INTRODUCTION

What is Wabash: An American diversified industrial manufacturing firm that is the largest maker of semi-trailers and liquid transportation systems in North America.

Our want: Anticipating demand for their primary products, which includes dry freight vans. The forecasting model is divided into two parts: industry-wide and Wabash-specific. Our Goal: To develop the best possible forecasting models so that Wabash can make informed business decisions.

Fall
Data exploration via groups divided by product types such as Dry vans (Enclosed Semi trailer), Reefer (refrigerated container) and tankers.

Spring
Further forecasting via groups divided by models (LSTM for text-based, XGBoost for machine learning, VARMA for variables in ARIMA), transitioning to multivariate focus.

Fall 40%
Spring 60%

Representation of Importance

**Fall required us to understand data and clean it, while the real work began in Spring to predict the market**

MODEL DESCRIPTION

LSTM – It’s a Recurrent Neural network (RNN) with a feedback connection that allows it to process strings of data instead of single points like most RNNs. The results of this model showed even with a full year lag we were able to predict a decline in the 2020 market.

XGBoost – Extreme Gradient Boosting, is the implementation of gradient boosted decision trees designed for speed and performance with great usage in classification and regression problems.

ARIMA – The multivariate version of ARIMA, a form of dynamic regression model. The model allows for quicker predictions due to lack of heavy data processing steps required. The prediction were more accurate further out in the lags.

Conclusions:
• Calculated and used closely related economic factors as weighted inputs.
• Implemented a variety of models including LSTM, XGBoost, & ARIMAX.
• Tested models with different lags, input variables, and prediction goals.
• Achieved 70% + accuracy for all tests.
• Helped Wabash gain a better knowledge of their business products and their performance.
• Provided reusable code that can be used for predictions in future.

Future Goals:
• Forecast for different Wabash products such as reefers, platforms, and tankers.
• Forecast for about three years into the future.
• Improve and choose forecasting model based on specific time frames like monthly, quarterly, bi-annually, and yearly.
• This is goal is affected by our project findings as seen above. Different forecast models have better accuracy rates.
• Build a UI for business use.

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