

Final Boot Camp Project 2023

ADIDAS & RETAIL:

A small business optimization case

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CONTENT

01

CONTEXT

02

METHODOLOGY

03

OBJECTIVE/GOALS

04

KEY FINDINGS

05

PREDICTION MODEL

06

CONCLUSIONS/SOME IDEAS

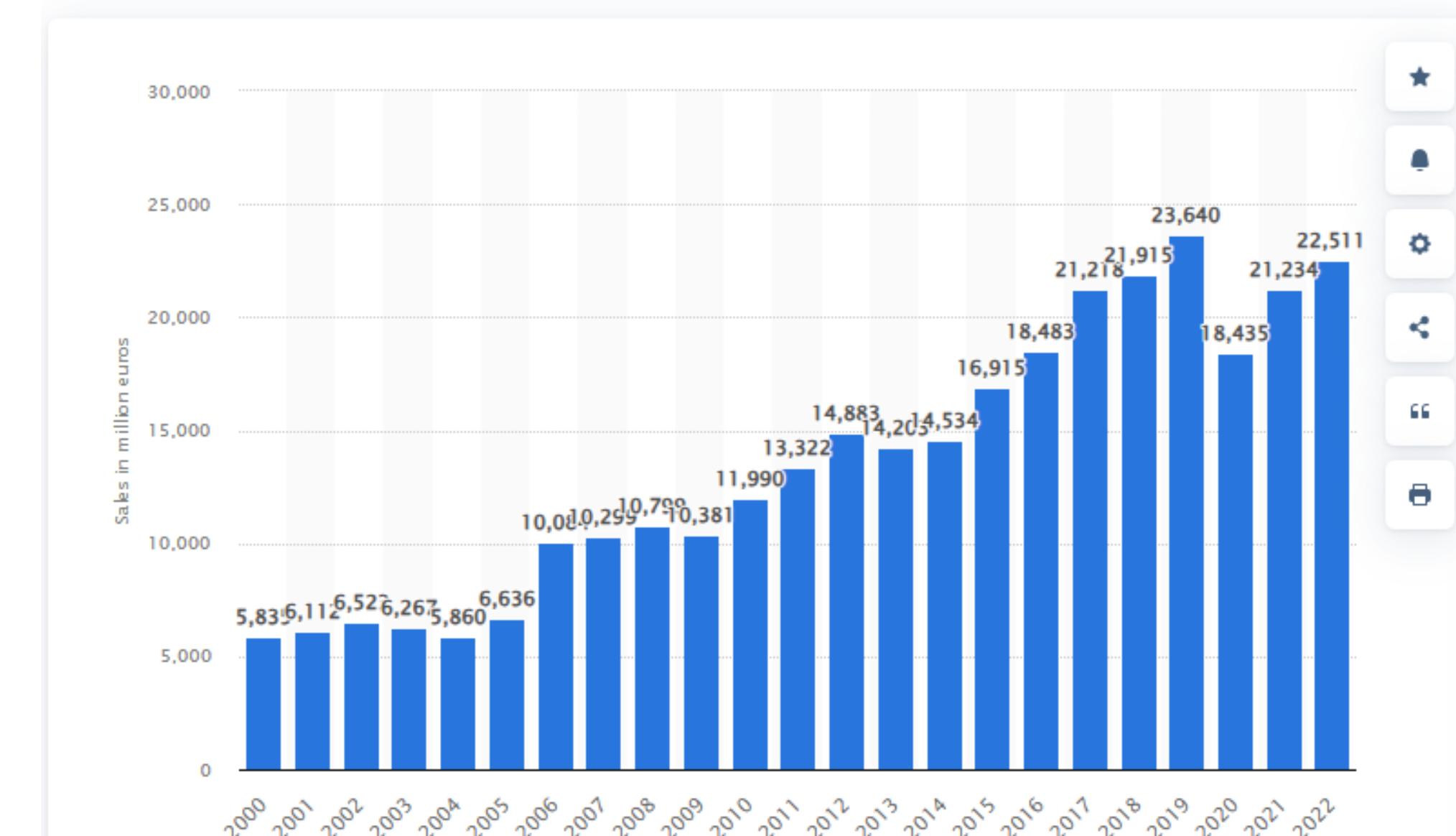
Contextualization

The adidas Group is the largest sportswear manufacturer in Europe and the second-largest in the world.

Close to a quarter of the group's sales was specifically accounted by North America, making it the company's second-largest focus market...



The adidas Group's net sales worldwide from 2000 to 2022
(in million euros)



METHOD

01

EDA on Adidas footwear and apparel dataset(14 columns and 9648 rows, Range Date 2020-01-01 and 2021-12-31

02

Data preparation and feature selection included, correlation matrix, scaling(Min-max scaler) and encoding(dummies) in python.

03

Data visualization incl.(pivot tables,plots) using python and Tableau public

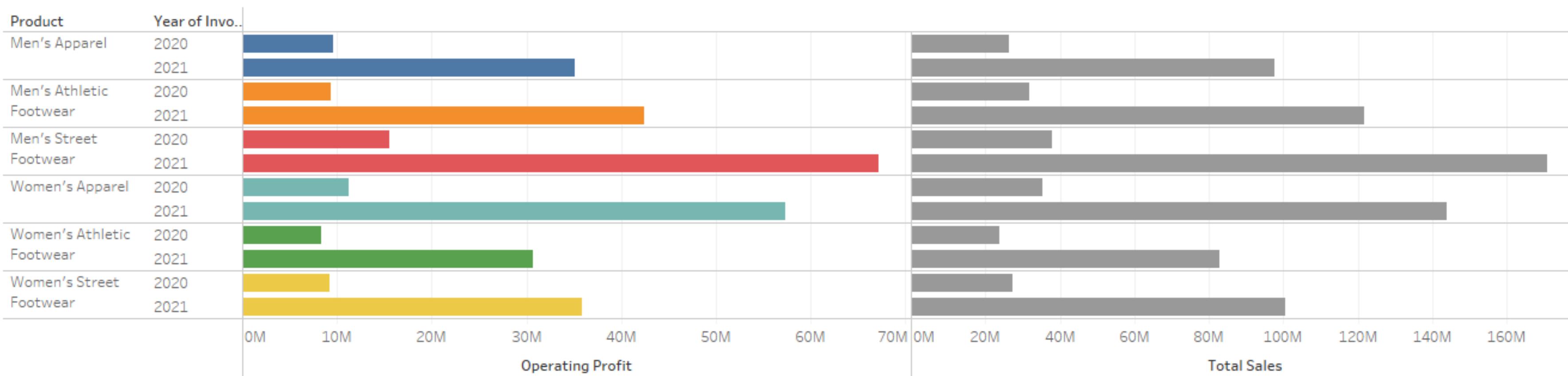
04

Prediction Models: KNNregressor , Linear regression and Random Forest regressor

OBJECTIVES/GOALS

- Find the products that added value to the brand
- States/Regions responsible for adding value to the brand(looking at sales and profit)
- Top retailers of adidas footwear and apparel
- Most frequent and profitable sales method(In store, Online or Outlet)
- Highest Sales Period
- Uncover an accurate model to predict Total Sales

Product Champion

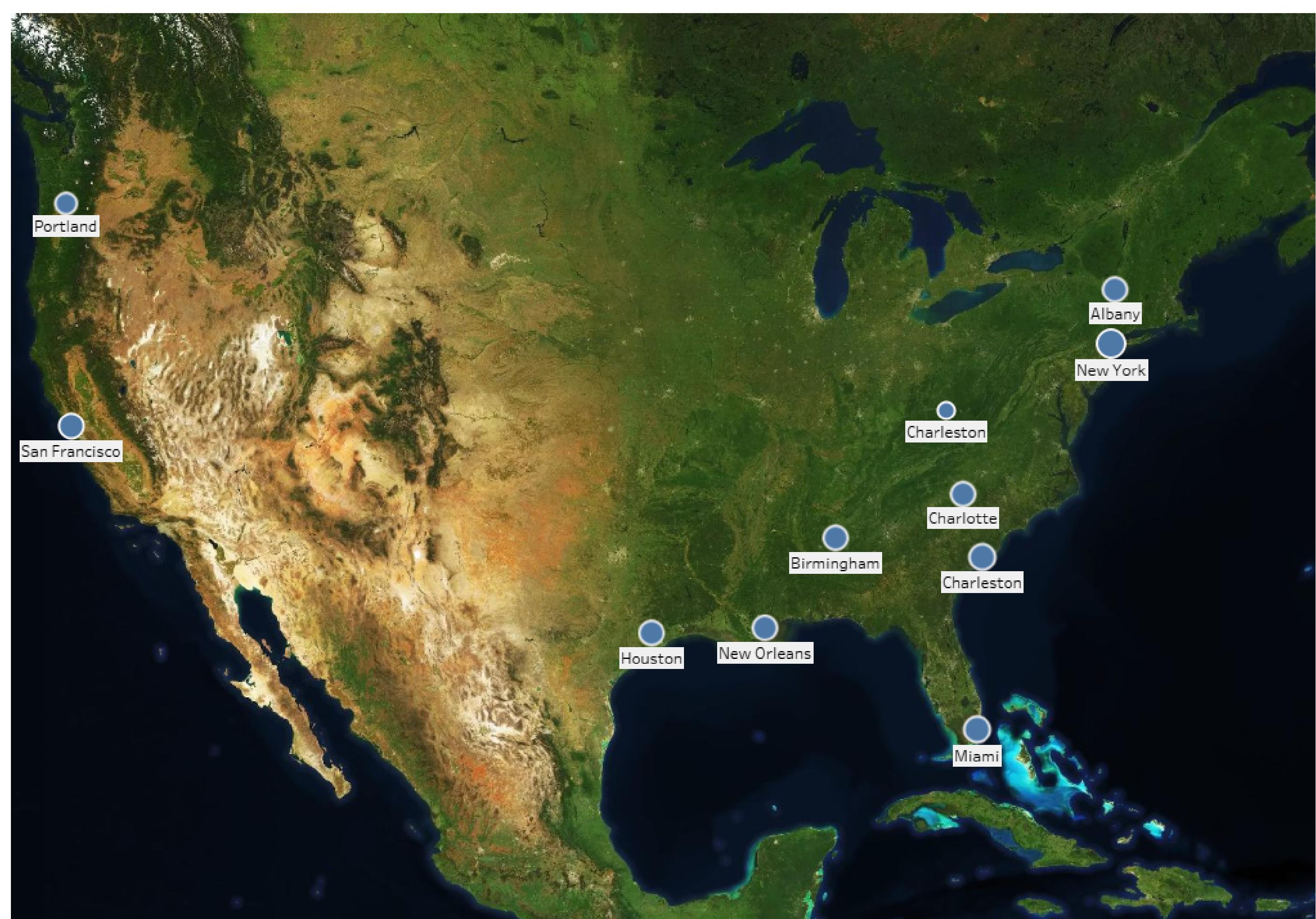


Top selling product: Men's Street Footwear with around 80 million generated dollars in sum of Operating Profit

Lowest selling product: Women's Athletic Footwear with 39 Million in operating profit

Most profitable cities

	city	operating_profit
1	Charleston	15607190.11
2	New York	13899973.16
3	Miami	12168619.11
4	Portland	10760799.37
5	San Francisco	10256249.56
6	Houston	9845141.06
7	Charlotte	9756422.87
8	Albany	9429850.91
9	New Orleans	9417233.49
10	Birmingham	9147581.39



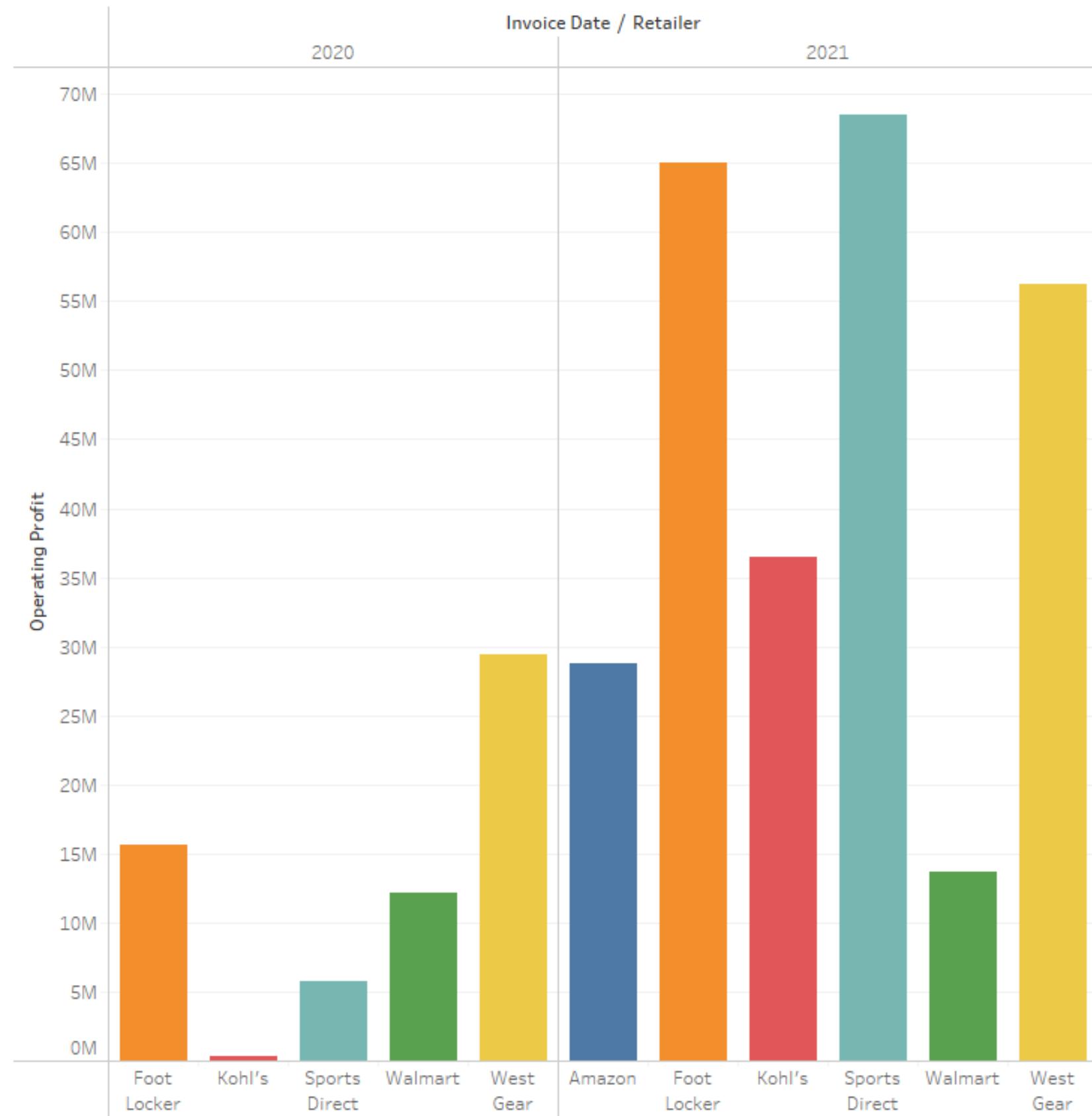
low profit cities

	city	operating_profit
1	Omaha	2439478.41
2	Des Moines	2655217.37
3	Minneapolis	2670229.76
4	Fargo	2688519.72
5	Baltimore	2757642.12
6	Milwaukee	2800830.09
7	Sioux Falls	2943318.21
8	Providence	3045817.26
9	Boston	3353875.87
10	Indianapolis	3379256.00



Retailers Race

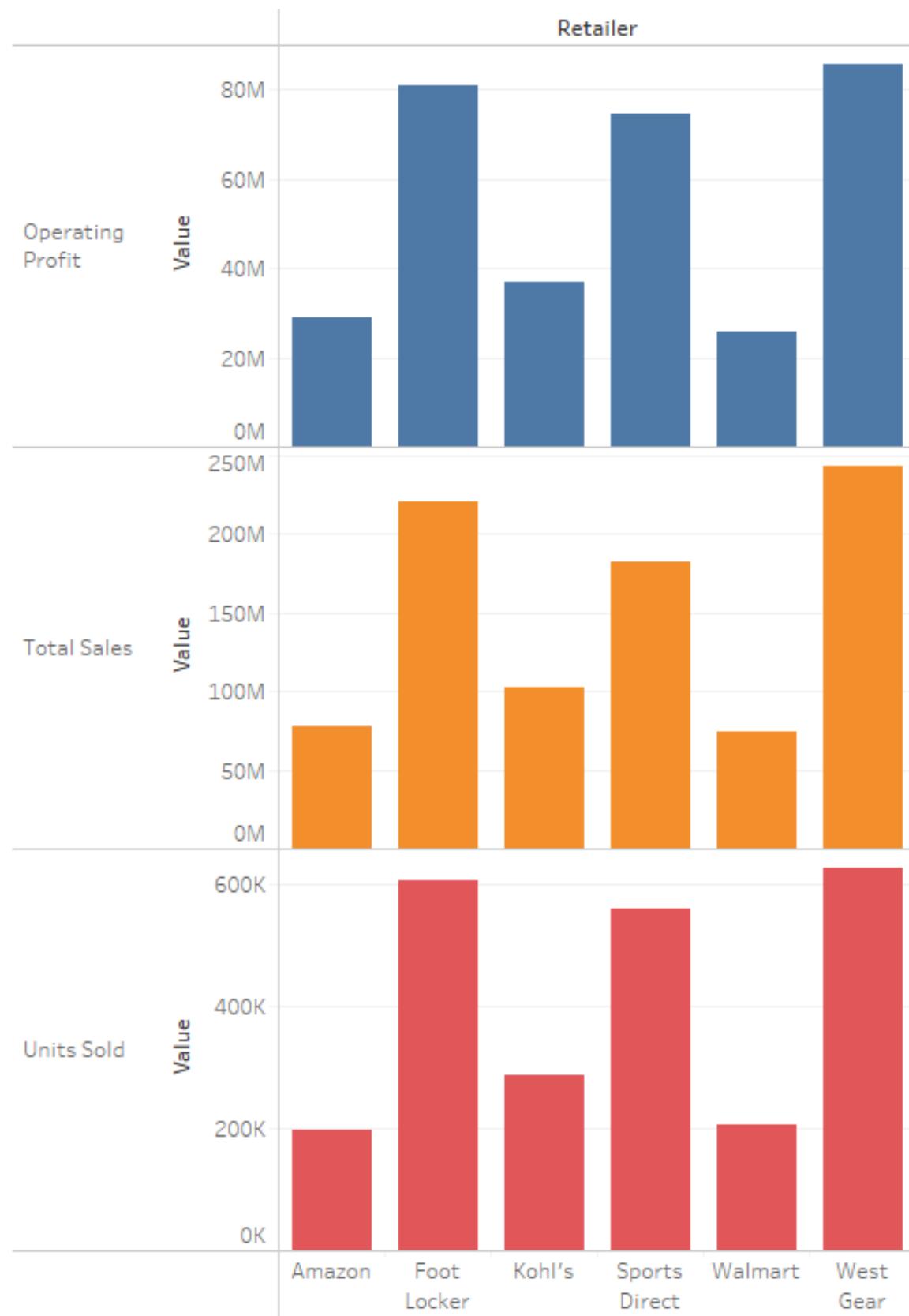
Retailer race



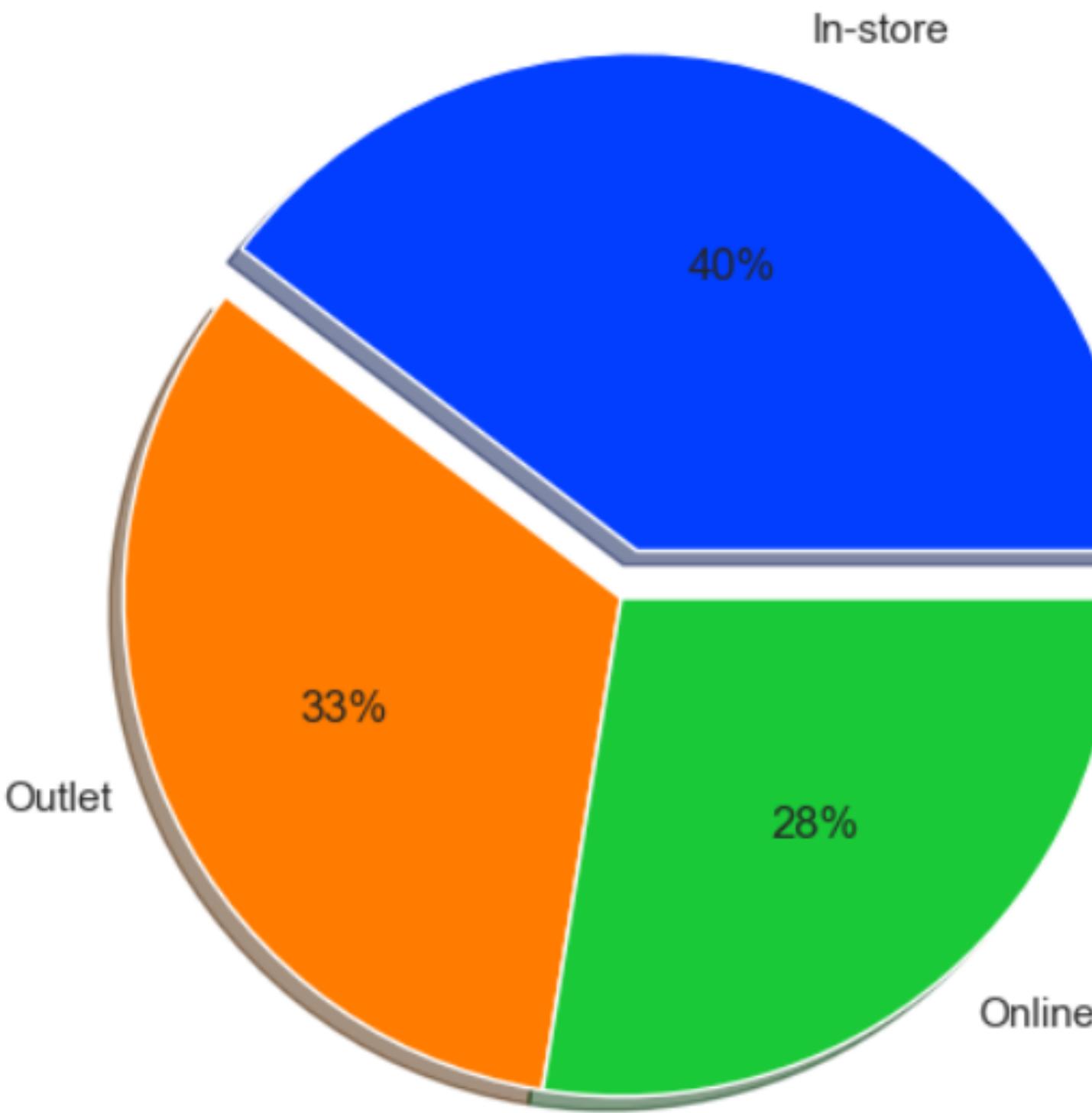
Top 3 Retailers:

- West Gear
- Footlocker
- Sports Direct

Retailer's Race final standings

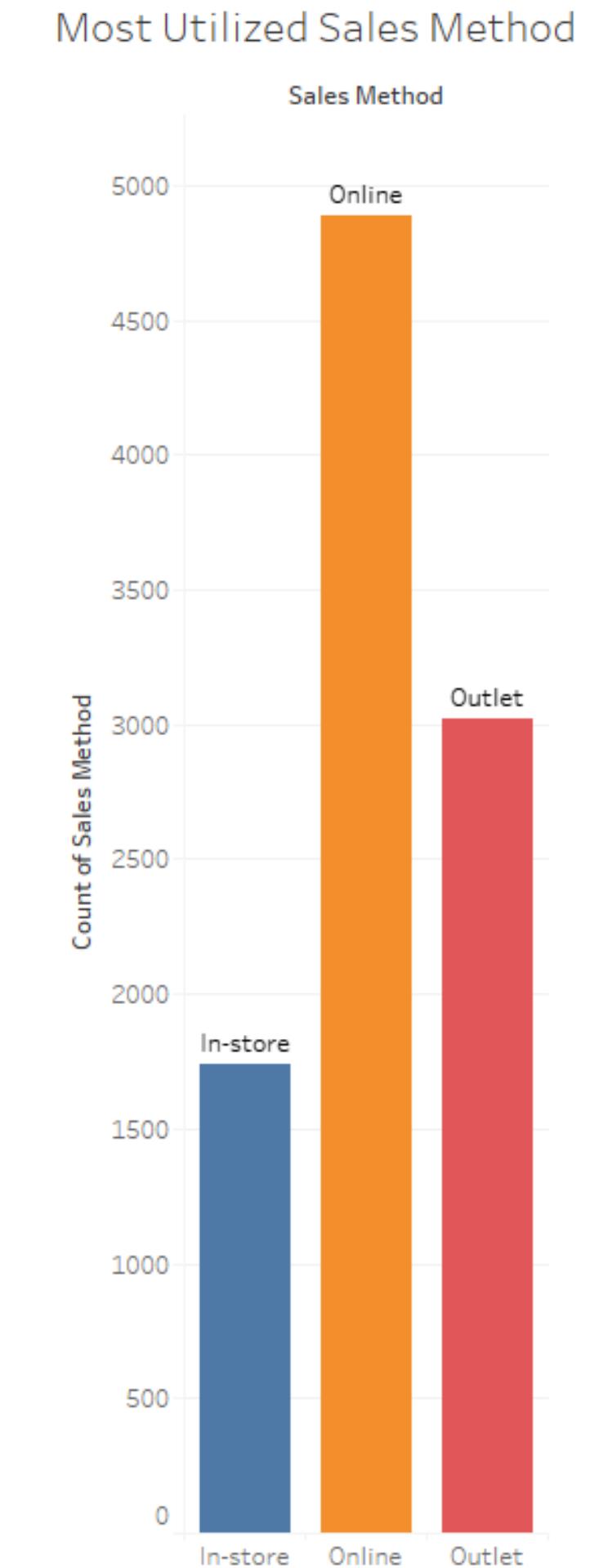


Most profitable vs Most frequent selling method



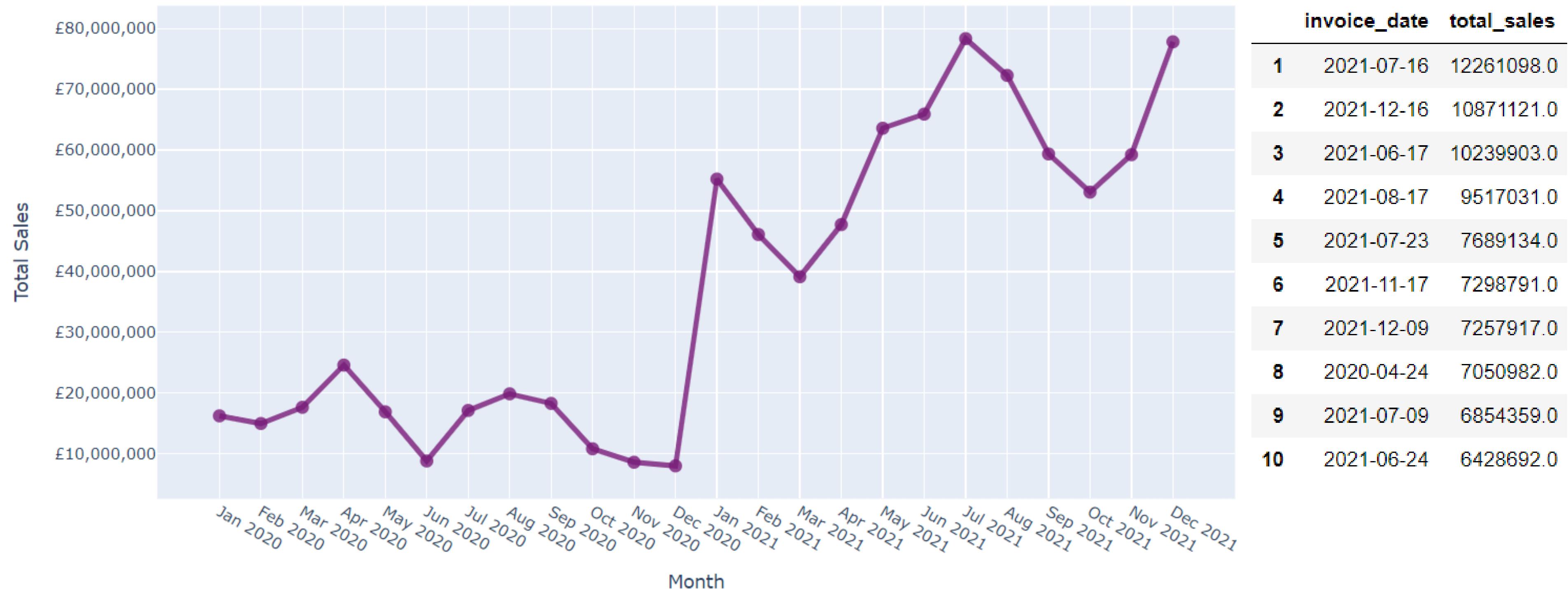
Mean price per unit by sales method

sales_method	price_per_unit
1	In-store
2	Online
3	Outlet

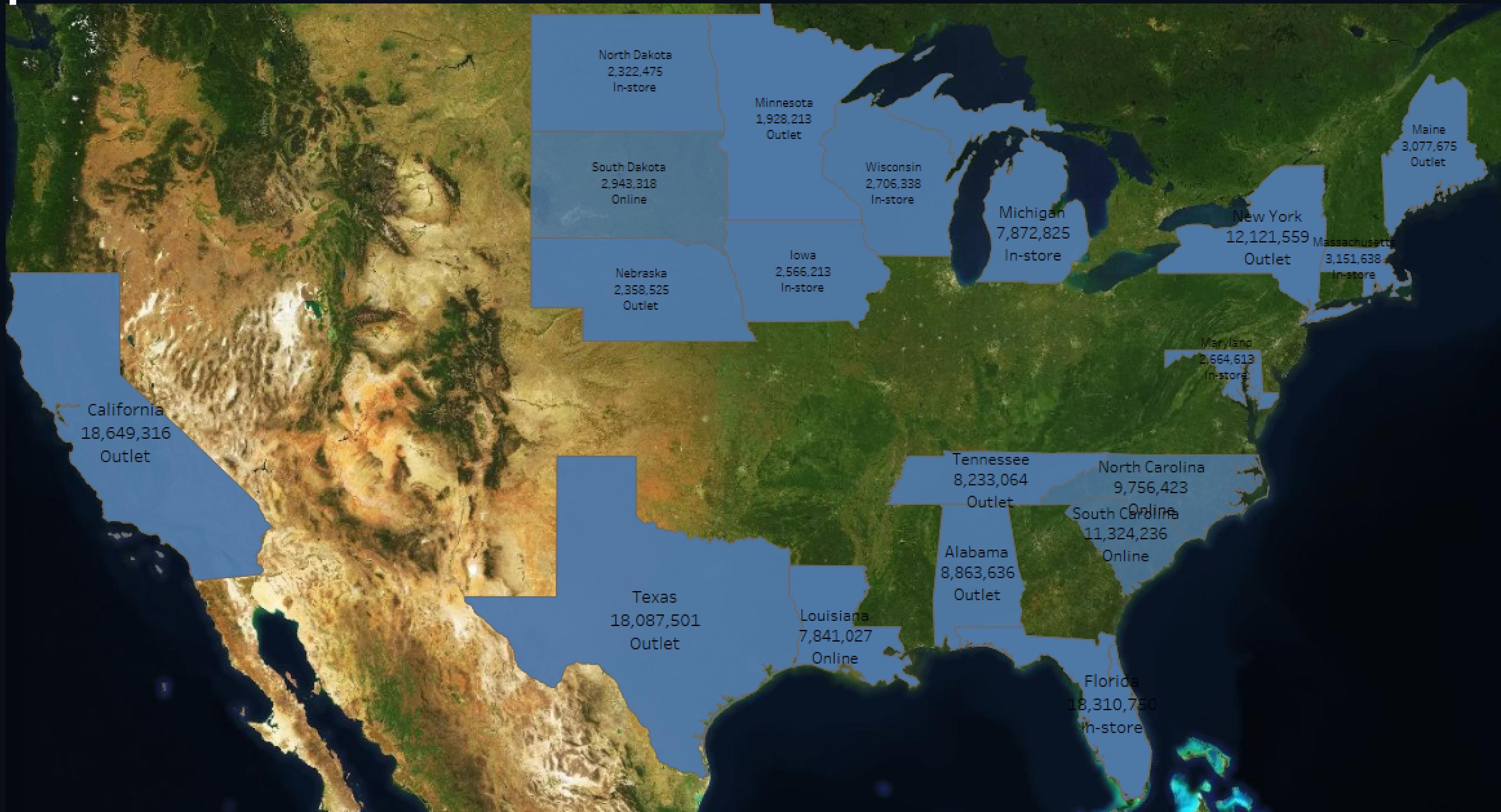


Highest Sale Date: July 16 2021

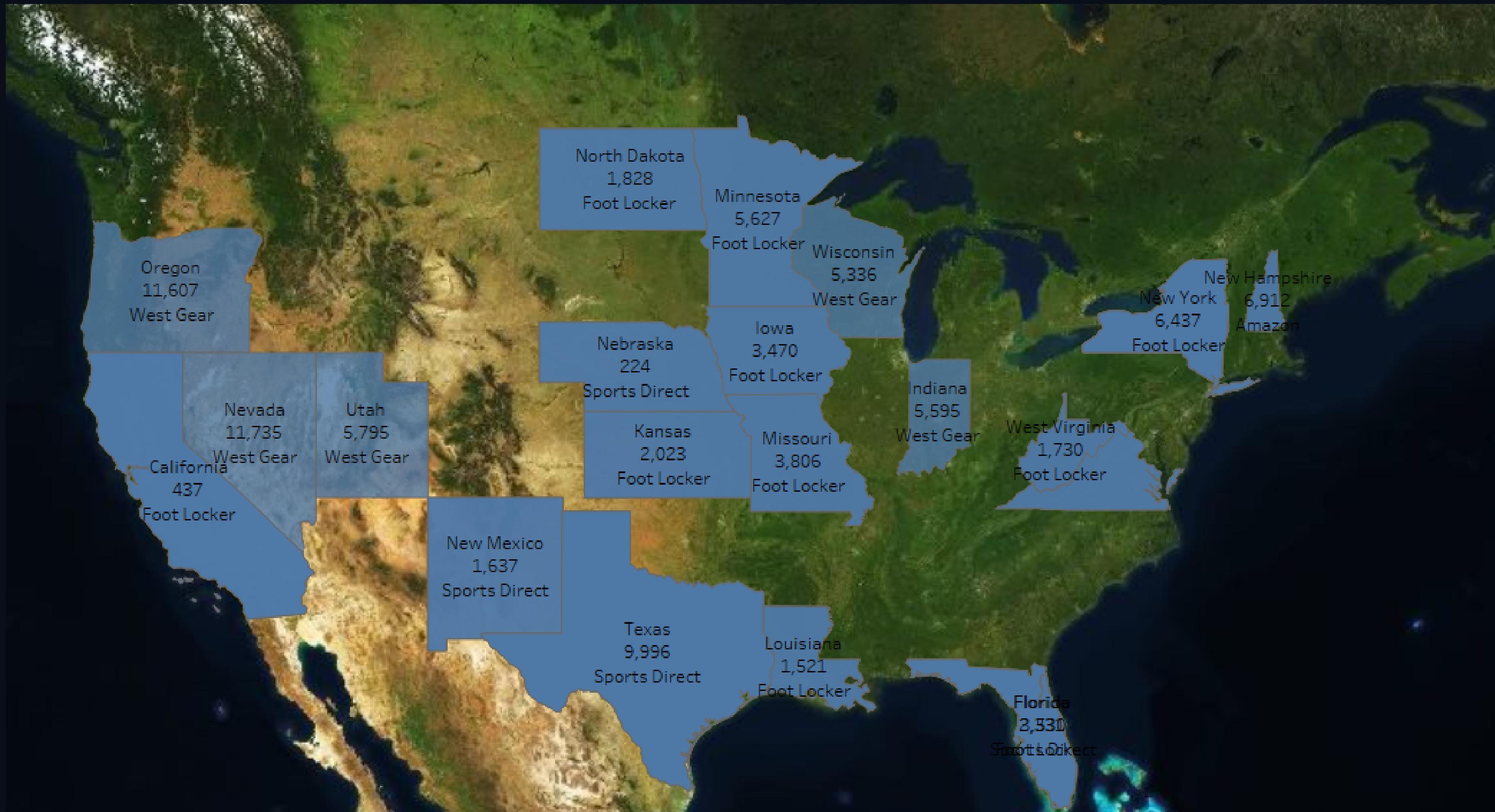
Total Sales by Month



State value for Adidas Brand: top 10 profitable states vs 10 lowest profitable states



Highest price per unit vs lowest price per unit



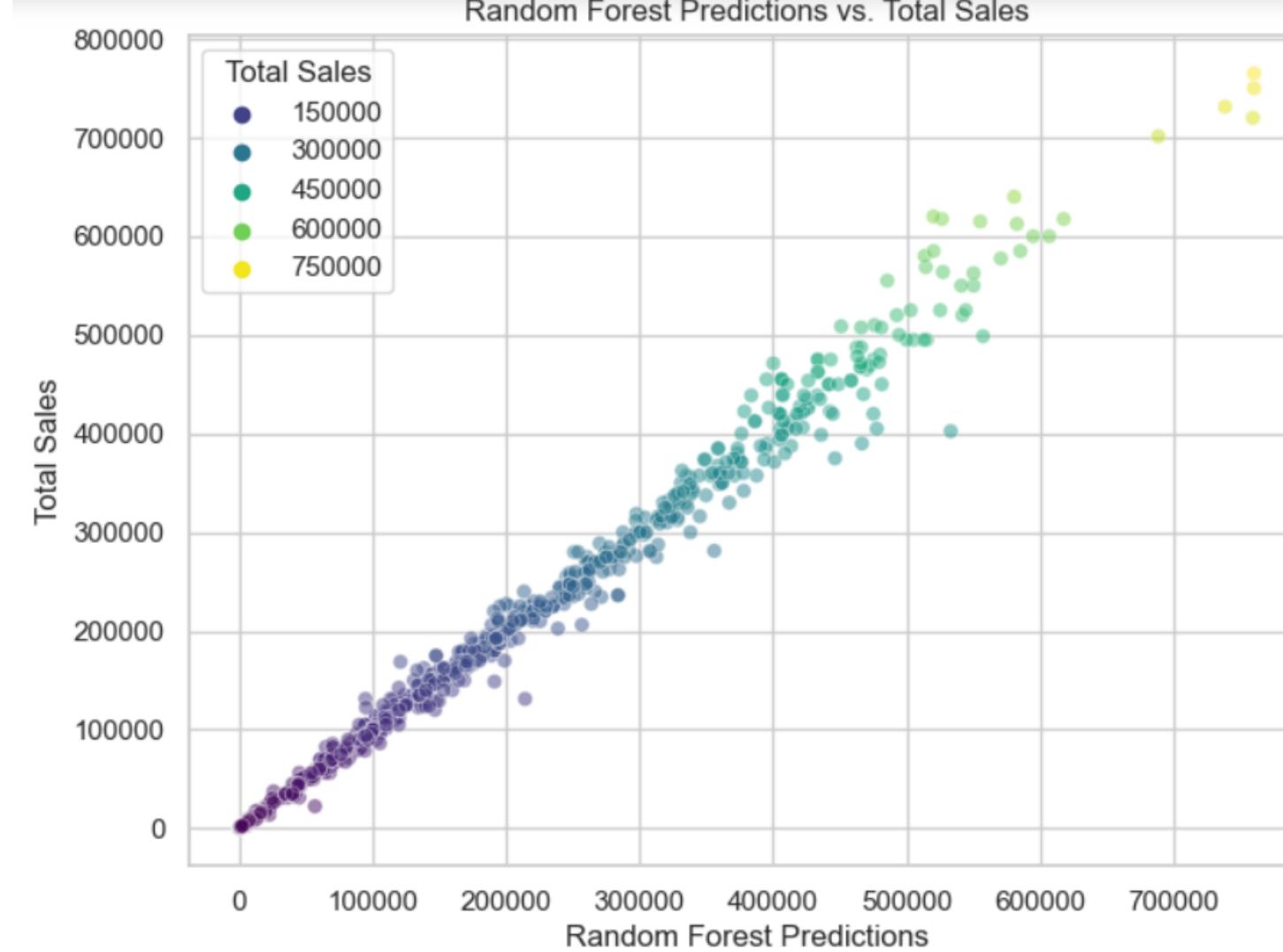
Predicting Total sales

Models:

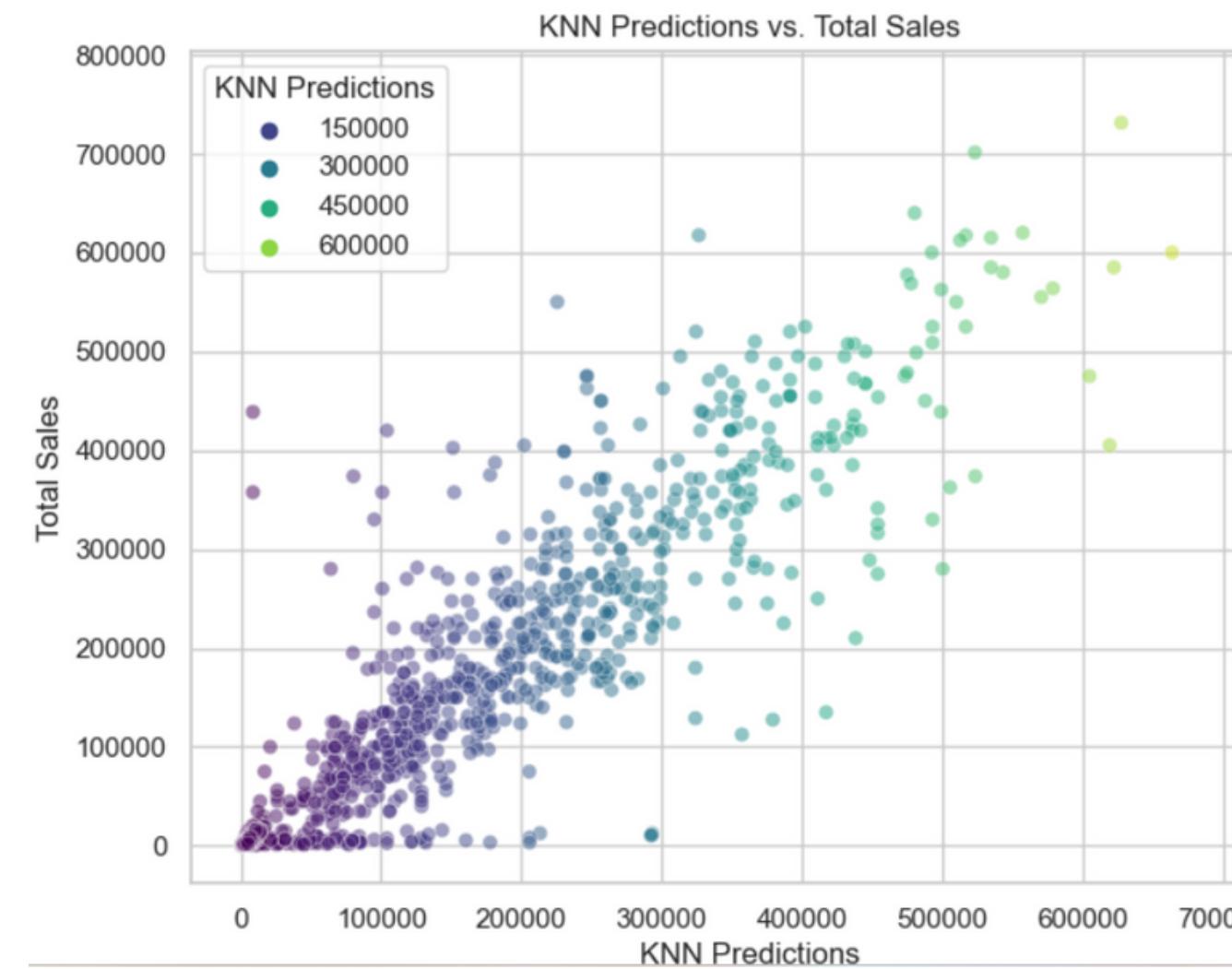
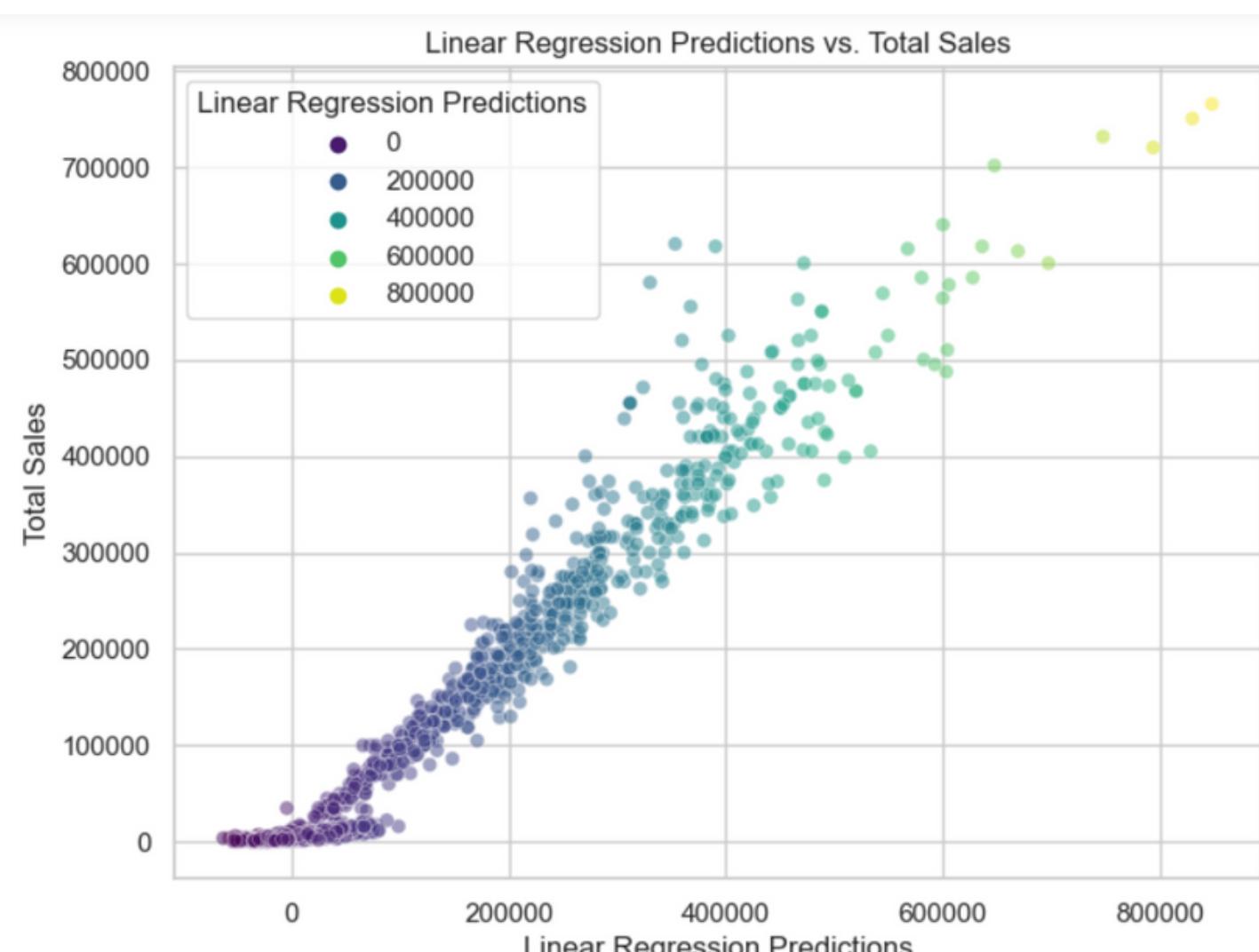
- Linear Regression : R-squared: 0.9560(Test) and 0.9549 (Train).
- Mean Absolute Error: 19211.72
- Root Mean Squared Error: 28870.17
- Random Forest regressor: R-squared: 0.9938(Test) and 0.9976 (Train).
- Root Mean Squared Error: 10816.32.
- Mean Absolute Error: 3872.68

KNeighborsRegressor (test) score 0.87, (train) score 0.92

	total_sales	random_forest_y_pred	linear_regression_y_pred	knn_y_pred
0	4352.0	4738.000000	-46752.0	42486.0
1	7956.0	7623.000000	24032.0	7706.0
2	3900.0	3403.333333	21152.0	3918.8
3	437.0	482.333333	-27008.0	455.4
4	5434.0	5246.333333	-10256.0	8260.0
...
1925	373750.0	348333.333333	292288.0	523250.0
1926	4800.0	4489.666667	19008.0	4522.0
1927	7980.0	7396.333333	14672.0	6711.4
1928	1980.0	1259.333333	24672.0	5144.8
1929	2725.0	2673.000000	-8160.0	104118.0



- Crucial features for the best model (Random Forest)
- operating profit
 - price per unit
 - state
 - retailer
 - product
 - units_sold
 - sales_method



CONCLUSIONS/SOME IDEAS

- Men's Footwear is a crucial product for adidas but what about the less significative products?,
- Different sales and marketing strategies for the cities and states that represent a higher value for the brand
- The race of retailers was dominated by: West Gear, Foot Locker and Sports Direct.(maybe the focus should have been in the best retailers for 2020-20201)
- Most frequent sales method was Online, but why did we had less operating profit from there?(worth investigating specially during covid period 20-21).
- Are the states where people purchased for higher prices interesting as a target to retrieve value for the brand?
- Spend some time investigating July 16.2023 (the highest sale date) . Maybe we can discover or learn a pattern-
- There are actually some models able to predict the total sales, as long as we consider the important features.