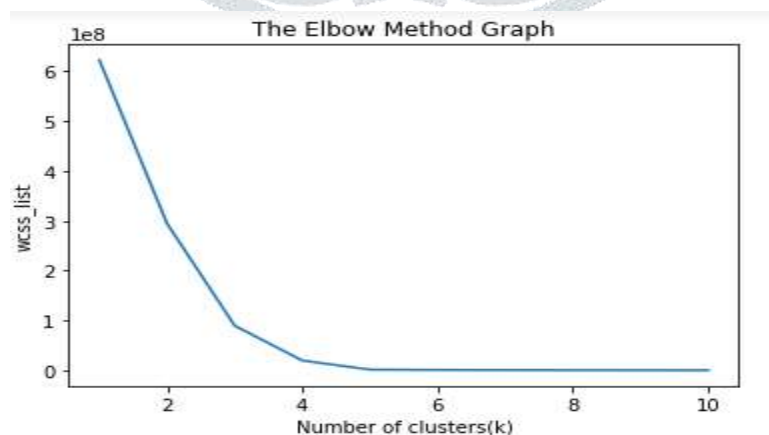
Linear regression is considered as supervised machine learning. It attempts to model the relationship between two attributes by fitting a linear equation to the given dataset. In this one variable is considered as explanatory and other is dependent. There are two types they are simple and multi variable regressions.

IV.RESULT

K-MEANS

➤ ELBOW METHOD GRAPH

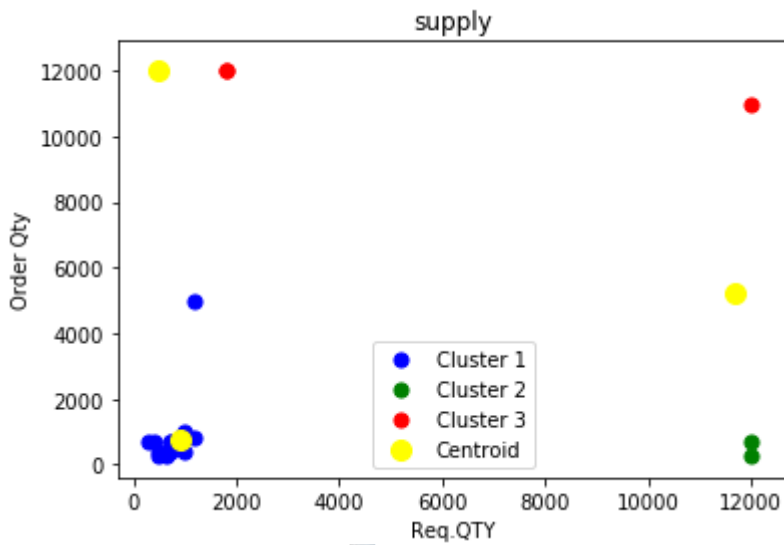
FIGURE4.1



The above graph represents the number of clusters that have been occurred in the given attributes. It computes average score of all the clusters. If the chart looks like an arm, then the “elbow” is the best value of k.(figure4.1)

➤ SCATTER PLOT

FIGURE 4.2

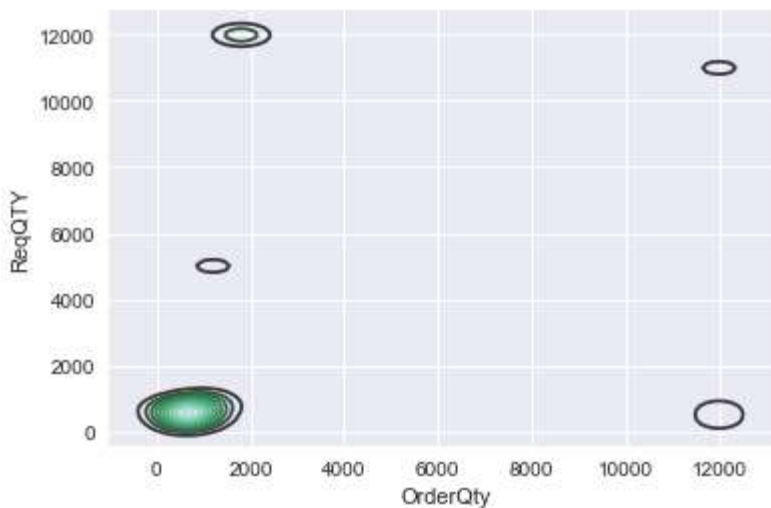


The above graph shows the clustering is made by similarities of two attributes taken from the dataset. It is clustered and represented in different colours. It represents the required quantity and order quantity is also shows the similarities between two attributes.(figure4.2)

LINEAR REGRESSION

➤ KDE GRAPH:

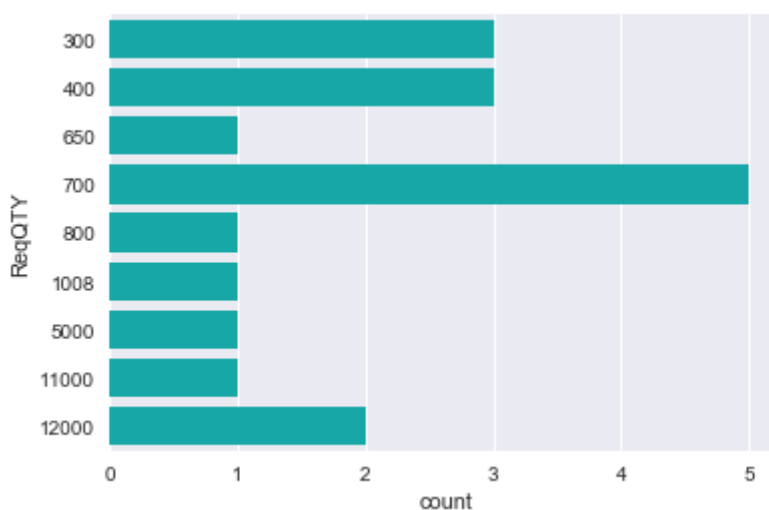
FIGURE 4.3



The above KDE graph represents the two attributes to find future supply of the product. It helps us to know the dependency and relationship between two attributes. In this supply is not constant it varies.(figure4.3)

➤ BAR GRAPH

FIGURE4.4



The above EDE graph in linear regression shows the relationship between the attributes and also it compares two attributes. By comparing two attributes required quantity and quantity sold it shows the result that supply is not constant and it keeps on varying. (figure 4.4).

FINDINGS:

- In linear regression the prediction is done with the help of bar chart. The range values show results according to the prediction done.
- The values of required quantity have fluctuations for each product. The supply of each product results in fluctuations.

V. CONCLUSION

This paper shows whether the supply of product increases or decreases in the supply chain, which is found with k-means and linear regression algorithms and it is analyzed and predicted for future purposes. It shows fluctuations in the result. That is, the supply of product increases and decreases frequently. So there is a probability of both increase and decrease in supply.

FURTHER WORK:

It is suggested to know the consumer's satisfaction and fulfill their needs. So that the demand for the product will increase and demand for the product also increases.

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First published: 10 May 2011
<https://doi.org/10.1002/j.2158-1592.2004.tb00170.x>