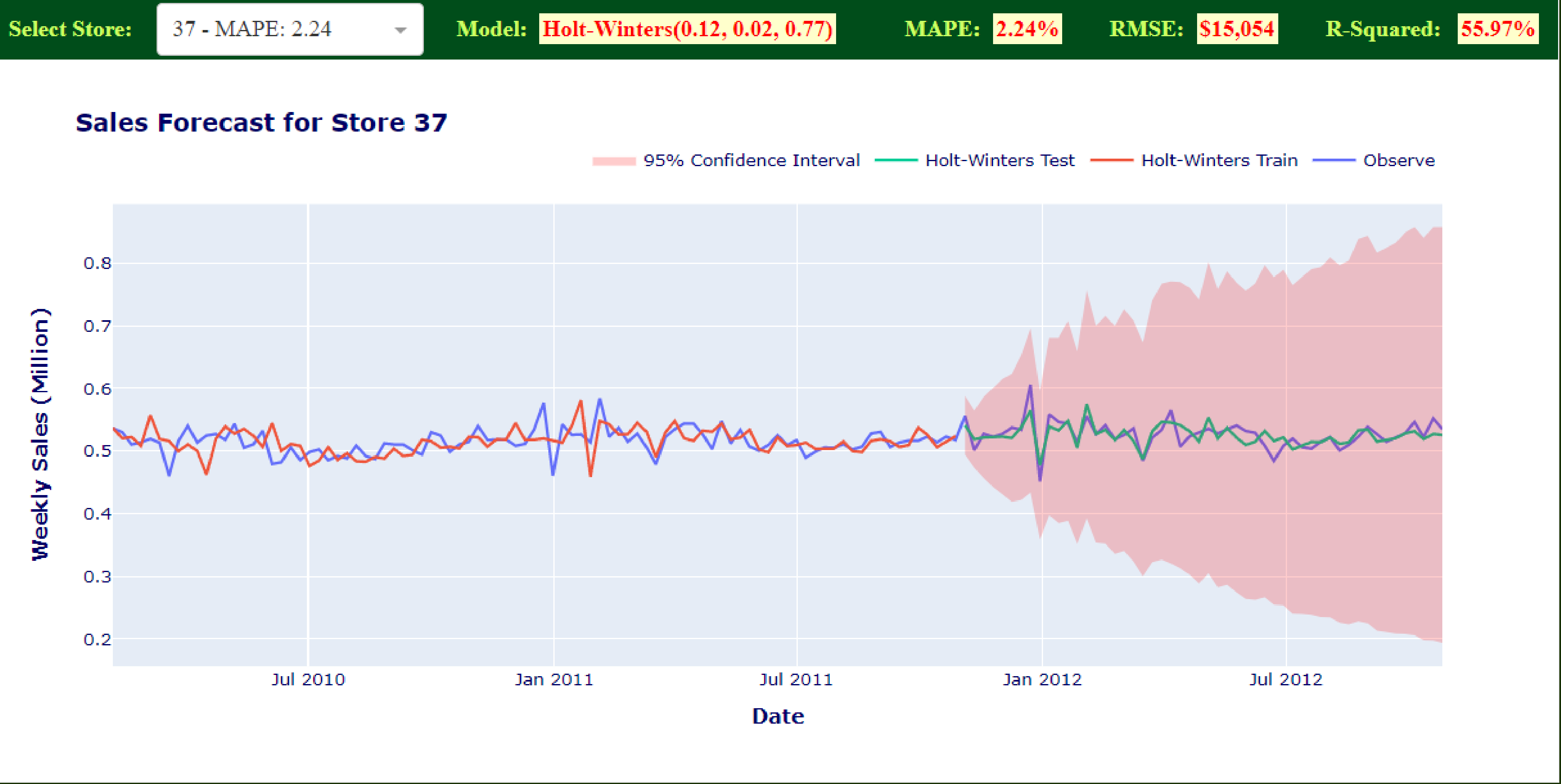


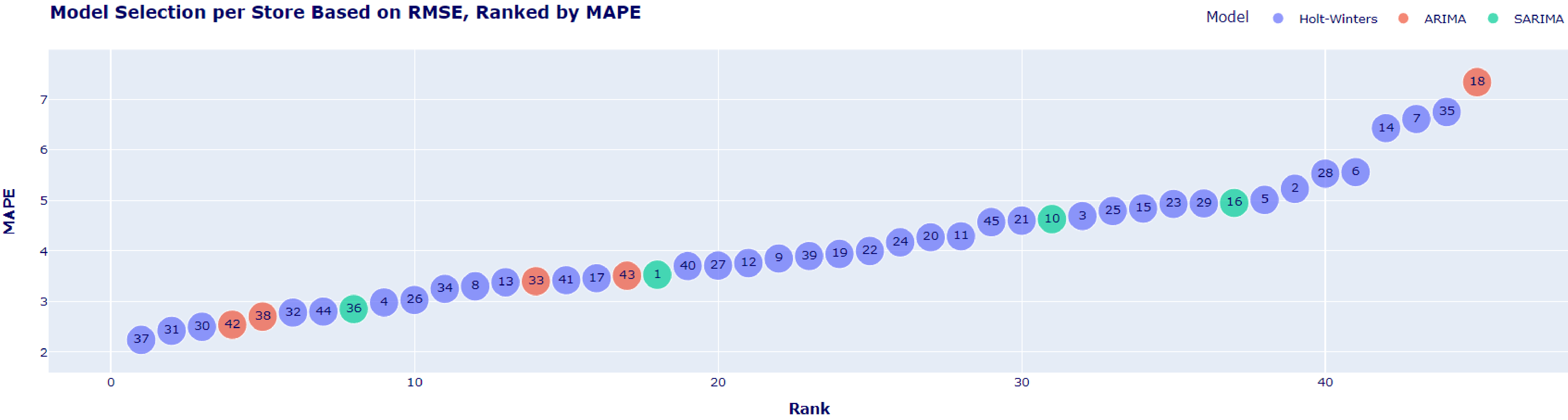
Forecast Model Selection

Select Optimal Model using: ☐ MAPE ☒ RMSE ☐ R-Squared Rank Model by: ☒ MAPE ☐ RMSE ☐ R-Squared

Rank	Model1	Store	RMSE	R-Squared	MAPE
filter					
1	Holt-Winters	37	0.015054	55.97	2.24
2	Holt-Winters	31	0.050715	84.67	2.42
3	Holt-Winters	30	0.012957	38.34	2.5
4	ARIMA	42	0.018233	86.4	2.54
5	ARIMA	38	0.017507	63.93	2.7
6	Holt-Winters	32	0.045307	90.75	2.78
7	Holt-Winters	44	0.011293	64.93	2.8
8	SARIMA	36	0.011081	64.94	2.85
9	Holt-Winters	4	0.085294	90.1	2.98
10	Holt-Winters	26	0.042117	86.7	3.03
11	Holt-Winters	34	0.039903	86.84	3.25
12	Holt-Winters	8	0.039805	85.88	3.3
13	Holt-Winters	13	0.100067	87.34	3.38
14	ARIMA	33	0.011296	66.84	3.4
15	Holt-Winters	41	0.062456	88.81	3.42

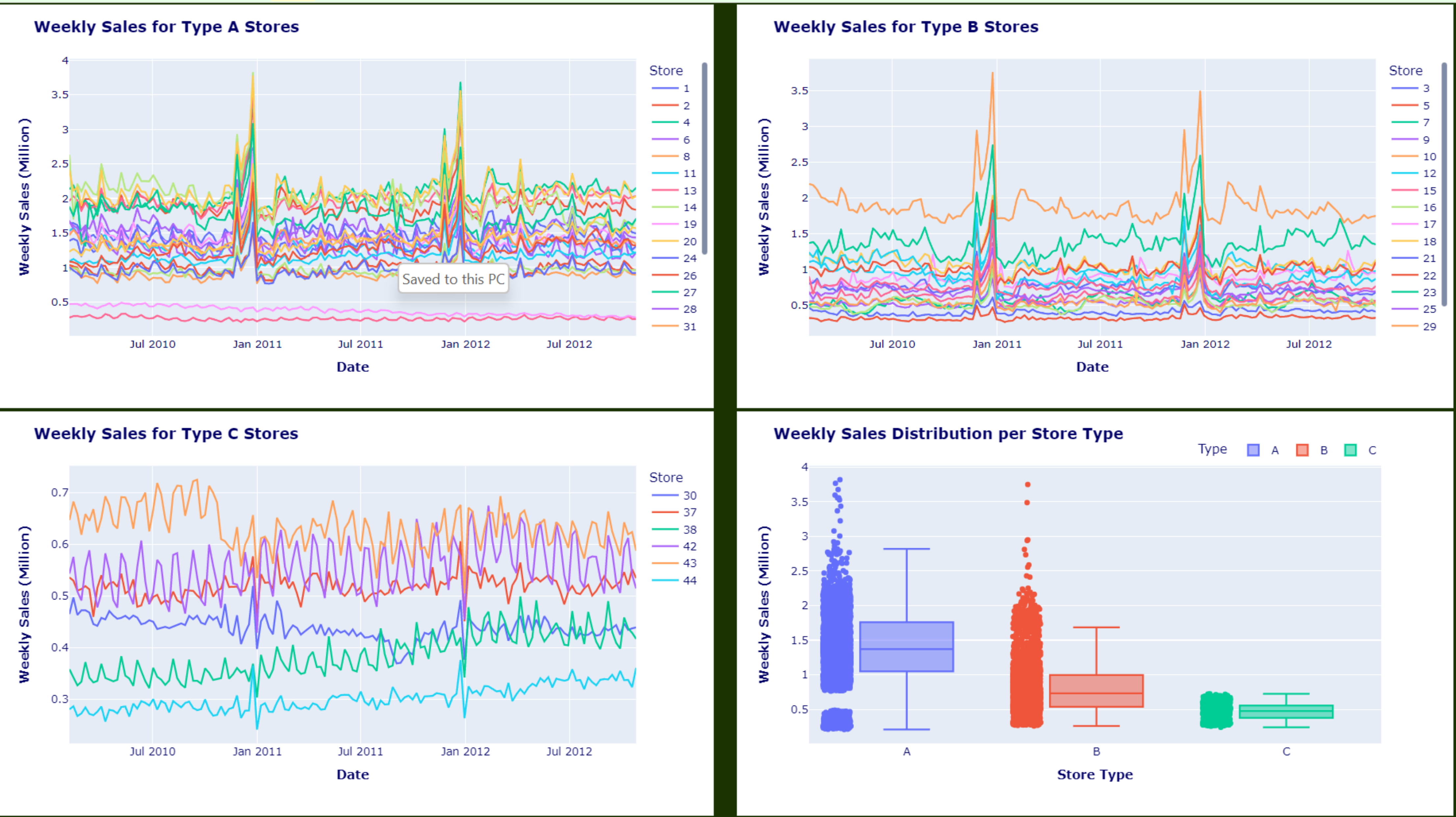


Model Selection per Store Based on RMSE, Ranked by MAPE



Walmart Store's Weekly Sales Analysis

Summary Statistics of Store's Weekly Sales 6,435 observations Mean: \$1,046,964.88 Median: \$960,746.04 Standard Deviation: \$564,366.62 Min: \$209,986.25 Max: \$3,818,686.45



Web Application to Evaluate Statistical Time Series Forecast Models: Application to Walmart Sales

<https://sales-forecast.herokuapp.com/>

<https://github.com/nphan20181/sales-forecast>

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ABSTRACT

Statistical time series forecast is a technique that predicts future values using past values and/or errors of sequenced time series data. Whereas **Exponential Smoothing** estimates the observed value by weighting recent observations heavier than distant observations, **Holt’s Linear Trend** expands Exponential Smoothing by adding a growth rate to the estimated value. Moreover, **multiplicative Holt-Winters** accounts for seasonality by multiplying seasonal factor and sum of estimated mean and growth rate. In contrast, **Autoregressive Integrated Moving Average** (ARIMA) predicts actual values using a linear combination of the mean of time series, a constant value, weighted past values, weighted past errors and current error. **Seasonal Autoregressive Integrated Moving Average** further extends ARIMA by incorporating seasonality terms into the model. To enhance understanding of aforementioned statistical time series forecast methods, this study builds a web application that forecasts weekly sales of 45 different Walmart stores in the US using sales data collected between 2010 and 2012. The application not only enables users to evaluate aforesaid statistical time series forecast models but also enables users to gain practical experience with each model.