

# Demand Forecasting





# OUR TEAM

**Mohamed Ibrahim**

**Ahmed Magdy**

**sherif Mohamed**

**Mohamed Hany**

**Abdelrahman Sameh**



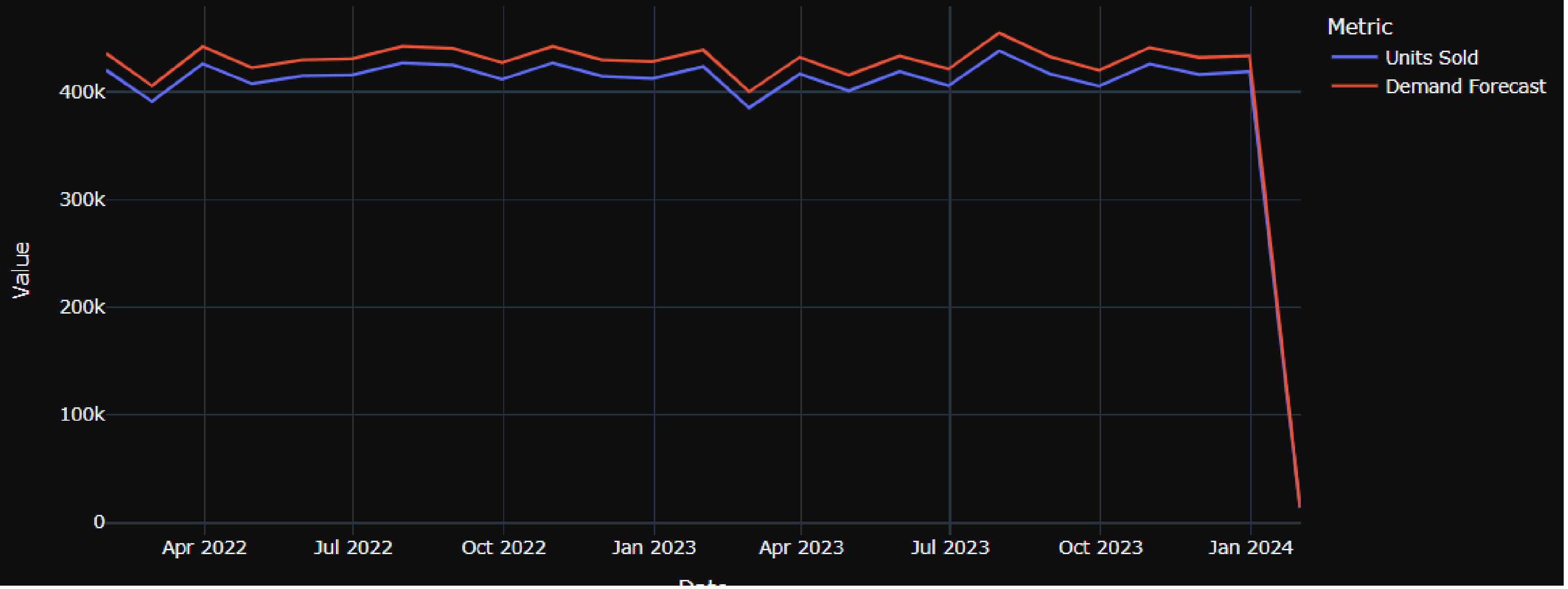
# OVERVIEW

- Introduction
- Models
- Visualization
- Evaluation on Test Data
- Preprocessing

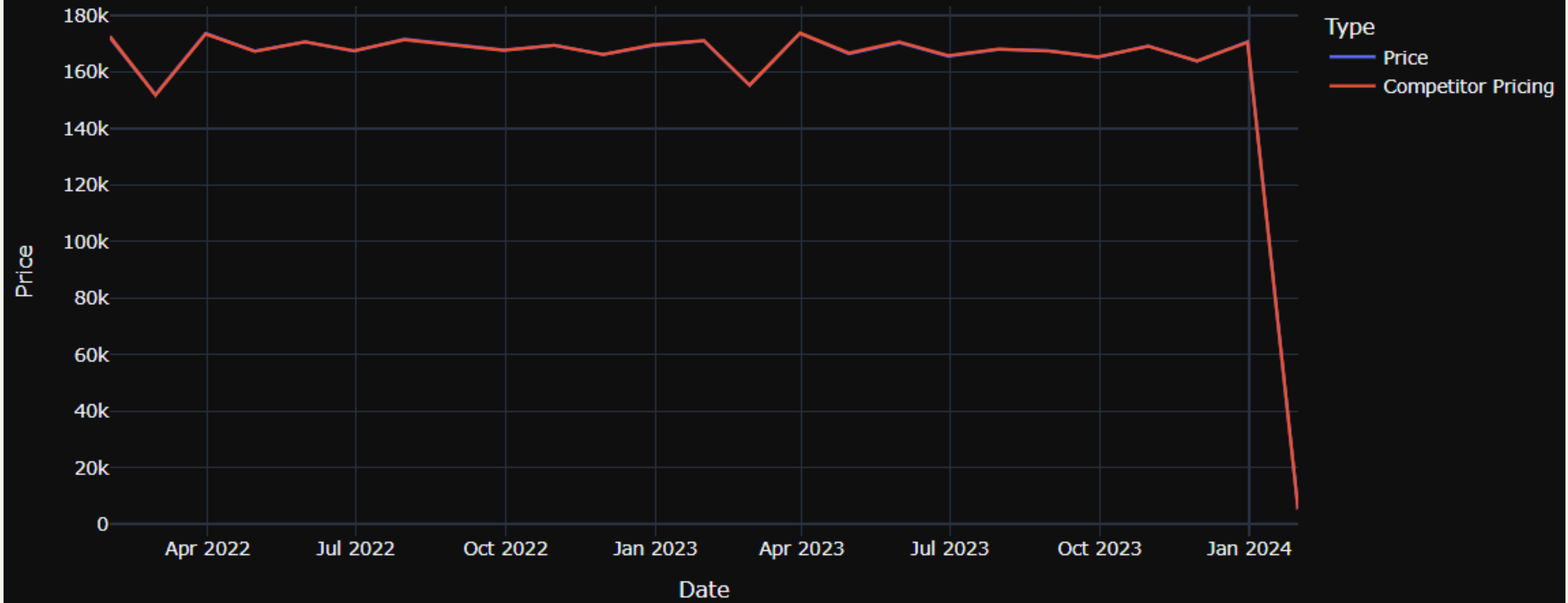
# INTRODUCTION

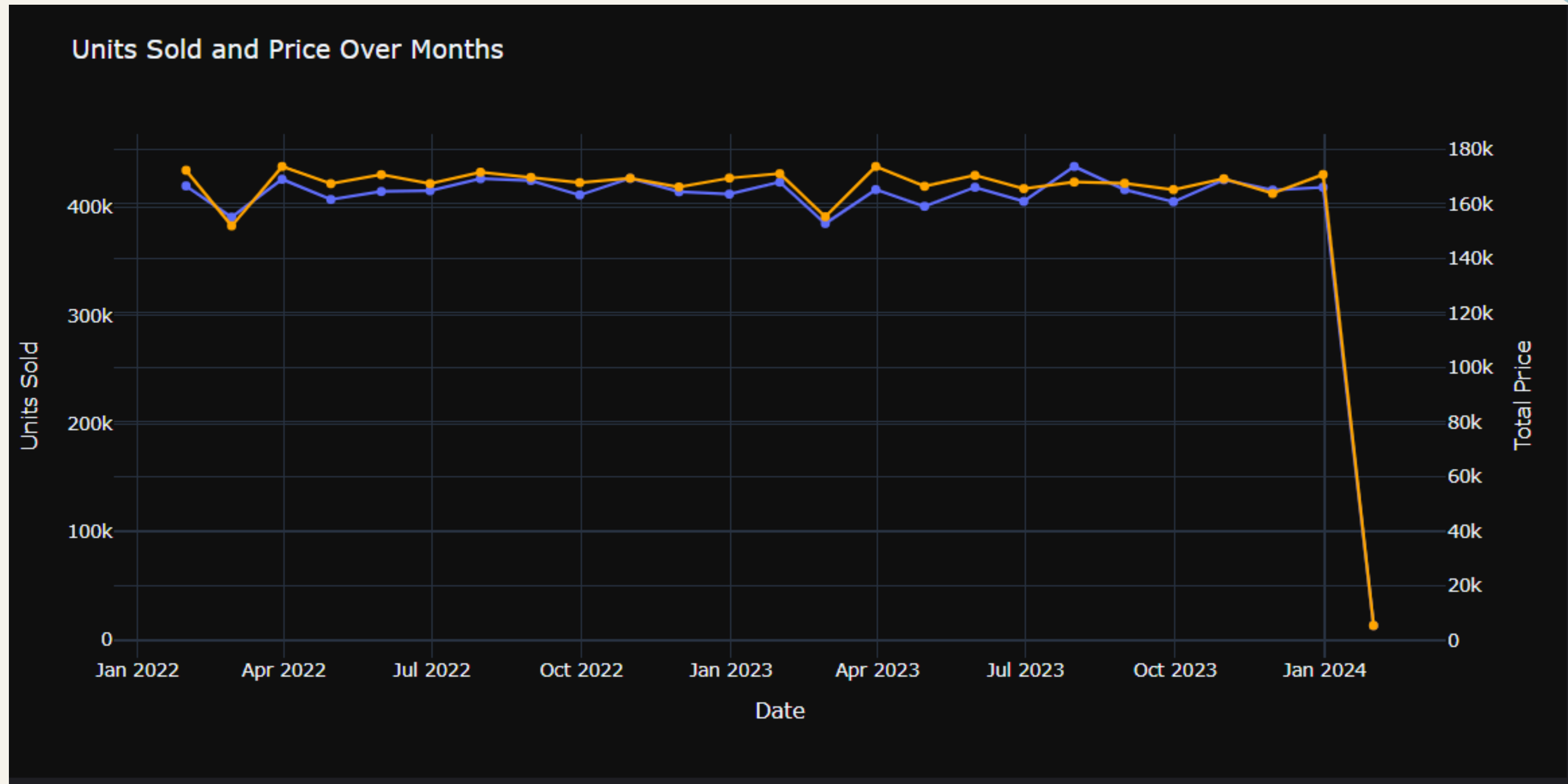
- **Objective:** Predict future Demand for a retail store.
- **Goal:** Minimize stockouts and overstock situations.

### Units Sold & Demand Forecast Over Months

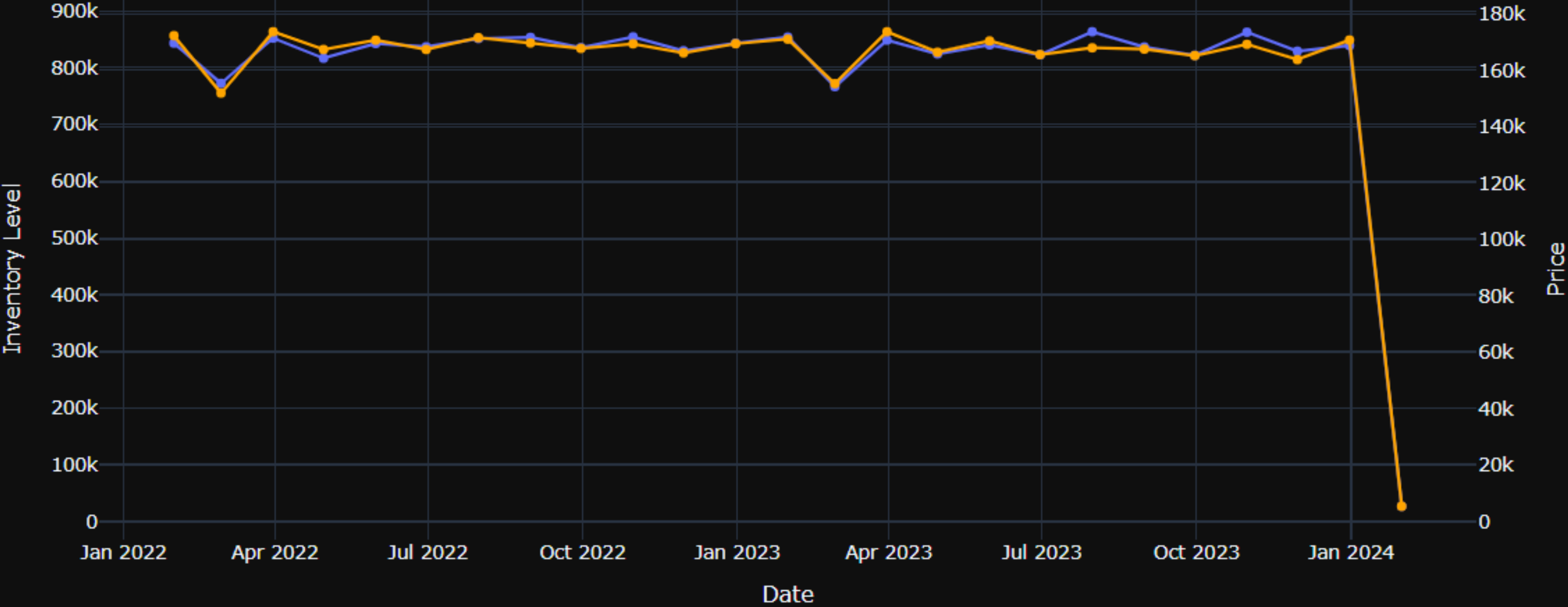


### Price vs Competitor Pricing Over Months



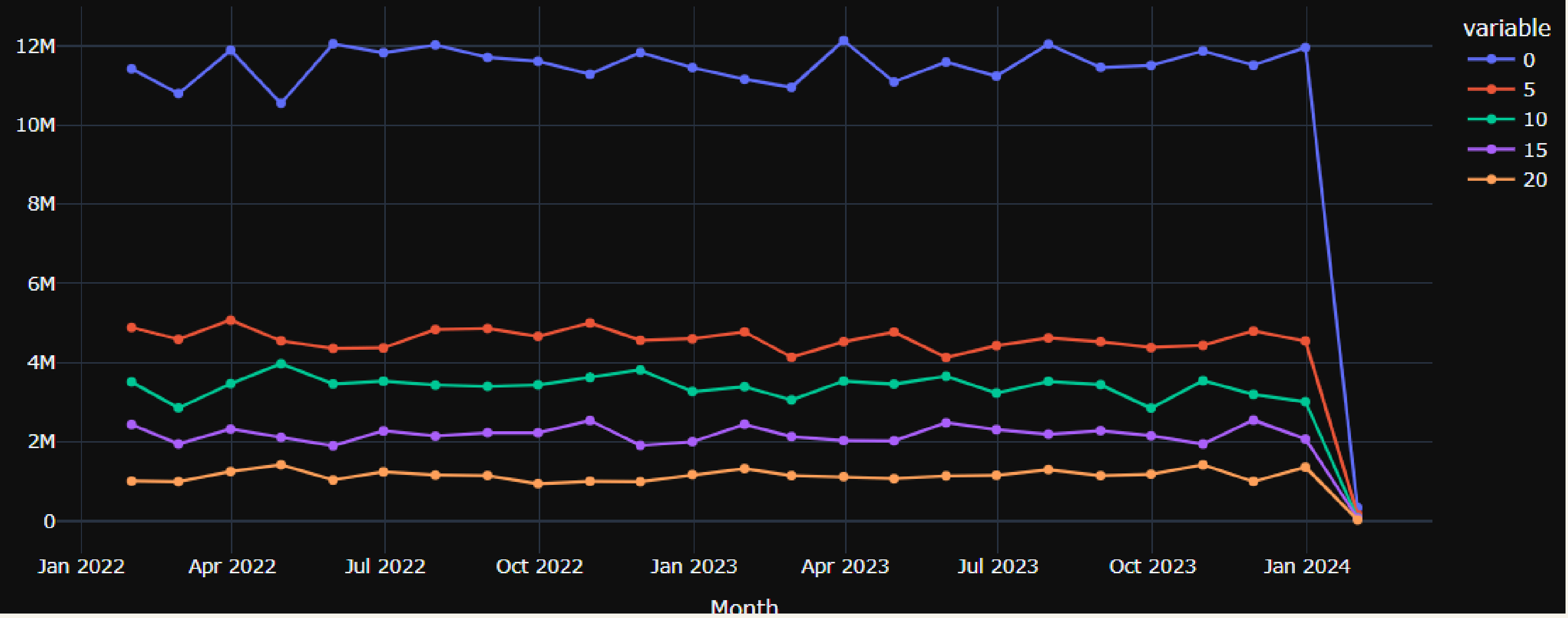


Inventory Level and Price Over Months

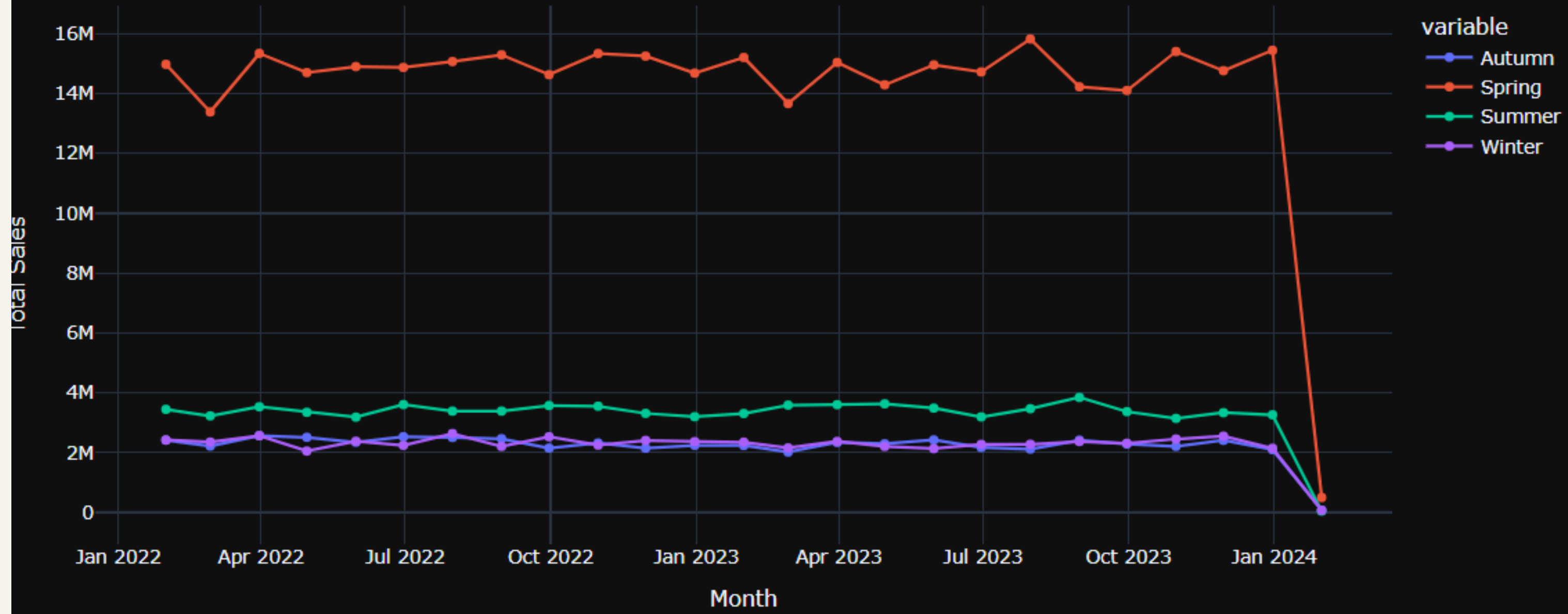




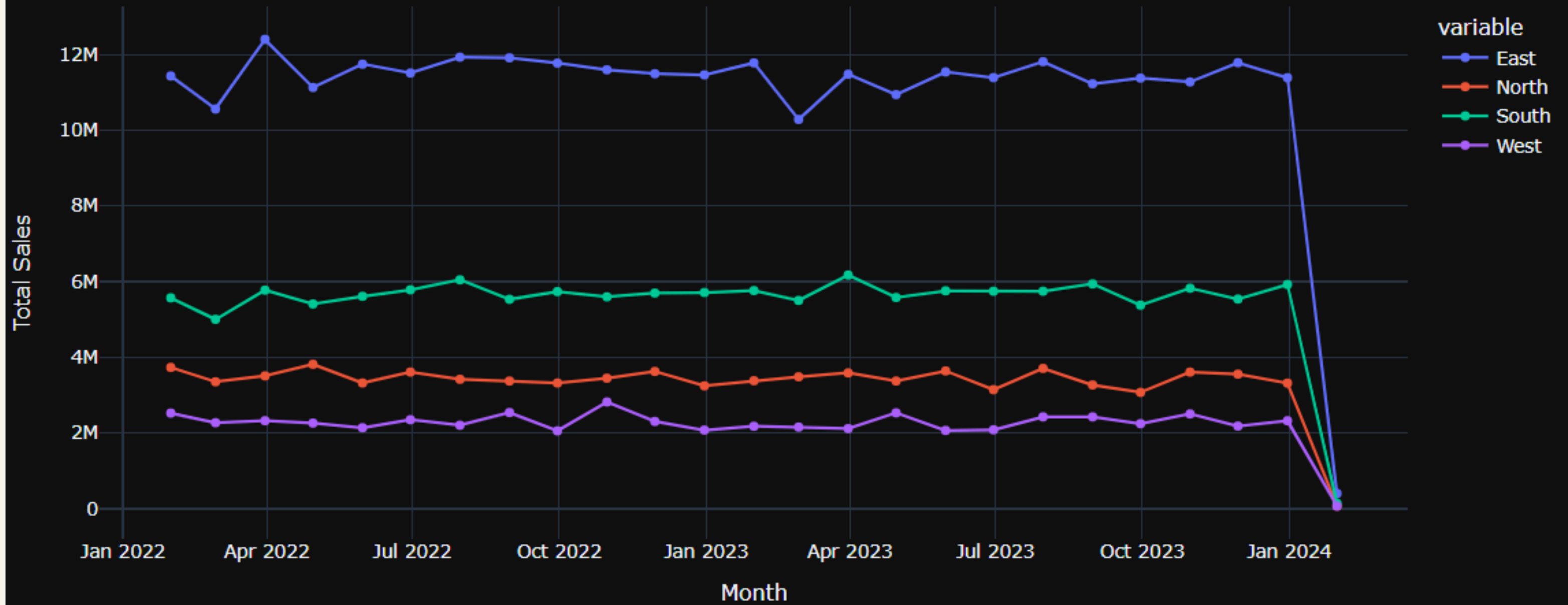
Monthly Total Sales by Discount Over 2 Years



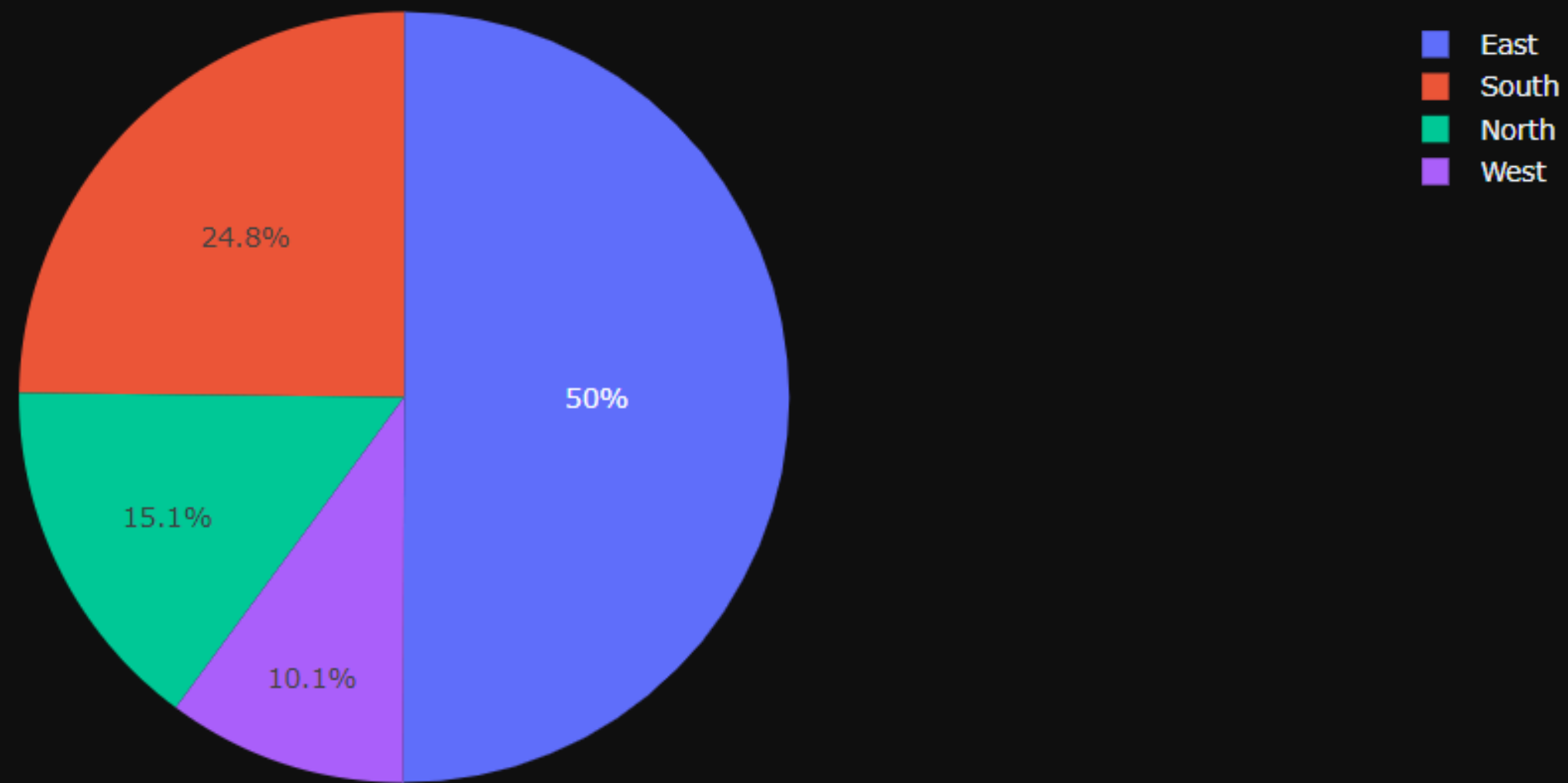
Monthly Total Sales by Seasonality Over 2 Years



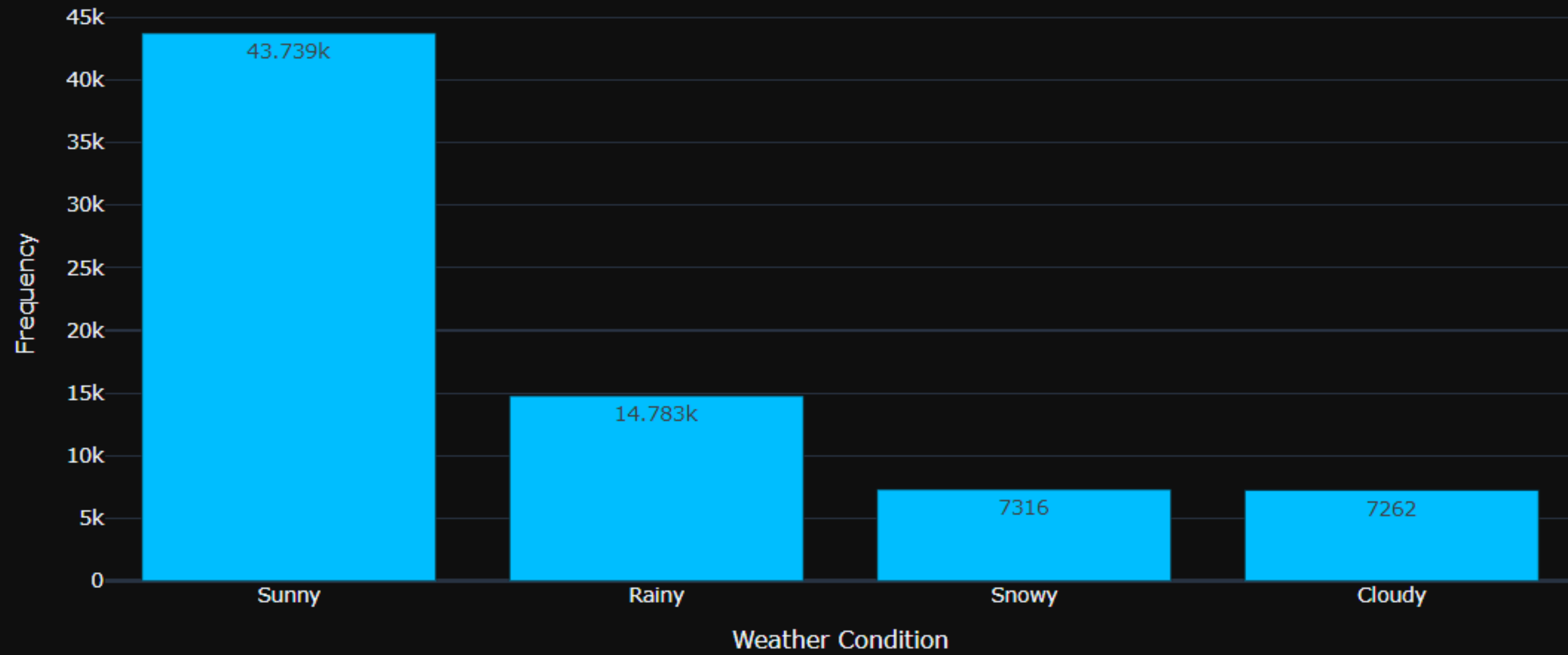
Monthly Total Sales by Region Over 2 Years



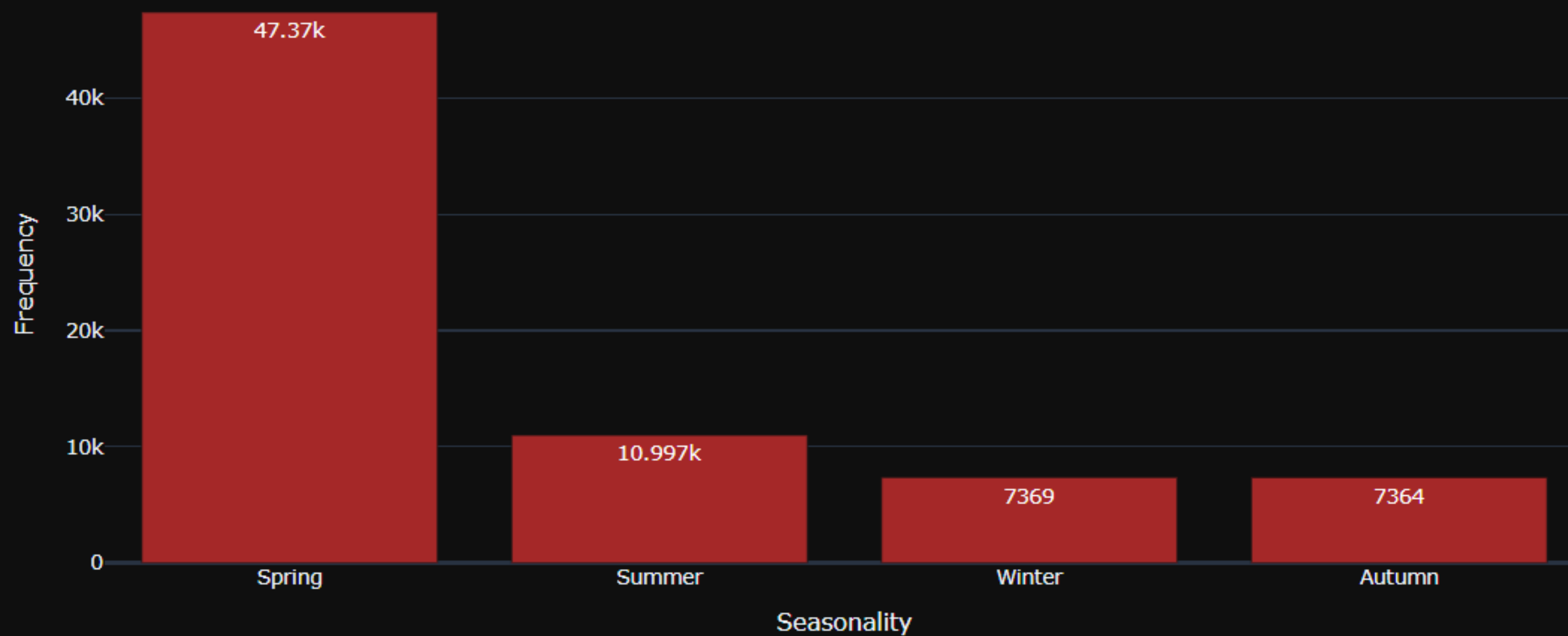
Distribution of Region



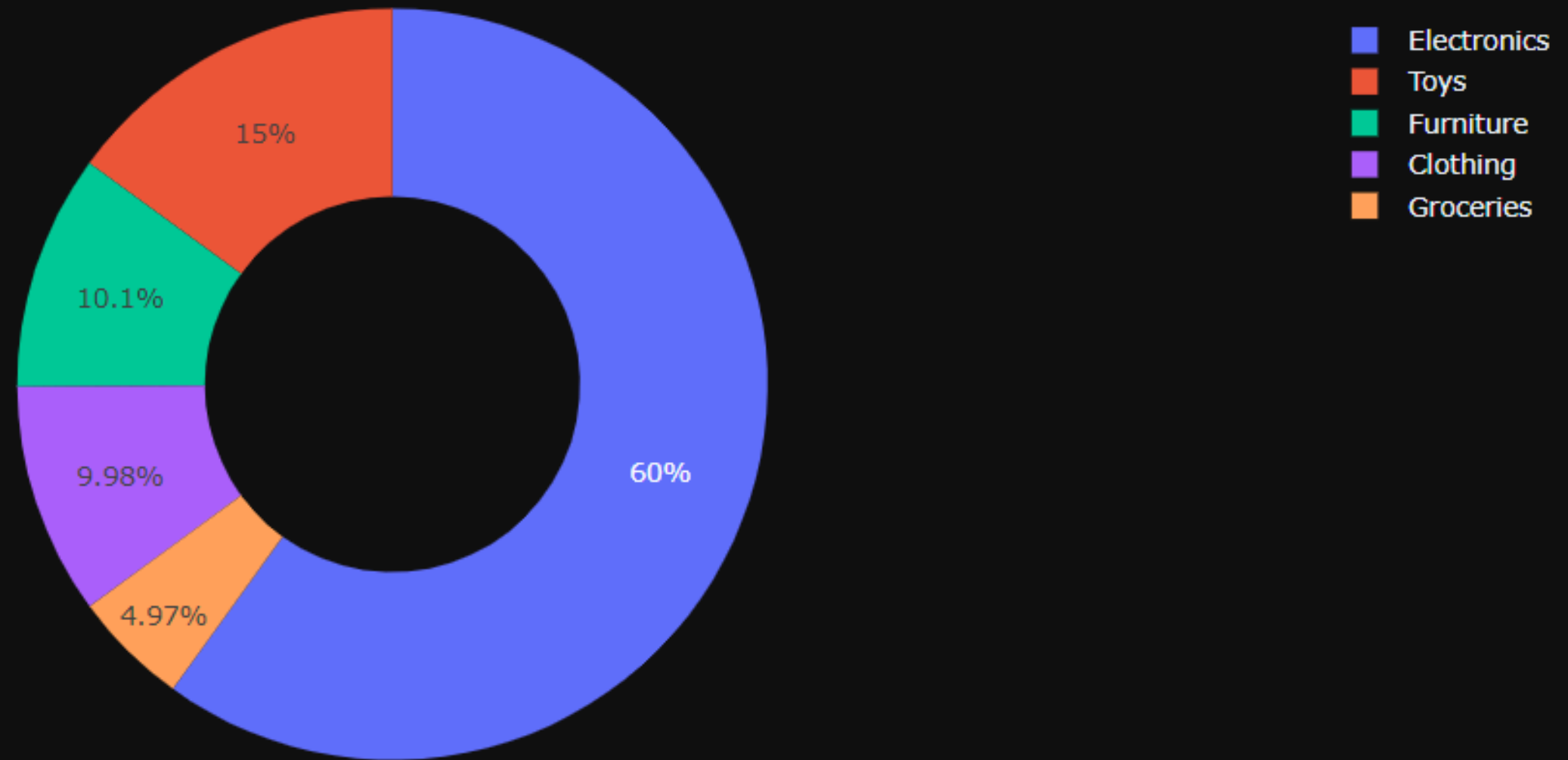
Distribution of Weather Condition



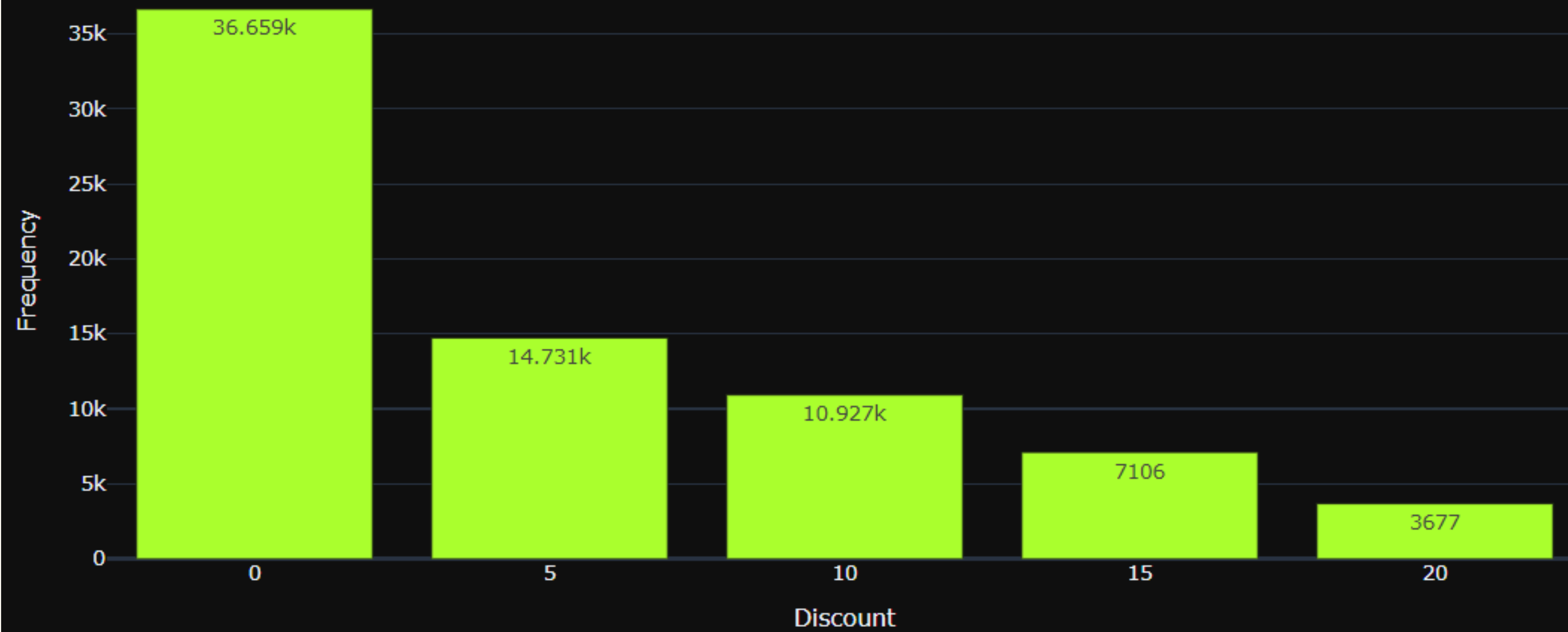
Distribution of Seasonality



Distribution of Category

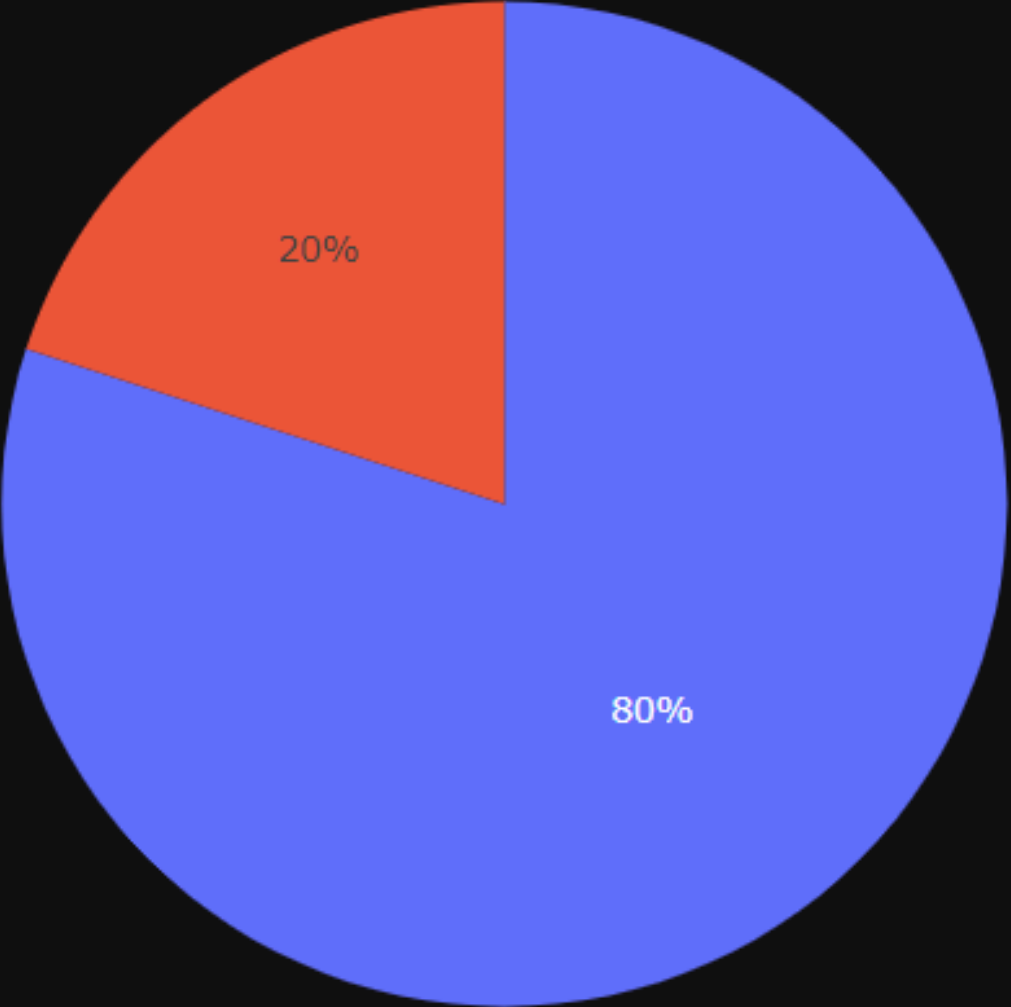


Distribution of Discount



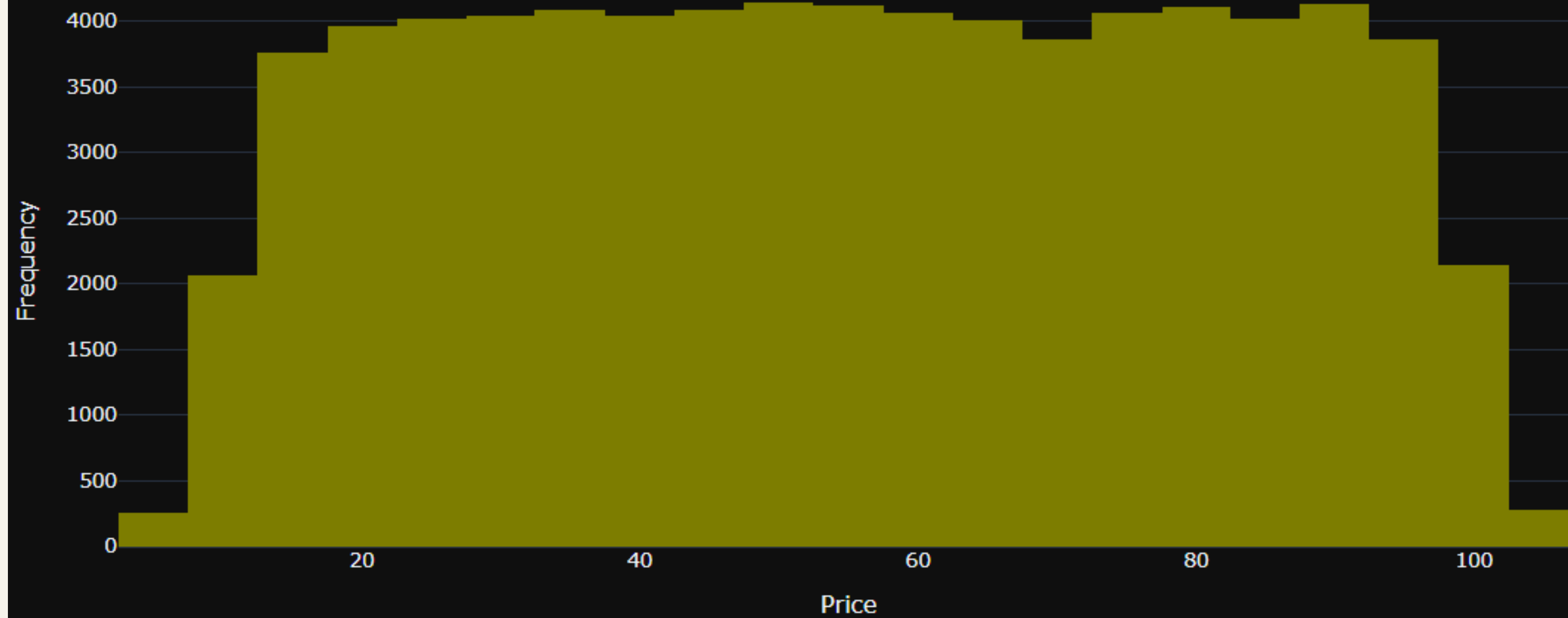


Distribution of Holiday/Promotion

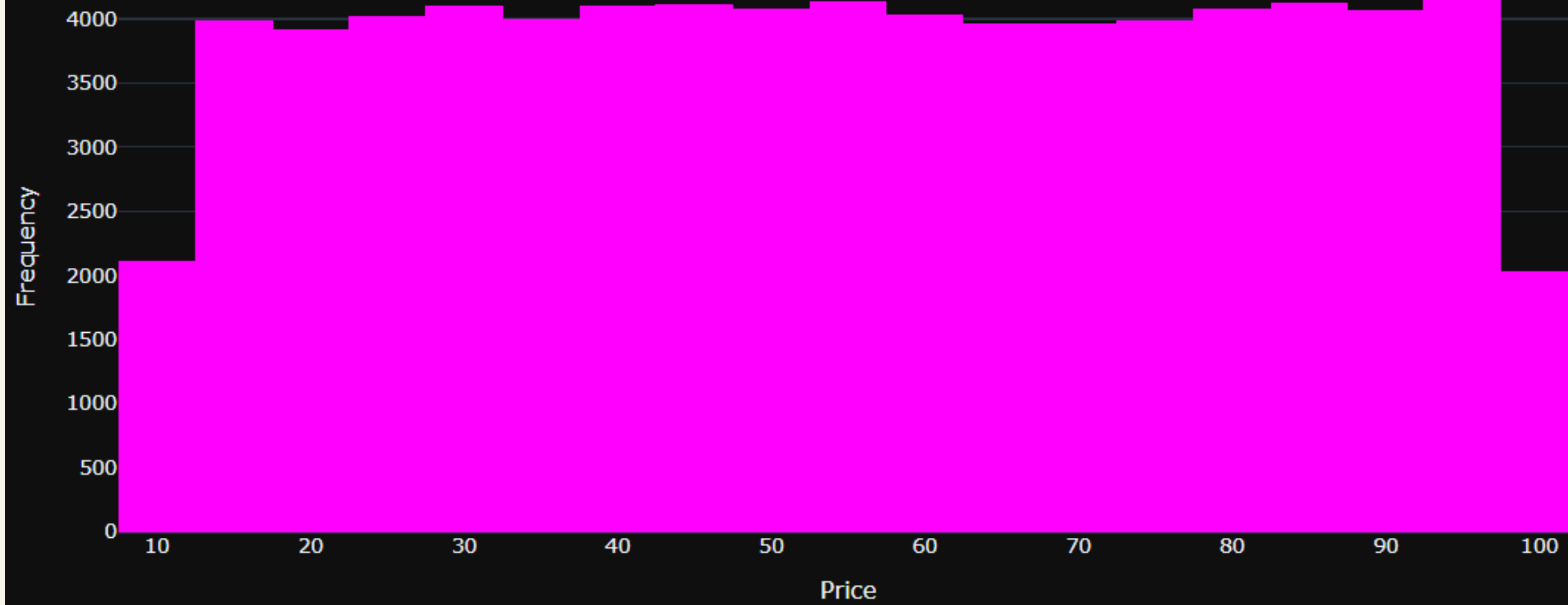


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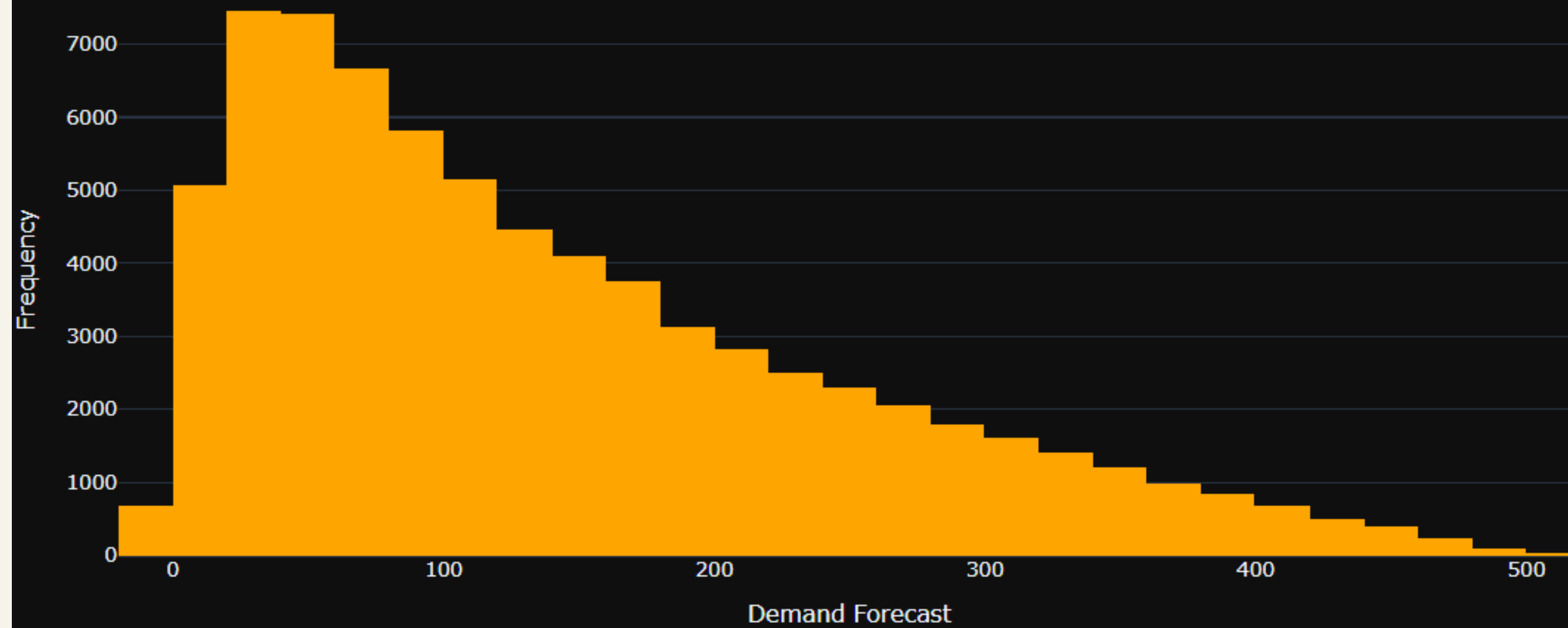
Distribution of Competitor Pricing



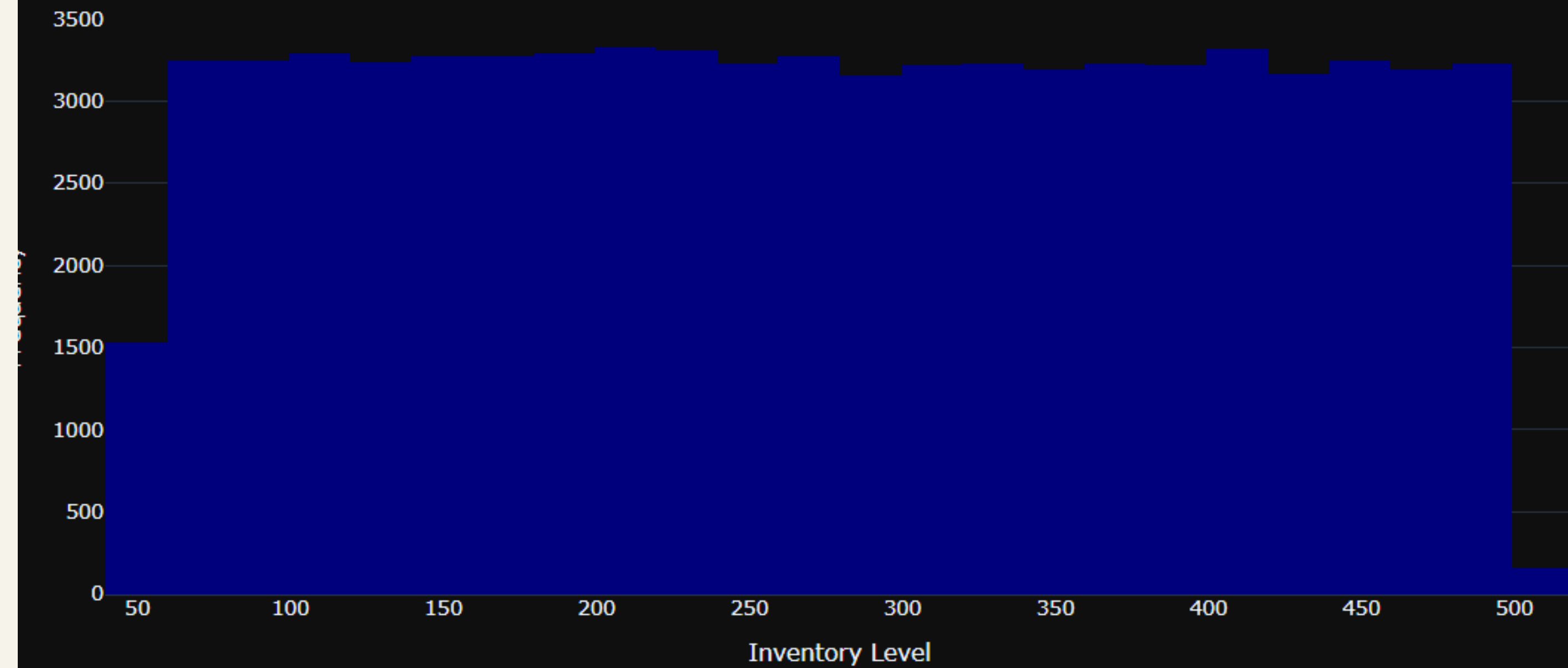
Distribution of Price

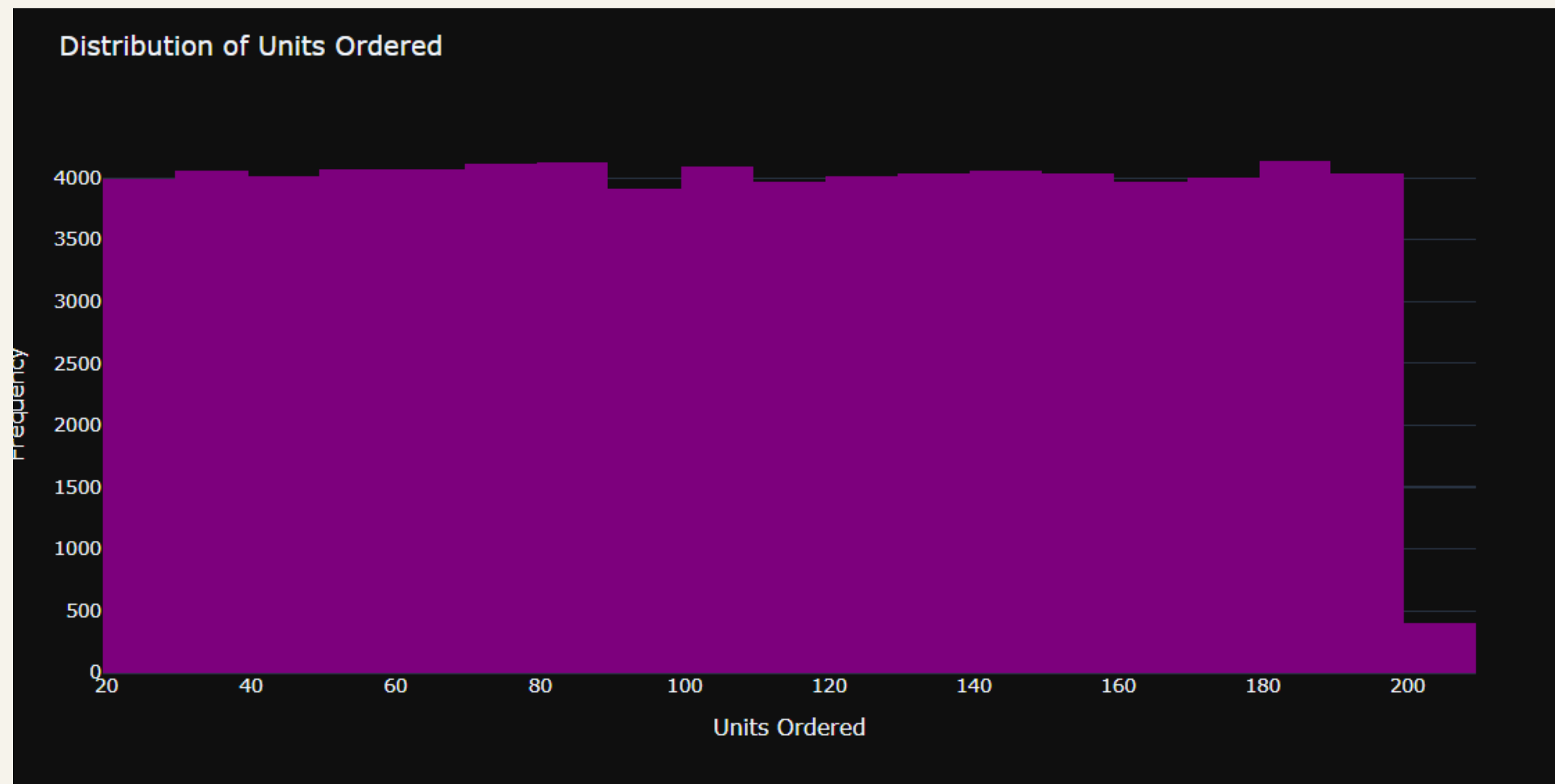


Distribution of Demand Forecast

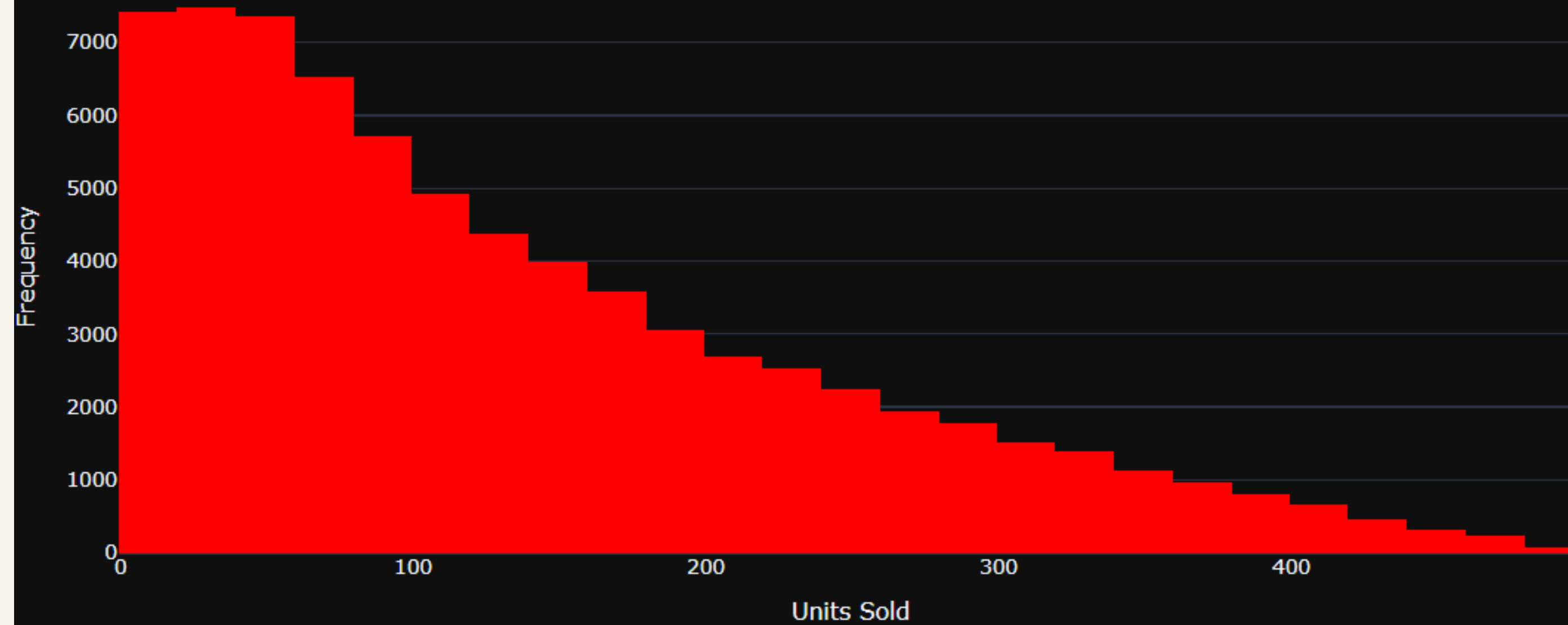


Distribution of Inventory Levels

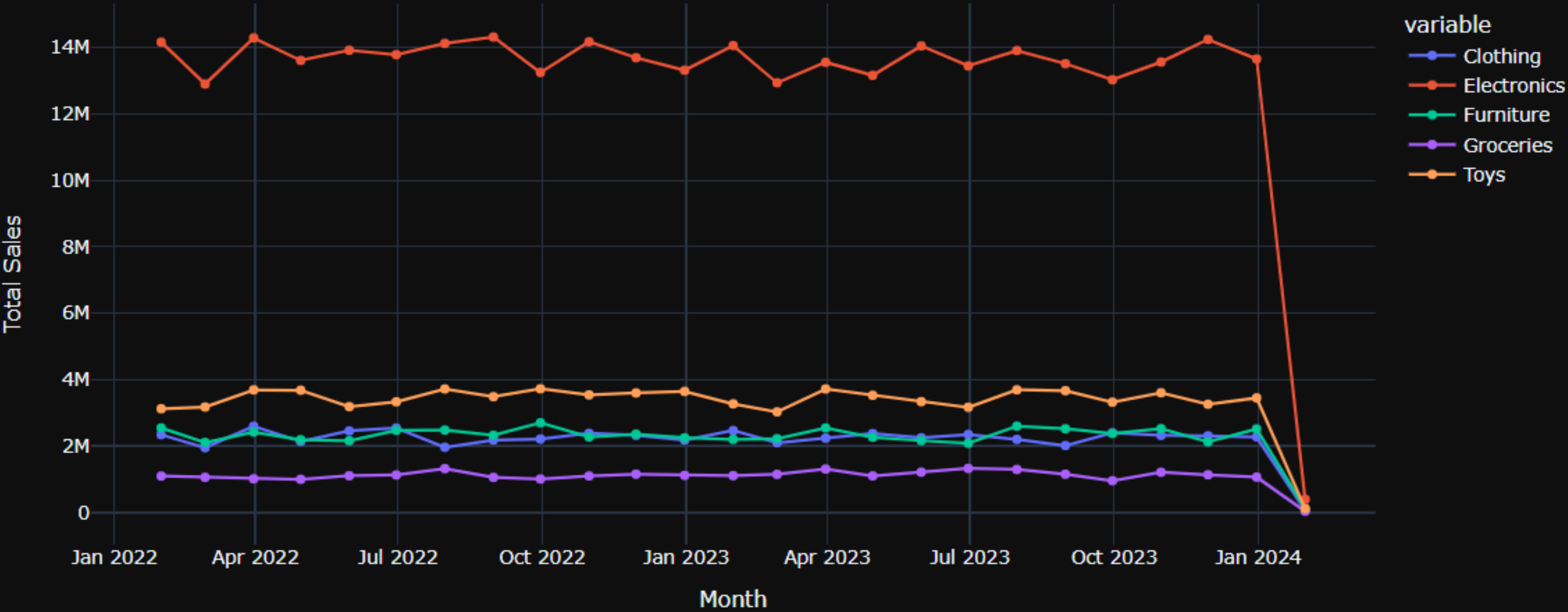




Distribution of Units Sold

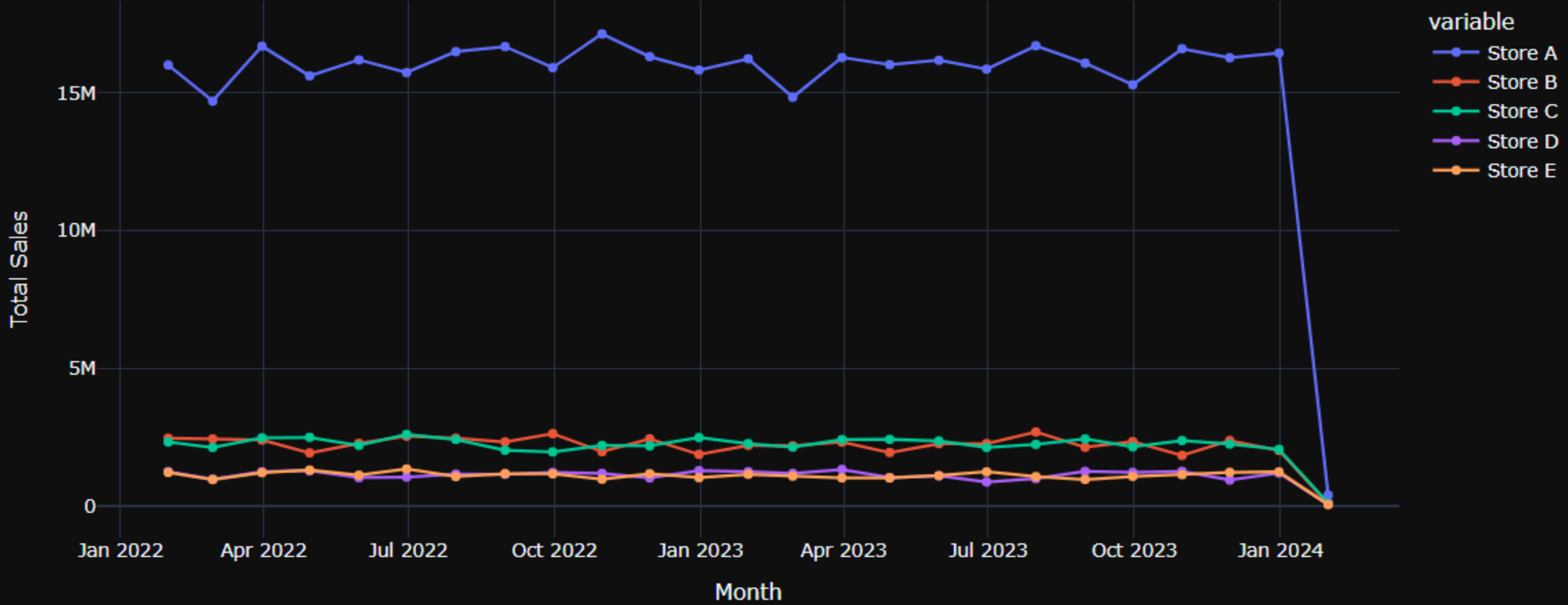


Monthly Total Sales by Category Over 2 Years

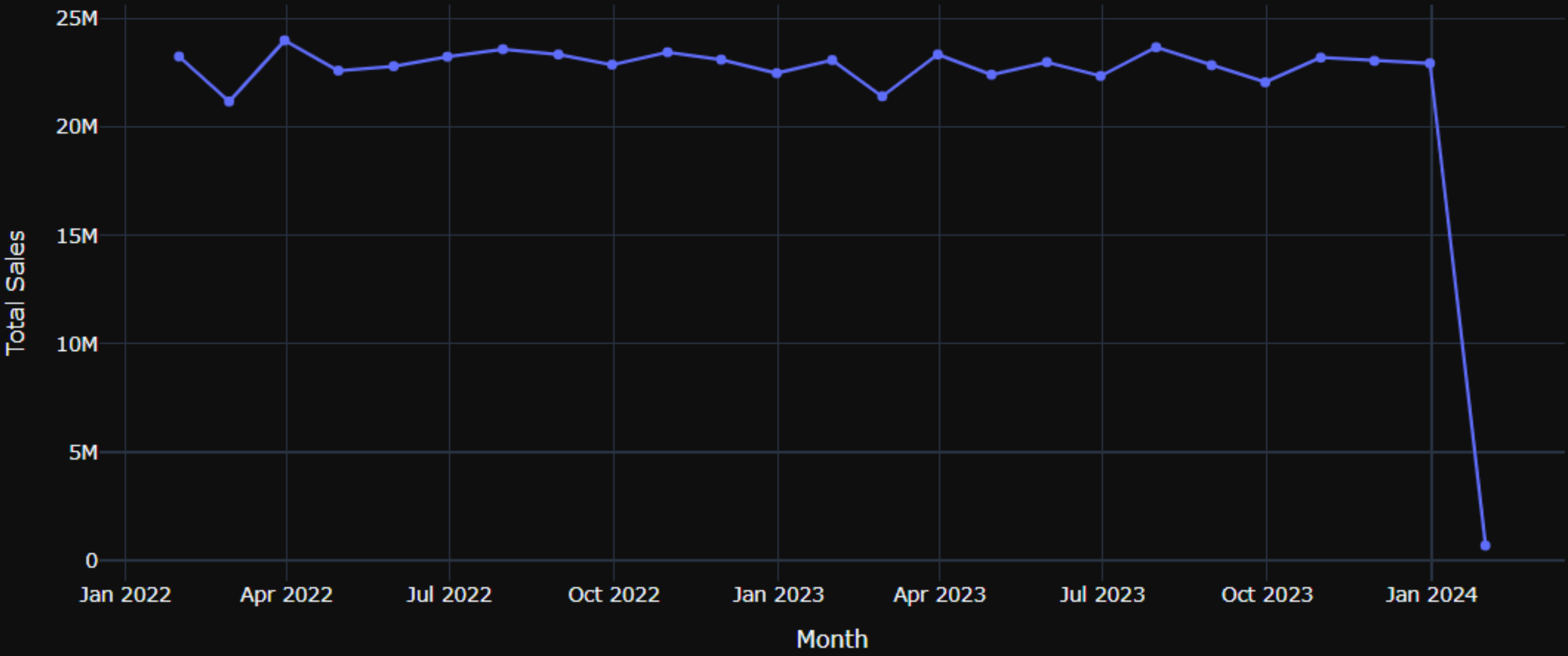


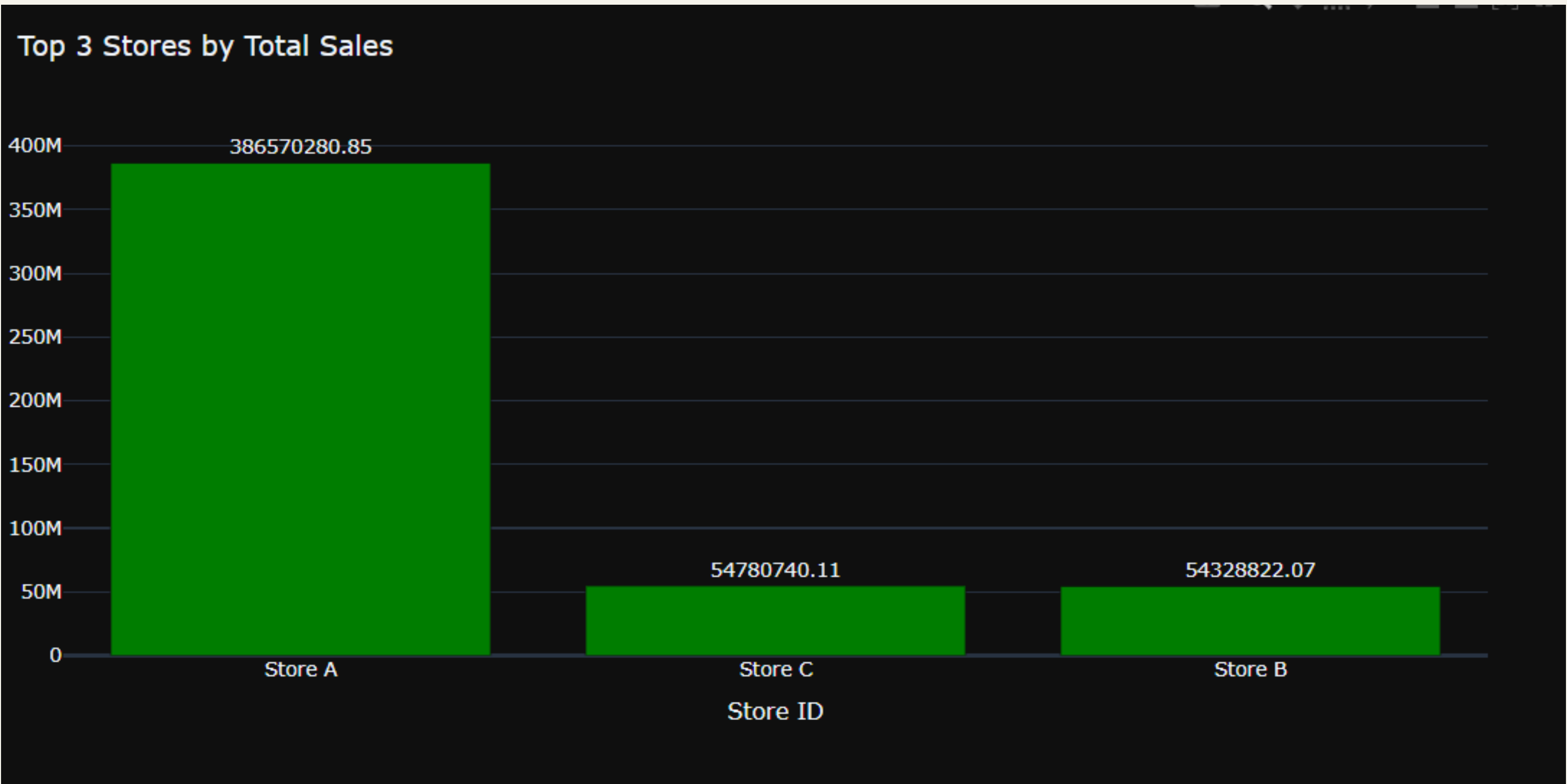


Monthly Total Sales by Store Over Time

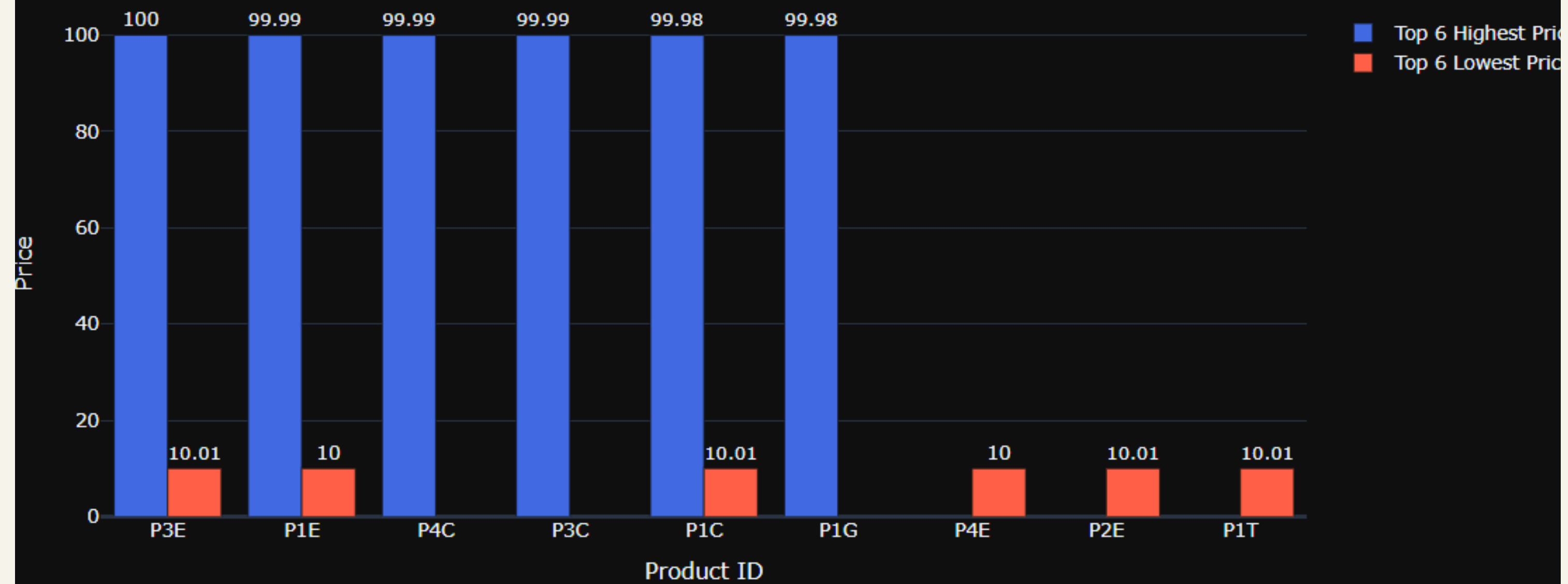


Monthly Total Sales Over 2 Years

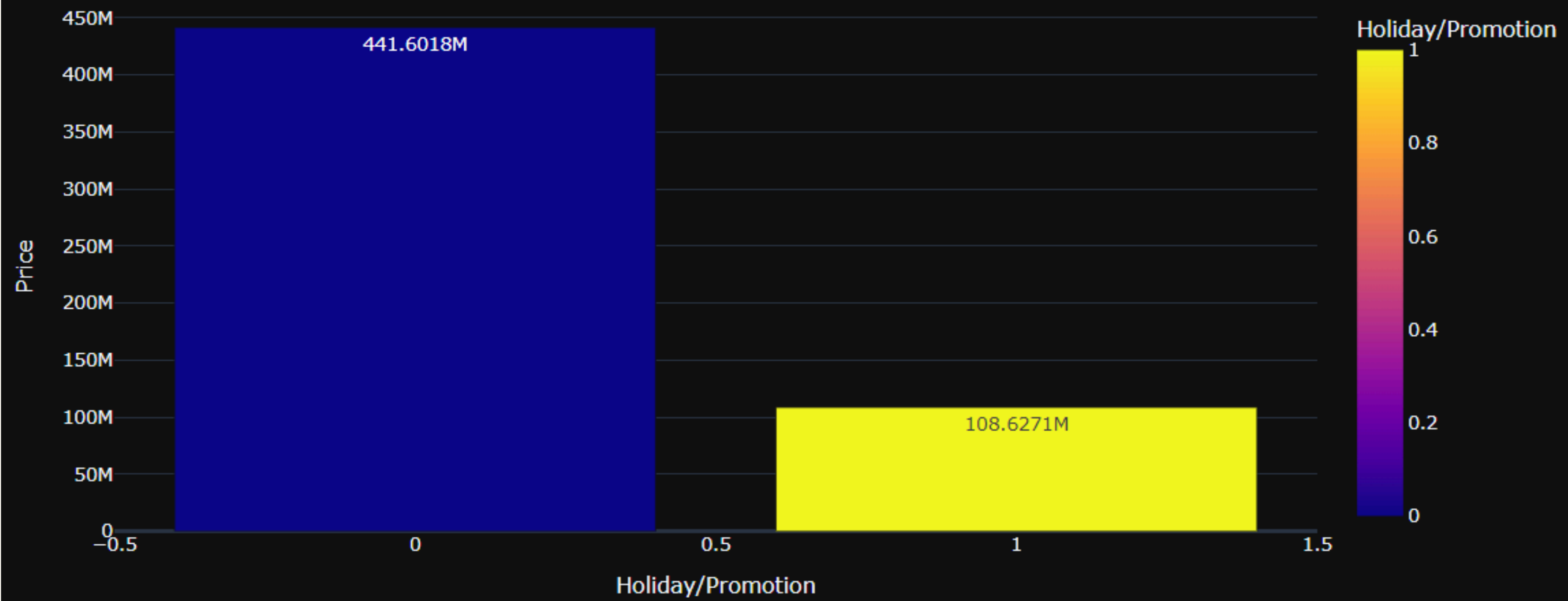




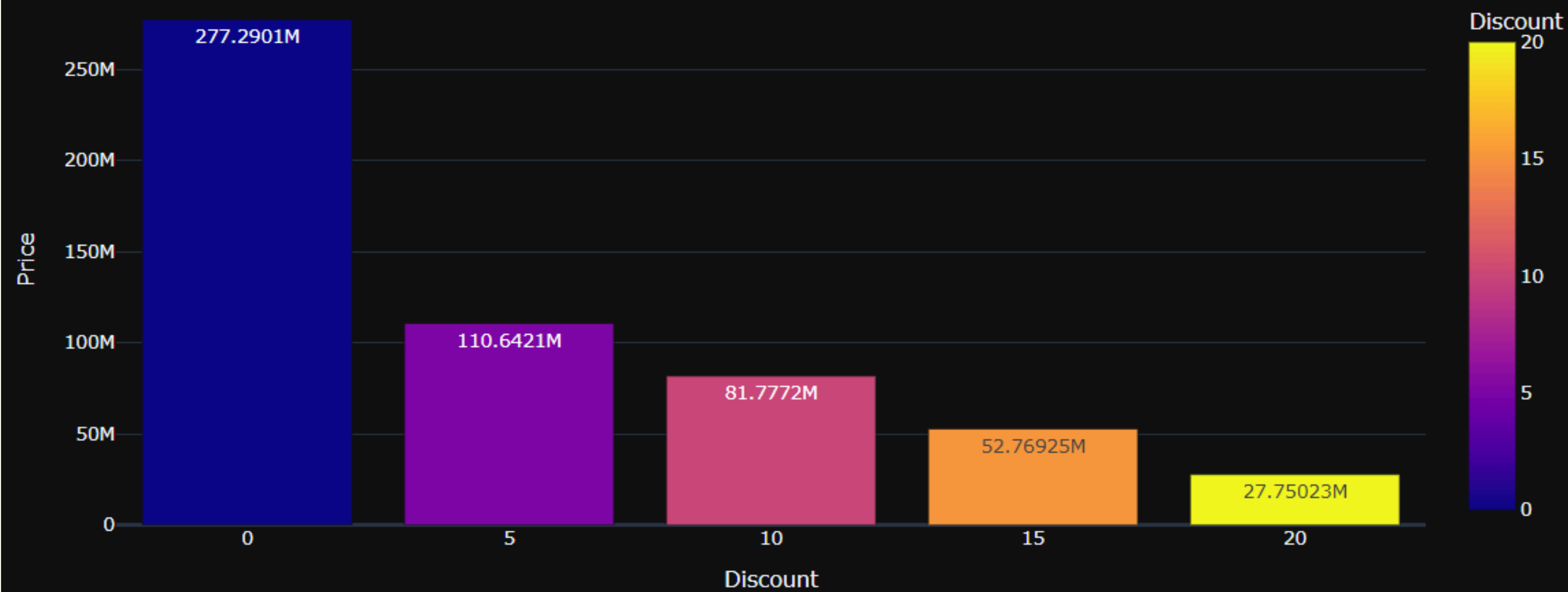
Top 6 Highest and Lowest Priced Products



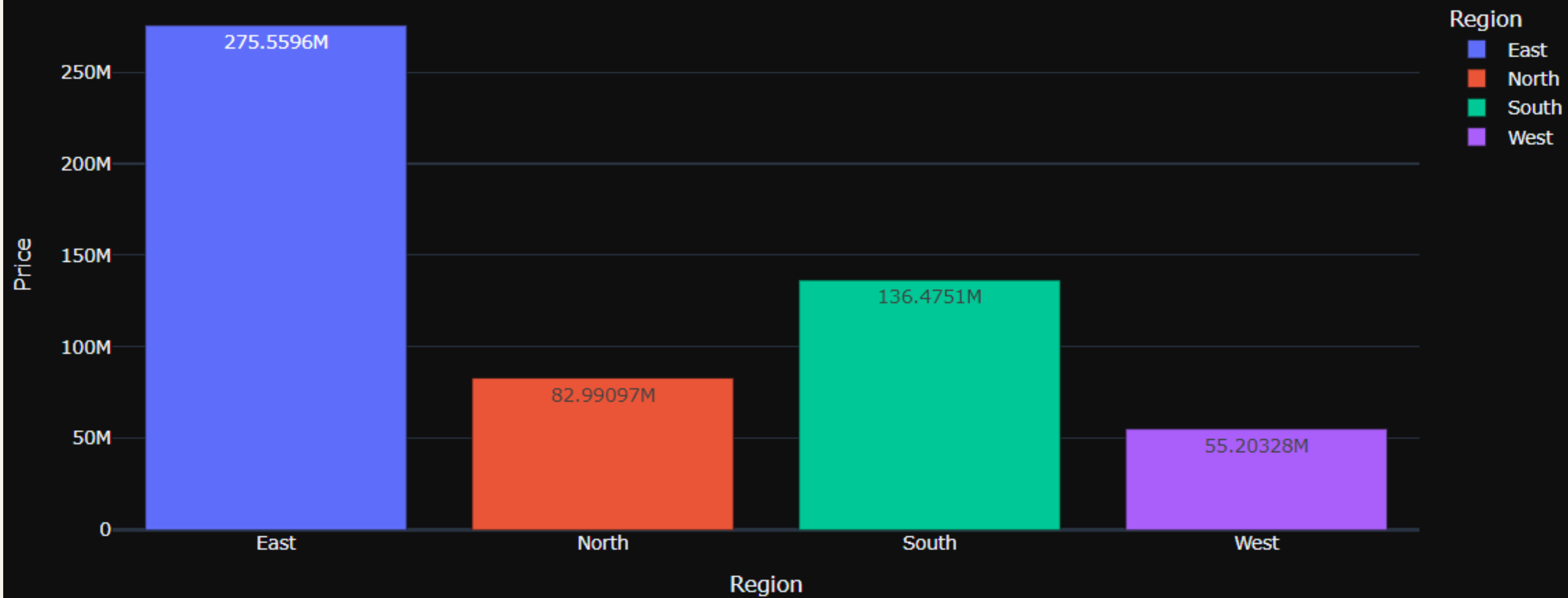
Total Sales by Holiday/Promotion



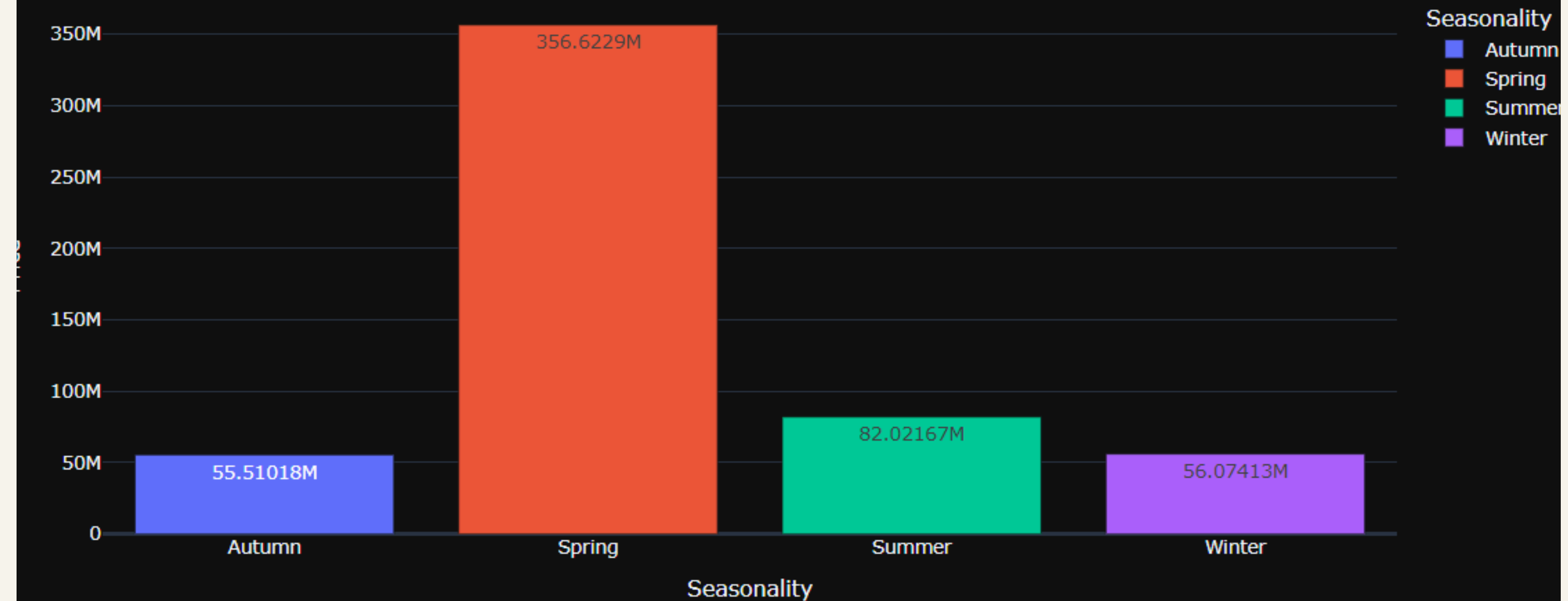
Total Sales by Discount



Total Sales by Region

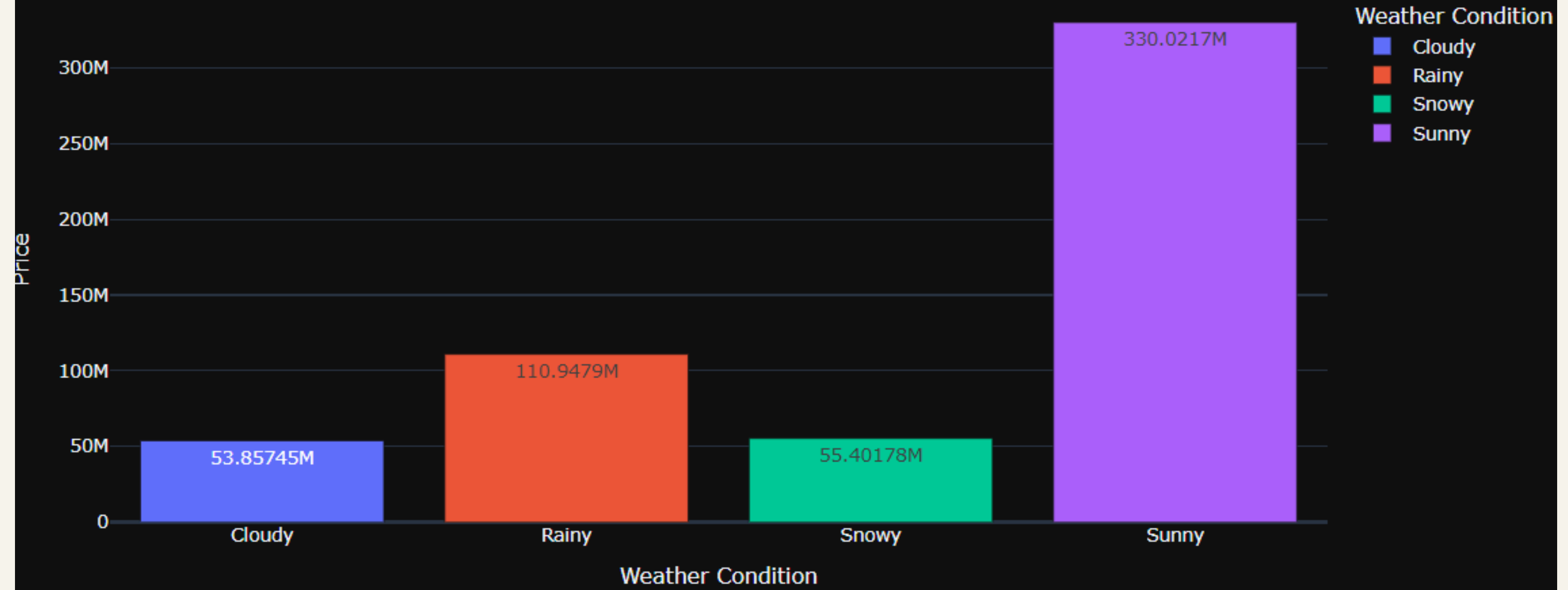


Total Sales by Seasonality

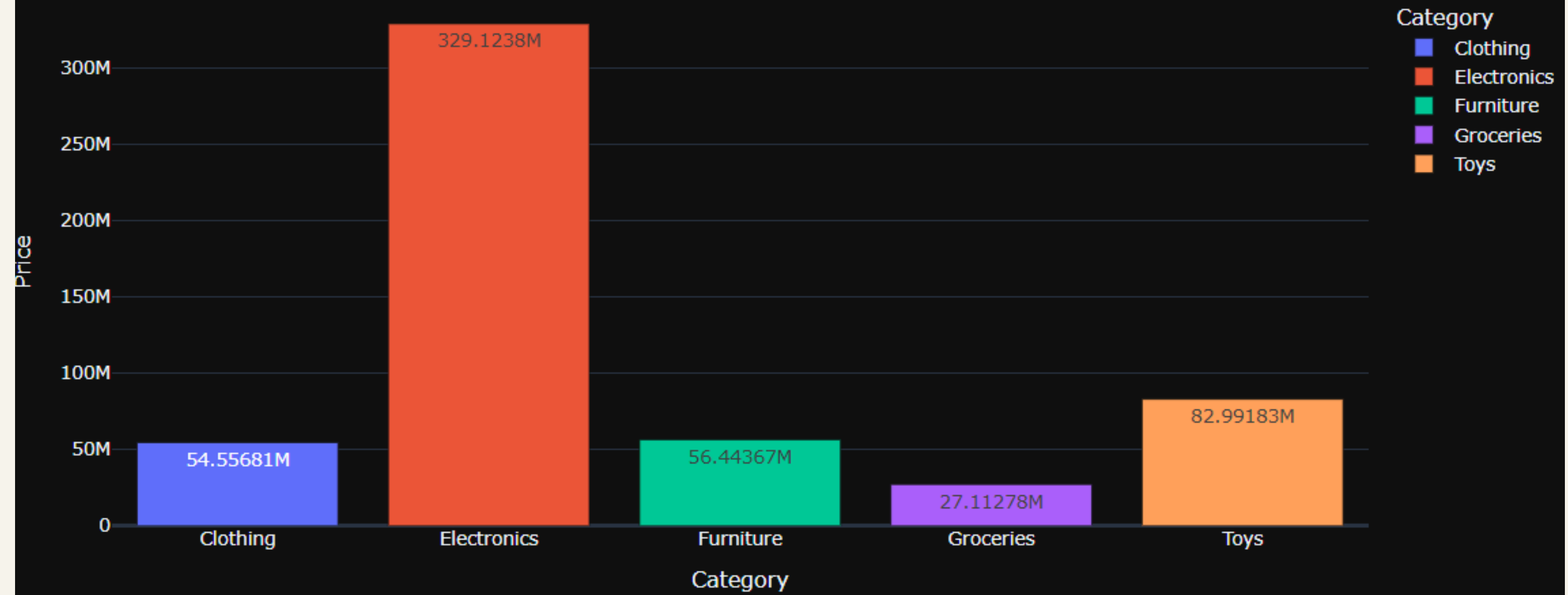




## Total Sales by Weather Condition



## Total Sales by Category



# PREPROCESSING

- **Rename From Store ID to Store Name.**
- **Redefine Product ID to be Unique For Each Product**
- **Using One hot Encoding & Label Encoding metadata**
- **Drop un necessary columns to avoid multi collinearity**
- **Using Standard Scaler**
- **Remove Outliers**
- **Split data into training 80% and testing sets 20%.**
- **Feature Engineering (Total Sales - Day of week - Month - Year)**

# MODELS

**Linear Regression**

**Decision Tree**

**Random Forest**

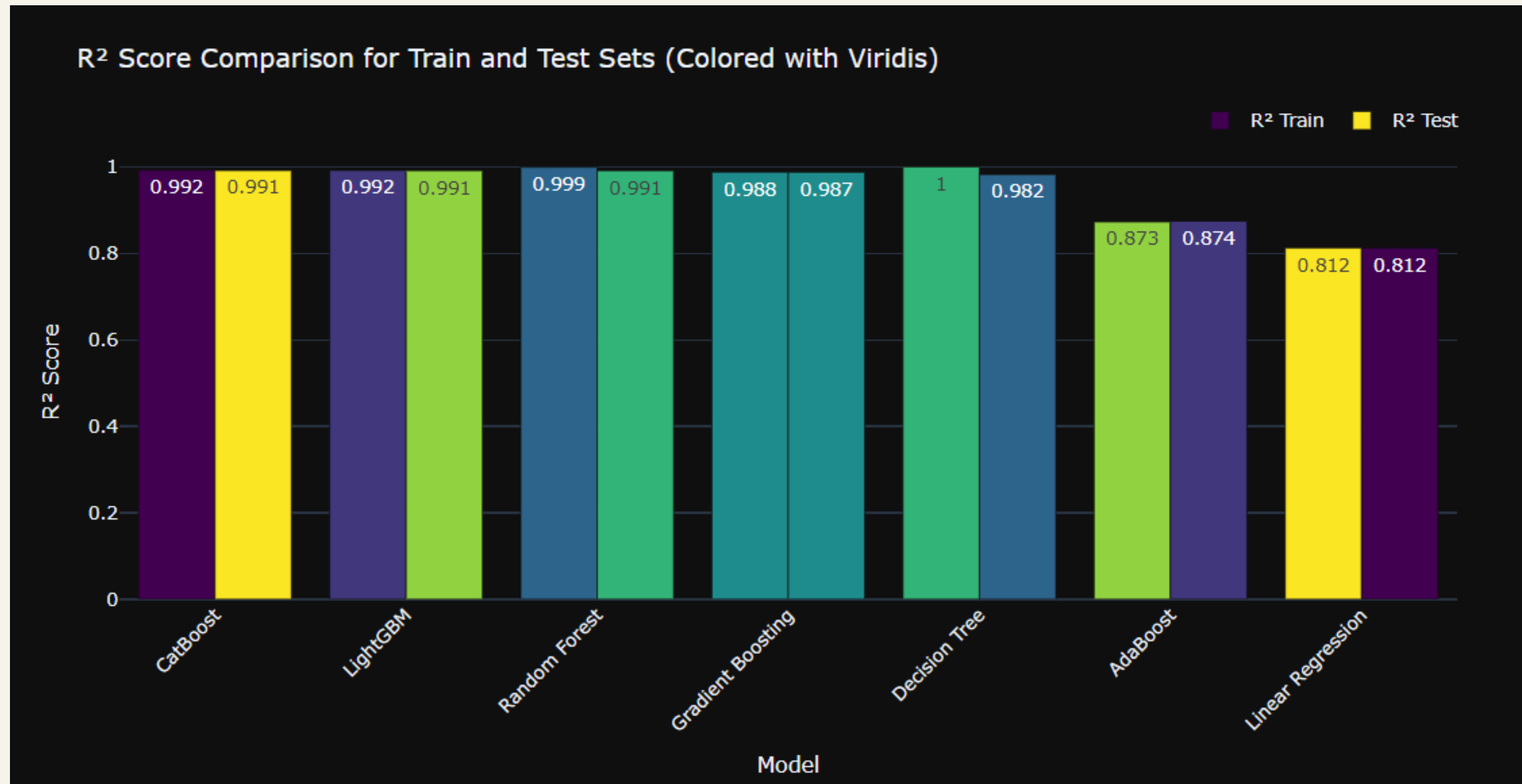
**Gradient Boosting**

**AdaBoost**

**LightGBM**

**CatBoost**

# Evaluation on Test Data



# Evaluation on Test Data

- **Top performing model: CatBoost & LightGBM (based on evaluation).**



**THANK YOU**