SKU OPTIMIZATION & RATIONALIZATION

STELLAR INDUSTRIAL SUPPLY

educate | explore | engage
MILGARD SCHOOL OF BUSINESS
UNIVERSITY *of* WASHINGTON TACOMA

ABOUT OUR PROJECT

The supply chain industry has unique challenges in the modern era. With challenges from compliance to globalization, the industry has shown there is a need to better look at new technologies and use the data that the companies are gathering to analyze and solve these issues.

Stellar Industrial Supply (referred to as Stellar) is a growing privately held company based in Tacoma, Washington. They are a distribution company within the supply chain industry that serve a wide range of customers across the United States from construction companies, Boeing, and to the government. Within Stellar's partnerships, vendors, manufacturers and suppliers, there are over 1 million SKUs (stock keeping unit) in their inventory.

Common issues in the supply chain industry for distributors include excess inventory, long lead times between distributors and manufacturers, and low consumption of the inventory. These can lead to a lack of space issues in warehouses, overstocked items, and generally impact the bottom line of the company.

In order to help reduce similar issues to these, Stellar would like to look at their overall SKUs and inventory. These can be summarized into three main key points:

1. **Reduce and/or Optimize SKUs**
2. **Leverage Key Suppliers within vendors, manufacturers, and suppliers**
3. **Better customer support by leveraging new technologies**

TOOLS

Azure

Microsoft **SQL Server**

EPICOR Prophet 21 - ERP

R Studio

PowerApps
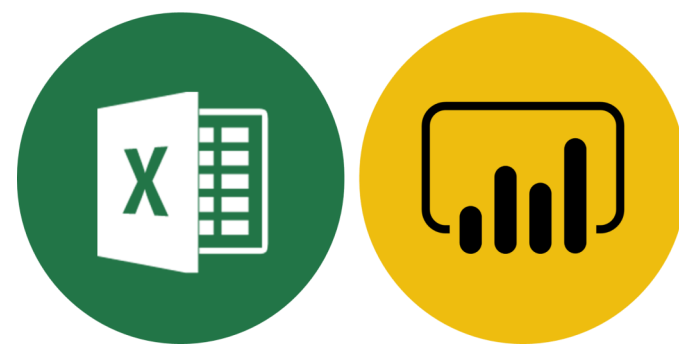
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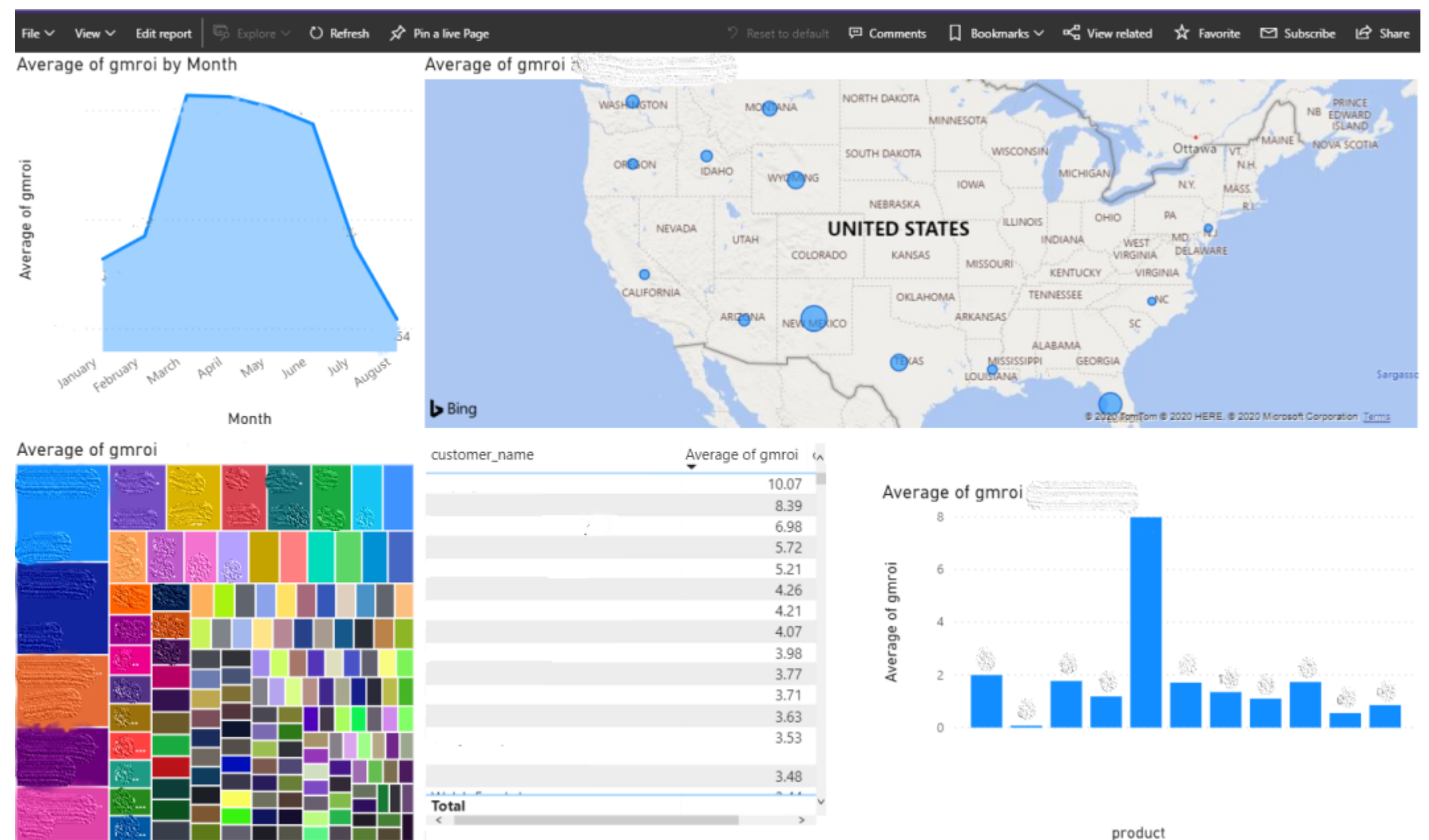apai23@uw.edu

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W **M.S. IN BUSINESS ANALYTICS**
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DESCRIPTIVE ANALYTICS

This dashboard, created in Power BI, displays Stellar's average GMROI by state, trends over the year, average GMROI by item and also by Product Groups. By visualizing data with a dashboard, the client is able to gain comprehensive insights into their data.

GMROI & TURN-EARN INDEX

What are GMROI, and Turn-Earn Index?

- GMROI, stands for Gross Margin Return on investment. This is an indicator that shows how much profit inventory sales produce after covering inventory costs. Calculated by the formula: **Gross Profit Dollars from Past 12 Months ÷ Average Inventory Value**

- Turn-Earn Index combines gross margin and turn over to balance turnover by profits. **Turn-Earn Index is calculated by multiplying inventory turns by the gross margin percentages.**

- Most companies use inventory Turn-Earn Index or GMROI as a measurement of their inventory profitability performance.

COGNITIVE ANALYTICS
## POWER BI: ANOMOLY DETECTOR

Using Power BI, we utilized the built in anomaly detector to predict item sales or forecast inventory needs. The anomaly detector looks for underperforming or overperforming stock items. This powerful tool can help with inventory management, and save on wasteful items or predict when items may need to be stocked before a large predicted purchase.
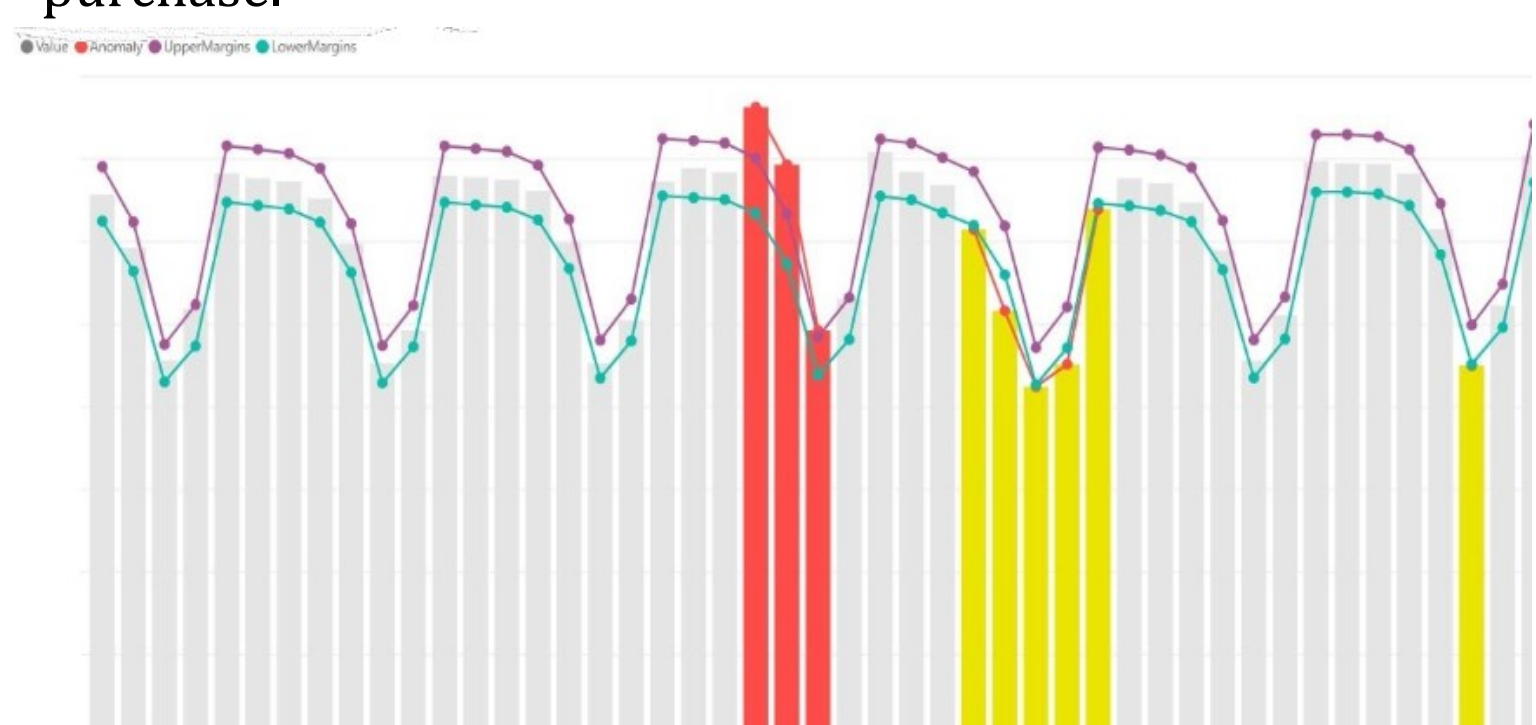
POWER APPS & CHAT BOT
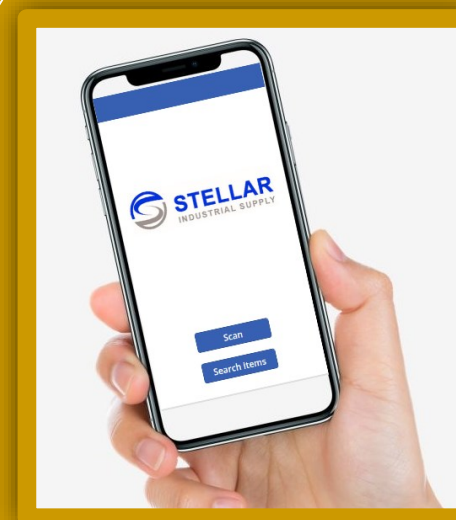
We developed two prototype mobile apps using Power Apps from Microsoft. The first was a scan and item search app that allows users to scan the barcodes of items they are in need of and to see if they are in stock. The second focuses on customer support, allowing a user to ask frequently asked questions to a chat bot. The chat bot, depending on the questions, responds with an answer.
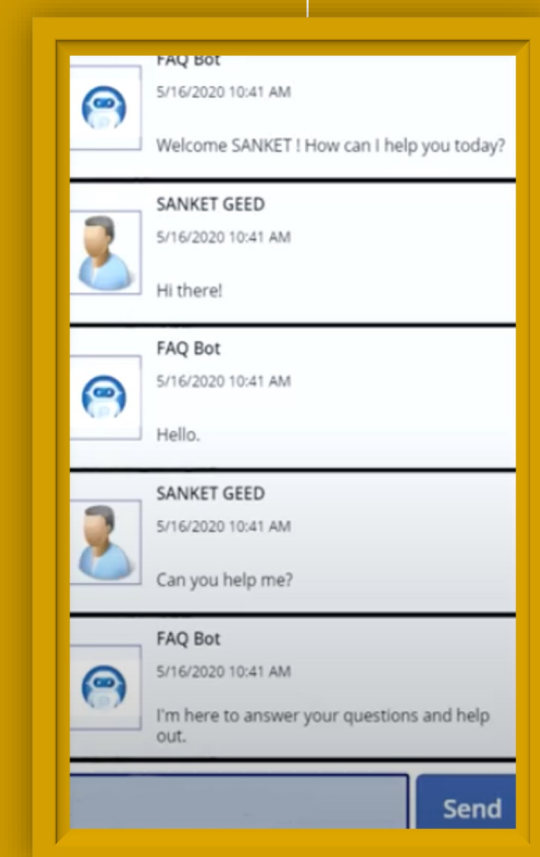
PREDICTIVE & PRESCRIPTIVE ANALYTICS

We performed a multitude of analysis on our client's data including:

- GMROI & Inventory Turn-Earn Index
- Linear Regression Analysis
- Principal Component Analysis
- Stepwise Feature Selection
- Modeling Neural Network
- Market Basket Analysis
- Time Series Forecast

RECOMMENDATIONS

- Integrate the GMROI & Inventory Turnover Metrics
- Refresh the Power BI dashboard with new relevant data for COVID-19
- Develop further on the Anomaly Detector and Power APPs
- Using AI/ data models to optimize warehouse inventory