PROJECT

Demand Forecast - Arconic

Inventory Control - VTI

Final Report ISEN 615(Production and Inventory Control)

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1.ARCONIC – Demand Forecasting

1.1. Instruction to Visual Basic Application for Arconic Forecasting

This section of the report helps the user to use a program developed by Visual Basic in excel for forecasting of demand of an Item # or Item group based on the Historical data provided. The user can easily forecast for short term demand or long-term demand (till 2023). The type of forecasting method used to find forecast for an entity is based the output obtained from R. R was used to analyze any trend or seasonality for a given entity. The final results of R are stored in the worksheet "RcodeTrendoutput". In addition to this the user has the flexibility to add new order data into the historical data as shown in the Figure 1. The user has to fill in the textboxes and click Copy to Database. This copies the entered historical data to the bottom of the Historical data sheet. The user can start the forecasting program by clicking the new forecast button to start the forecasting program. The user has the option to reload the Item # and Item group stored in the database. The final forecast output is available in the sheet "Forecast Output". The output contains the forecasted value, forecasting error due to the assumptions inbuilt in the selected forecasting method. The user can print the forecast result from the forecast dashboard by selecting print. Most control buttons, except for Log Out and Exit program, are inactive as shown in Figure 1.

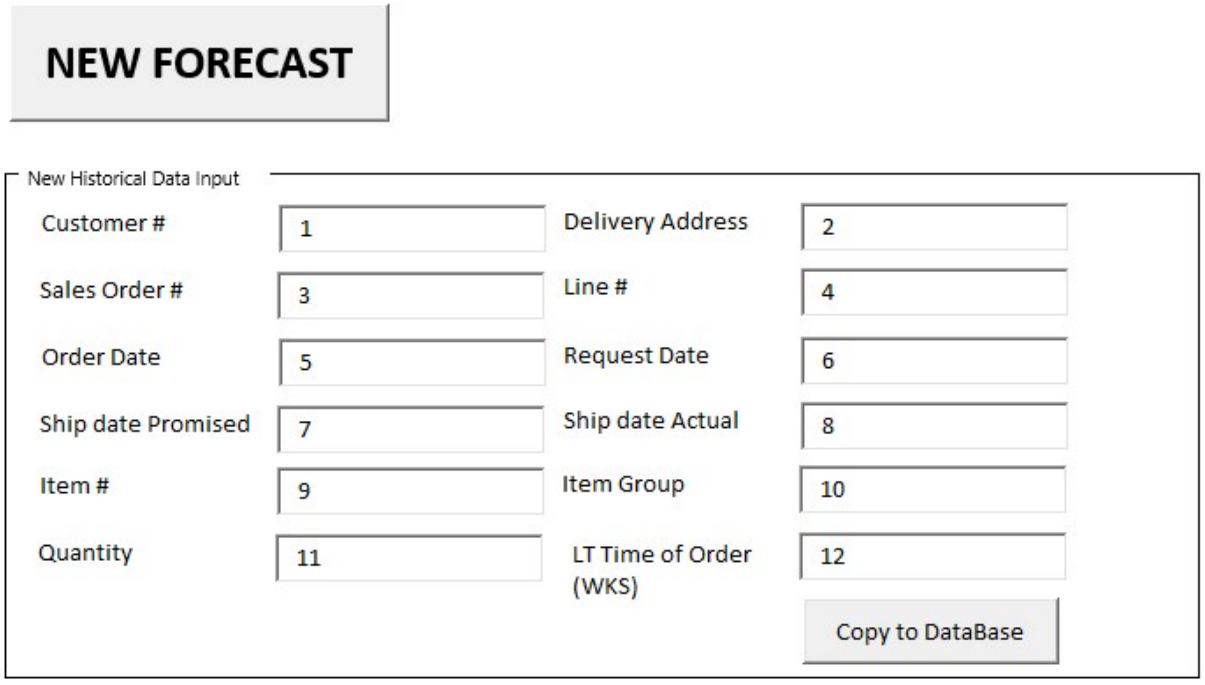

Figure 1 – Shows the Dashboard Sheet layout

Steps to follow: Click on the NEW FORECAST button. You will be greeted by a dialogue box as shown in Figure 2. The user has the option to reload the database of Item # and Item group if a new Item # and Item Group has been added to the Historical database that was not present before.

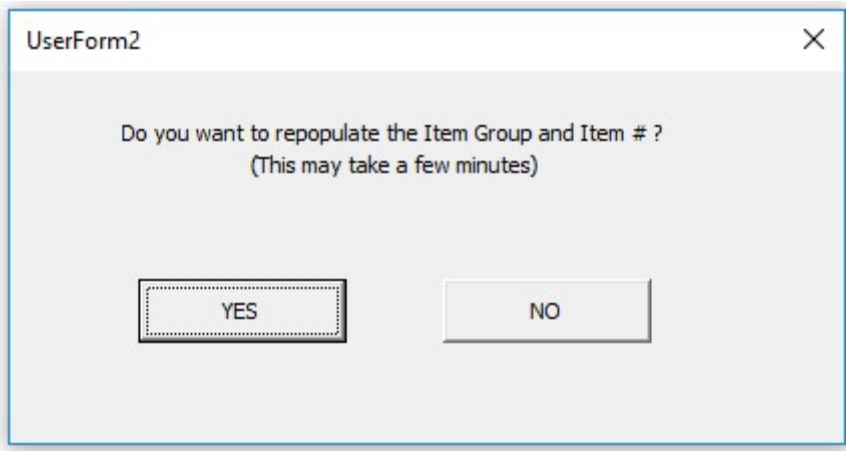

Figure 2 – Shows the database reload option.

1. After the selection has been made, the user is greeted by Forecasting dialogue box (Figure 3). The dialogue box is shown in Figure 3. The user has the option to forecast by Item group, Item# or Item # in a particular Item group. (**Caution**: If the year wants to shortlist Item # for the list of items in an Item group then the user must first select the Item group followed by the Item # for the program to work.)
2. Once Item group or Item # or both are selected, the year and Quarter option becomes active. The user should select either Year or Quarter radio button to enable further options. If the user selected year button, quarter option gets deactivated and vice-versa. In the case of year button being selected, the user can select the year the wants the forecast of from the drop-down list. After the year has been selected, the user has to select the type of forecast the user wants – short (forecast for the selected year) or long (forecast till 2023).
3. If the user wants to forecast by quarter, then the user has to select Quarter button which disables the year button. The user then proceeds to select the quarter he wants the forecast for, followed by the year of the quarter. After the year has been selected, the user has to select the type of forecast the user wants – short (forecast for the selected year) or long (forecast till 2023).
4. After the selections have been made, the user must click the Calculate Forecast button to trigger the program for the calculation of forecast.
5. The final forecast value is displayed on the Forecast number text box. (**Note**: The value of forecast displayed is the final forecast value i.e., if the user selects long term forecast, the value of forecast displayed is for the year 2023 and Qtr4 2023 for year and Quarter wise forecast respectively.
6. If the user wants more details about the forecast, he/she can click the Click for more details button. The user will be redirected to the Forecast Output sheet which contains details about the forecasting method, forecast error and graph of the forecast.
7. If the user has made any mistake while entering the details of the forecast, he/she has the option to clear the values entered and start over the forecasting without needing to close the dialog box.
8. The Print button lets the user to print the final results of the forecast for recordkeeping.
9. The user can exit the dialog box at any moment by clicking the Exit button.

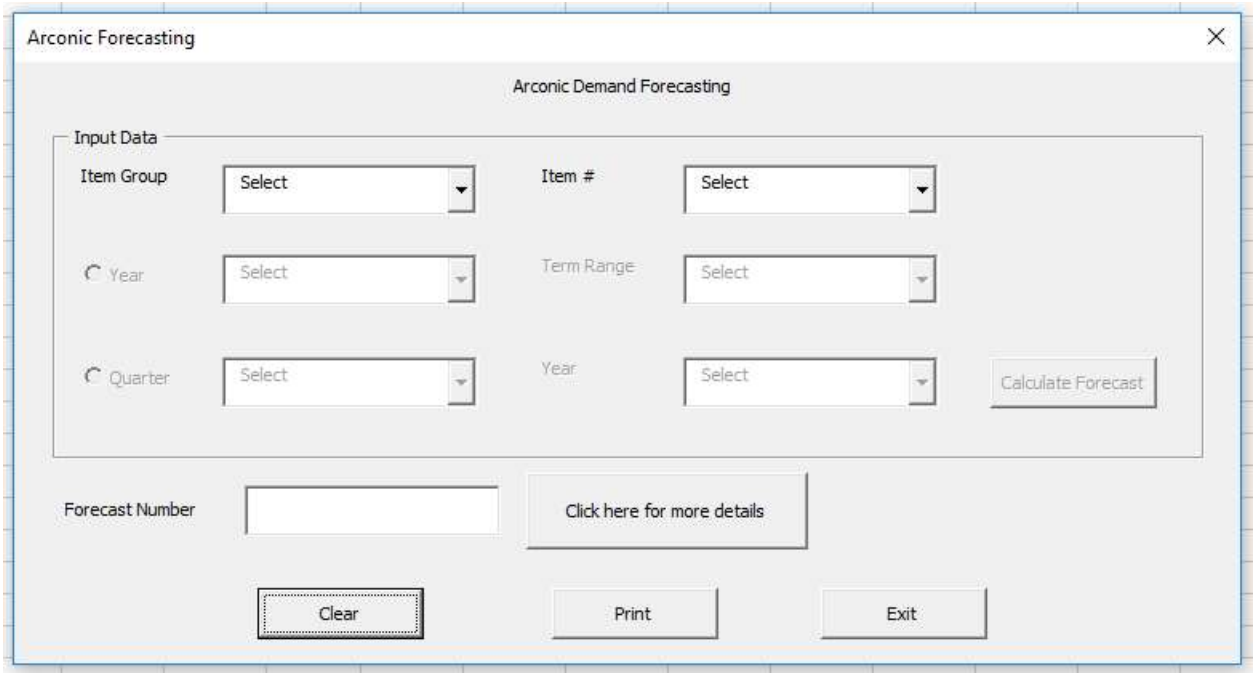

Figure 3 - Arconic Forecast Window

1.2. Data Analysis Phase:

The Arconic data has been analysed under three categories Item name, Item Group and Customer. Also, each of these three categories are further classified under quarter wise and year wise.
First, we took the data set and imported it as a data frame in R. The data was first cleaned considering item number, item group, customer, sales order date and sales quantity. Further the sales dates allocated to quarters and years.

Using data frame functions, we calculated the correlation value for item number against the timeline in both quarters as well as years using R. Now we filtered data having R^2 (correlation) of greater than 0.75 as having the trend. The R code used for filtering is given in Appendix 2.

This assumption was made considering that the R^2 value of 75% explains the variation of Sales with time. The filtered data was then exported to excel sheet for forecast analysis. The item number having R^2 greater than 0.75 is to be forecasted using regression and the others are to be forecasted using moving average. The item number and item group having R^2 value greater than 0.75 is given in Appendix 3.

The same procedure was followed for both Item group and Customer.