**Developing Forecasting models for predicting Product Demand of a Manufacturing Company**

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**Problem Description**: - For a manufacturing company with a global footprint, it is obligatory to produce a wide variety of products in different categories, satisfying customer expectations. Thus, the products are shipped from the manufacturing firms to the different warehouses. In our case, we are considering the case of four central warehouses responsible for meeting customer needs in a particular region. Thus, the products are shipped from the globally located manufacturing firms to the 4 warehouse centers which generally take more than a month’s time to reach their destination. Thus, there are chances of inventory stock-out if the products are not shipped before a month. With the production taking place on a global scale, it’s important for the company to predict the demand for the month after next. This is important to avoid inventory stock-out, thereby reducing the total lead time of the products. Thus, a forecasting model that predicts the product demand of a manufacturing company will be developed that helps the company overcome situations of stock-out and help it plan efficiently and effectively.

**Objective**: - Using the previous demand data procured for the globally spread large scale company, we will be analyzing the demand rates of the warehouse over a span of four years and developing a forecasting model to predict the demand for the month after next month, in advance for products having less variability in demand as well having large variability in demand.

**Technical Approach**: - Demand forecasting will first involve checking the accuracy of the data since the effectiveness of the forecasting model highly depends on the accuracy of source data being used. The next task will be to create a dataset having demand data of all the products of each month, whether it is null or not.

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| --- | --- | --- |
| Product\_Code | Year/Month | Order\_Demand |
|  |  |  |
| P1 | 2012/01 | 20470 |
| P1 | 2012/02 | 21574 |
| P1 | 2012/03 | 18479 |
| P1 | 2012/04 | 12452 |
| P1 | 2012/05 | 10585 |
| P1 | 2012/06 | 0 |
| P1 | 2012/07 | 0 |
| P1 | 2012/08 | 24945 |

The data for all the products will be arranged in a dataset this way, in order to use it to find the trends and relationships between the past demand data. The next step will be to check the past demand data for seasonality and other factors, using time series analysis. Next phase will involve choosing the right forecasting model using Statistical technique and using that model for forecasting demand for the next month. A casual model will be created depicting the relationship between the different factors and identifying the turning points. The final step will be checking the accuracy of the demand forecasting model and improving the accuracy by taking required measures.

**Project Management**:-

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|  | Planned vs Actual time frame for IE 550 project | | | | | | | |  |
|  |  | week 1 | week 2 | week 3 | week 4 | week 5 | week 6 | week 7 |  |
|  | phase 1 |  |  |  |  |  |  |  |  |
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|  | phase 2 |  |  |  |  |  |  |  |  |
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|  | phase 3 |  |  |  |  |  |  |  |  |
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|  | phase 4 |  |  |  |  |  |  |  |  |
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|  |  | Actual |  |  |  |  |  |  |  |
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Phase 1:- Examining the accuracy of the demand data acquired from the company.

Phase 2:- Analyzing the different types of trends in the data such as seasonality, etc. using time series analysis.

Phase 3:- Selecting the forecasting technique and developing the forecasting model using Statistical Technique. Creation of casual model.

Phase 4:- Determining the accuracy of the forecasted data and increasing the error accuracy.

**Final Deliverables**: - The final deliverables of the project will be a forecasting model with the least possible mean forecasting error, for predicting the products’ demands in the month after next, for a global footprint company supplying goods to 4 Warehouses in this case. The Model will be helpful in determining the surge in the demand for the future months and will help the manufacturing company in shipping the products well in advance to the warehouses, thereby reducing lead time and preventing inventory stock-out situations.