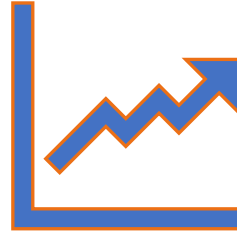# XYZ Superstore Time Series Model

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Problem Statement

- Improve workforce in the superstore
  - Make Data Driven Recommendations

- Model to predict sales in Furniture and Office Supplies

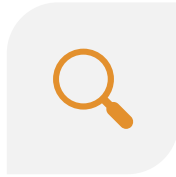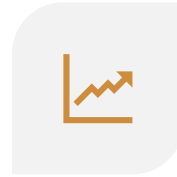 - Create a Time Series Model that can predict when sales will increase.

Busines Value

UNDERSTANDING SALES SEASONALITIES

INVESTIGATE IF THIS DATA CAN BE USED TO PREDICT FUTURE SALES NUMBERS

USE PREDICTIONS TO MAKE RECOMMENDATIONS

Methodology

| Frame the Problem | Collect Raw Data | Process the Data | Explore the Data/ Perform In-Depth Analysis | Train and Evaluate Models | Communicate results |

Frame the problem: Identify business priorities and make strategic decisions that will lead my work

Collect raw data: Extract data from the database provided.

Process the Data: Understand the data and proceed to clean it.

Explore the data: Split the data in different ways and use statistics to test and create visualizations to interpret data

Train and Evaluate Models: Create Time Series Models to predict future sales numbers.

Communicate Results

Collect Raw Data and Process the Data

THERE ARE +9,000 SALES DATA ENTRIES

ORIGINALLY THERE WERE 21 FEATURES. HOWEVER, ONLY **ORDER DATE** AND **SALES** COLUMNS WERE NECESSARY

CLEAN DATA: MISSING VALUES, MAKING ORDER DATE INDEX, GROUPING SALES BY MONTH.

There are more than 9,000 sales data entries in this dataset. There were 21 features in this dataset, however for Time series analysis we only need two, in this case Order Date and Sales.

Cleaning the data was different in here. There is the obvious data cleaning procedure, such as missing values. We also had to change the index of the data to be Order Date. And do Aggregation which is grouping sales by month.

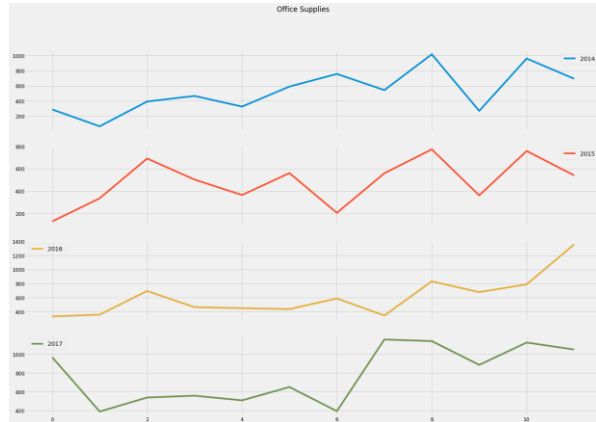## Explore Data/Perform In-depth Analysis Furniture
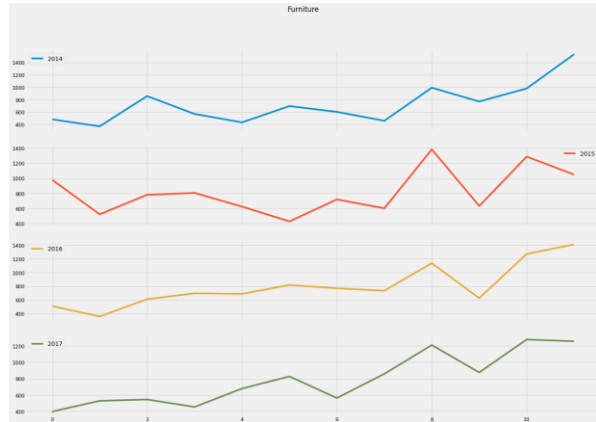
Using the line graph throughout the years, we can appreciate that there is a year seasonality pattern. For furniture, during the months of September, November and December there is an increase of sales. There is a massive decrease of sales during October.
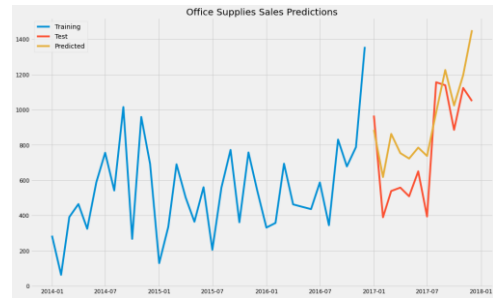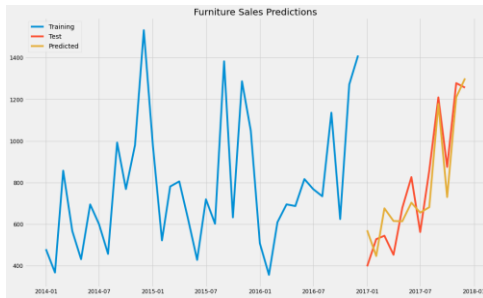
Explore
Data/Perform
In-depth
Analysis
Office Supplies

For Office Supplies, sales are more constant, there are more sales overall throughout the year. However, months September, November and December are also notably higher.
There is also a decrease in October.

Train and Evaluate Models

Predictions are quite close to the actual number. As with any time series model the prediction will not be 100% accurate. However, based on both graphs we can see that the predicted models do show the year seasonality.
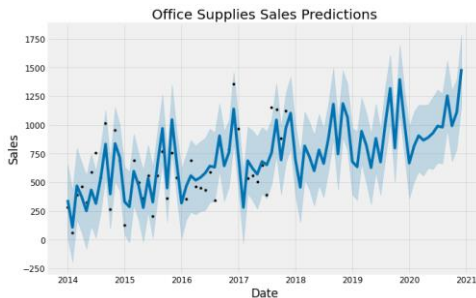
Recommendations - Furniture

Furniture Sales Predictions

❑ Increase of workforce when sales are higher. September, October and December

❑ Increase of stock before the high-sales months

Recommendations for furniture, September, October and December are the months when sales spike up dramatically. This indicates that:
•A minimum personnel is to be maintained throughout these months, perhaps even increasing workforce.
•Increasing stock this month is also recommended as sales will increase .
•January to May are quiet months therefore personnel can be redirected to different departments.
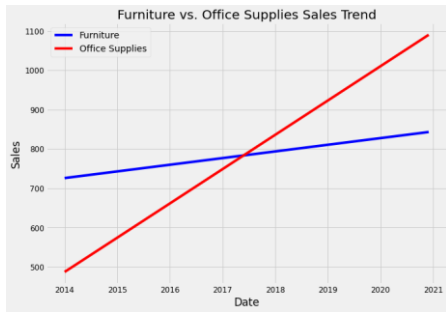
Recommendations – Office Supplies

Office Supplies Sales Predictions

❑ Increase of workforce when sales are higher, September, October and December.

❑ Increase of stock before the high-sales months

❑ Maintain a minimum number of employees

Recommendations for the office supplies department, during the months of September, October and December the sales increase dramatically. Therefore, it is recommended:
•To hire more personnel as this will be needed.
•It is also recommended to have enough stock to maintain a high quality service for every customer that desires to buy Office Supplies.
•Sales in Office Supplies increase steadily throughout the years, therefore, maintaining a minmium number of employess in this section is recommended

Recommendations- Trend

Furniture vs. Office Supplies Sales Trend

❑ Volume sales per month increase exponentially

❑ Increase of workforce in office supplies is recommended

The volume of sales per month for both Office Supplies and Furniture, increase steadily over time. However, Office Supplies does trend higher than Furniture. It is recommended to spend more resources in Office Supplies department as it has a higher probability to be more profitable than furniture in the long run.

Future Work

❑ Extra column, workers in each section.

❑Making a prediction on Technology could also be helpful.

- Having the number of workers in each section working each day will also help. Perhaps, there is a correlation between number of workers and sales.
- Gaining more insight on how sales between different departments differ will help a lot, for managing stocks in advance, for example.

Thank You

Erik Castro – Flatiron School

Any Questions?