MSBA Capstone Project

**Bi-Weekly Progress Report**

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**Project Title:** Optimizing Growth: Sales and Market Expansion for GIFCO

**Elevator Pitch**

This project aims to optimize GIFCO’s sales and market expansion strategies by leveraging historical sales and shipment data. The focus is on creating a dashboard, forecasting sales trends, and identifying potential expansion opportunities. The project has progressed through data cleaning, feature engineering, and exploratory data analysis to prepare for predictive modeling and optimization.

**Tasks Done During the Previous Two Weeks**

After completing data cleaning, feature engineering, and EDA in the previous phase. I started with sales forecasting by implementing forecasting models:

* The first model implemented was ARIMA but initial results showed that ARIMA struggled with seasonality, leading to a higher RMSE than expected.
* The second model was Exponential Smoothing which performed better than ARIMA but still had limitations in predicting sudden variations.
* Finally, the third model was Prophet and it produced the best forecasting results so far, with the lowest RMSE compared to ARIMA and Exponential Smoothing. It successfully predicted future sales trends with confidence intervals but still needs some tuning.
* To assess model accuracy, I used the measure RMSE. Prophet demonstrated superior performance, likely due to its ability to capture long-term trends effectively.
* Finally, I created a comparative visualization to analyze actual vs. predicted sales and the performances of the different models.

**Difficulties and Challenges Encountered**

* I mostly faced technical issues with python packages since I was trying to use LSTMs for forecasting and the TensorFlow and NumPy packages were giving me errors for me to be able to use this model and still working on it till now.
* Had issues displaying yearly intervals properly on forecasting charts.
* Also, model optimization is a bit challenging since I am facing high RMSEs but I was able to make them better but still working on it.

**Tasks To Be Completed**

* Further model optimization by implementing LSTMs if possible to improve forecasting accuracy. Also, ARIMA, Prophet, and Exponential Smoothing need to be fine-tuned to enhance predictions.
* Then, I will be working on developing a tableau dashboard to visualize key trends and insights for stakeholders.