PRODUCTION TIME IN SUPPLY CHAIN VISIBILITY

AFFILATION
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ABSTRACT:

Supply chain visibility improves the planning process by providing real-time information regarding location and status of supply chain inventory and resources. SCV is enabled by supply chain management technology, which provides near-real-time data about logistics, production raw materials and supply chain operations. The algorithm that is used for analysing the data is Linear Regression and K-Means. This analysis help the organisation to improve the delay of Production time and to reach the finished goods to customer on time.

Keywords - Near-real-time, Linear Regression, K-means

I INTRODUCTION:

supply chain visibility is the ability to track raw materials and components from original suppliers and manufacturers through the organization's manufacturing facilities to customers. It's the study about the process of raw materials to finished goods , from the purchase of raw materials and to analyse the process of time take to production of the goods, The production function is a technical relation showing how inputs are transformed into outputs. Production time covers the period from the moment of entry of production into an enterprise up to the completion of the finished product. The algorithm that is used for analysis the data in Linear Regression. Linear regression is commonly used for Predective analysis and modeling.

II RELATED WORK:

Logistic management plans, implements and operates logistic networks and schedules orders, stocks and resources. Modern logistics comprises operative logistics, analytical logistics and management of logistic networks. Central task of operative logistics is the efficient supply of required goods at the right place within the right time[1]. Supply chain management (SCM) is the management of a network of interconnected businesses involved in the provision of product and service packages required by the end customers in a supply chain[2]. A supply chain, as opposed to supply chain management, is a set of organizations directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer. Managing a supply chain is 'supply chain management'[3].

Supply chain business process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information. According to Lambert and Cooper (2000), operating an integrated supply chain requires a continuous information flow. The key supply chain processes stated by Lambert (2004)[4].In the 21st century, changes in the business environment have contributed to the development of supply chain networks. First, as an outcome of globalization and the proliferation of multinational companies, joint ventures, strategic alliances and business partnerships, significant success factors were identified, complementing the earlier "Just-In-Time", Lean Manufacturing and Agile manufacturing practices[5]. Tax efficient supply chain management is a business model which considers the effect of tax in design and implementation of supply chain management. As the consequence of globalization, businesses which are cross-national should pay different tax rates in different countries. Due to the differences, global players have the opportunity to calculate and optimize supply chain based on tax efficiency[6].

Today, supply chain visibility is an essential instrument for the accomplishment of a company. However, deficiency of synchronization within the performance of the different tasks often occurs when the individuals within an organization did not completely understand and comprehend all activities, operations, production process, and work in process one level below or above their position within the supply chain network[7].

Visibility: the strategic importance of supply chain for manufacturing sectors of an economy makes it paramount that companies measured their performance. Performance measurement in the context of the time, quality, and cost are of high importance to manufacturing companies[8] .

Implementing supply chain visibility becomes easier just because passing information about products globally is more a matter of priorities and investment, which is not the case when sharing "official data" about people. As social technolo-gies become more prominent, this may change over time. When you think about it, these ideas make total sense[9]. Visibility creates value among the many impacts of the different store manu-factures, supplier, etc., and the effect is the heightened demand for consumer visibility into availability and shipping logi stics, from the first mile to the last. Not surprisingly, businesses see value in getting the right supply chain visibility to meet those customer expectations and ensure efficiencies in their operations.[10]

III METHODOLOGY:

A.DATA MINING:

Data mining is the discovery of structures and patterns in large and complex data sets. There are two aspects to data mining: model building and pattern detection. Model building in data mining is very similar to statistical modeling, although new problems arise because of the large sizes of the data sets and the fact that data mining is often secondary data analysis

B.LINEAR REGRESSION:

Regression analysis is a Statistical technique for investigating and modeling the relationship between variables. Application of regression are numerous and occur in almost every field, including engineering, life and biological science. Regression analysis is used extensively in data mining and is a basic tool of data science and Analytical.

C.MatplotLib library:

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general-purpose GUI toolkits like Tkinter, wx Python, Qt, or GTK.
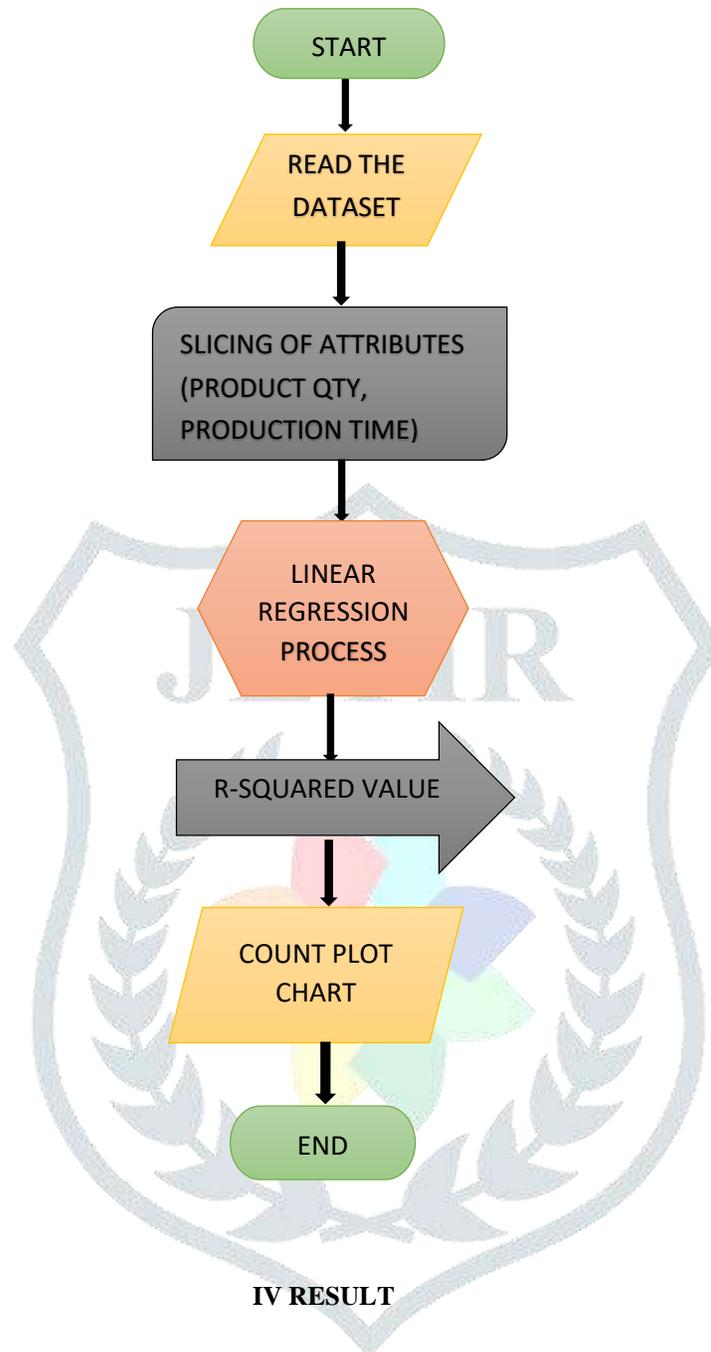
D.Seaborn library

Seaborn is an amazing Python visualization library built on top of matplotlib that provides a high-level interface for drawing attractive and informative statistical graphics.

E.Bar plot

A barplot (or barchart) is one of the most common types of graphic. It shows the relationship between a numeric and a categoric variable. In this plot we choose a categorical column for the x-axis and a numerical column for the y-axis or the attributes to be analysed.

FLOWCHART OF THE PROCESS

START

READ THE DATASET

SLICING OF ATTRIBUTES (PRODUCT QTY, PRODUCTION TIME)

LINEAR REGRESSION PROCESS

R-SQUARED VALUE

COUNT PLOT CHART

END

IV RESULT

```
In [20]:  model.fit(data,a.PRODUCTQTY)

Out[20]:  Pipeline(steps=[('polynomialfeatures', PolynomialFeatures(degree=3, include_bias=True, interaction_only=False)), ('linearre
          gression', LinearRegression(copy_X=True, fit_intercept=True, n_jobs=1, normalize=False))])

In [21]:  pred = model.predict(data)

In [22]:  from sklearn.metrics import r2_score

In [23]:  r2_score(pred,a.PRODUCTQTY)

Out[23]:  0.99999999999999944

In [24]:  sns.barplot(a.PRODUCTQTY,a.PRODUCTIONTIME)

Out[24]:  <matplotlib.axes._subplots.AxesSubplot at 0x9834730>
```

atically sends some data to Mozilla so that we can improve your experience.

Fig 1

In the Fig 1, R-Squared value is 0.99 that R² value implies that there is 99% less variation around the line than the mean. In other words, the relationship between PRODUCTQTY and PRODUCTIONTIME accounts for 99% of the variation dependent variable being studied is explained by the variance of the independent variable which means PRODUCTQTY and PRODUCTIONTIME are dependent.
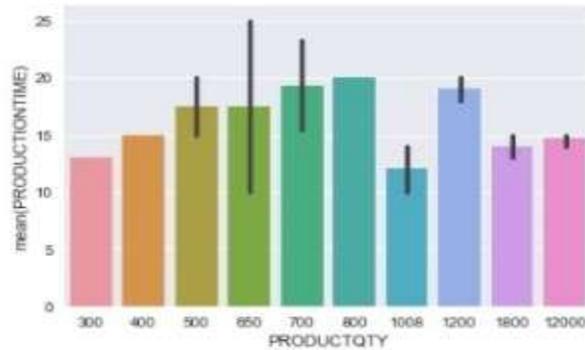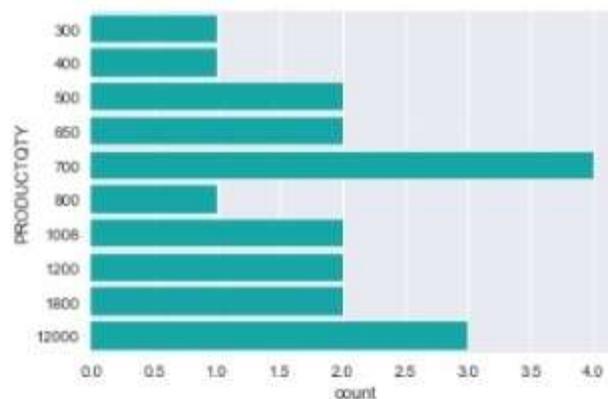

Fig 2

In the above Fig 2,it clearly known as PRODUCTION QTY is higher than the fixed PRODUCTION TIME for the product. This plot is to demonstrate the R^2 value.

Fig 3

The above Fig 3 shows the relationship of the variables. We can clearly understand that both are dependent variables with the regression with Count plot.

V CONCLUSION :

In this paper, Jupyter Notebook is the tool to analyse the Production time by using linear regression and the main objective is to finish the Production process with the fixed time. To predict the performance, product quantity and production time which is the time used to convert the raw material is the factor being used. In plotting the data of linear regression, it shows the relationship between the two variables. The R^2 value implies that there is 99% of dependence of the resource time to raw material quantity. This analysis helps to find the direct relationship between product qty and production time.

REFERENCE:

[1]Timm Gudehus, Herbert Kotzab, *Springer Science & Business Media -* Comprehensive logistics,10-Jan2012.

[2] Harland, C.M. (1996) Supply Chain Management, Purchasing and Supply Management, Logistics, Vertical Integration, Materials Management and Supply Chain Dynamics. In: Slack, N (ed.) Blackwell Encyclopaedic Dictionary of Operations Management. UK: Blackwell.

[3]Mentzer, J.T. et. al. (2001): Defining Supply Chain Management, in: Journal of Business Logistics, Vol. 22, No. 2, 2001, pp. 1–25.

[4] Lambert, Douglas M. Supply Chain Management: Processes, Partnerships, Performance

[5]MacDuffie and Helper, 1997; Monden, 1993; Womack and Jones, 1996; Gunasekaran, 1999

[6] Investor Words definition of "tax efficient"

[7]Holcomb MC, Manrodt KB. The relationship of supply chain visibility to firm performance. Supply Chain Forum: An International Journal. 2011;12,32-45.

[8]Francis V.Supply chain visibility: Lost in translation? Supply Chain Management.2008;13(3):180-184.DOL:10.1108/13598540810871226

[9]Fisher MSR, Cui JWL. Environmental performance evaluation with big data: Theories and methods. Annals of Operations Research.2016,270(2):459-472.DOL 10.1007

[10]Tu Q , Vonderembse MA, Ragu-Nathan TS, Sharkey TW. Absorptive capacity: Enhancing the assimilation of time-based manufacturing practices. Journal of Operations Management.2006;24(5):692-710.DOL:10.1016