

IOWA LIQUOR INVENTORY

restocking predictions for 2024 at
Iowa's busiest liquor retailer

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business context

stakeholder: store manager at Hy-Vee Grocery Store in Des Moines, IA

goal: predict liquor inventory
restocking throughout 2024





project overview

the big picture: start by training models on all liquor types from 2017-2023

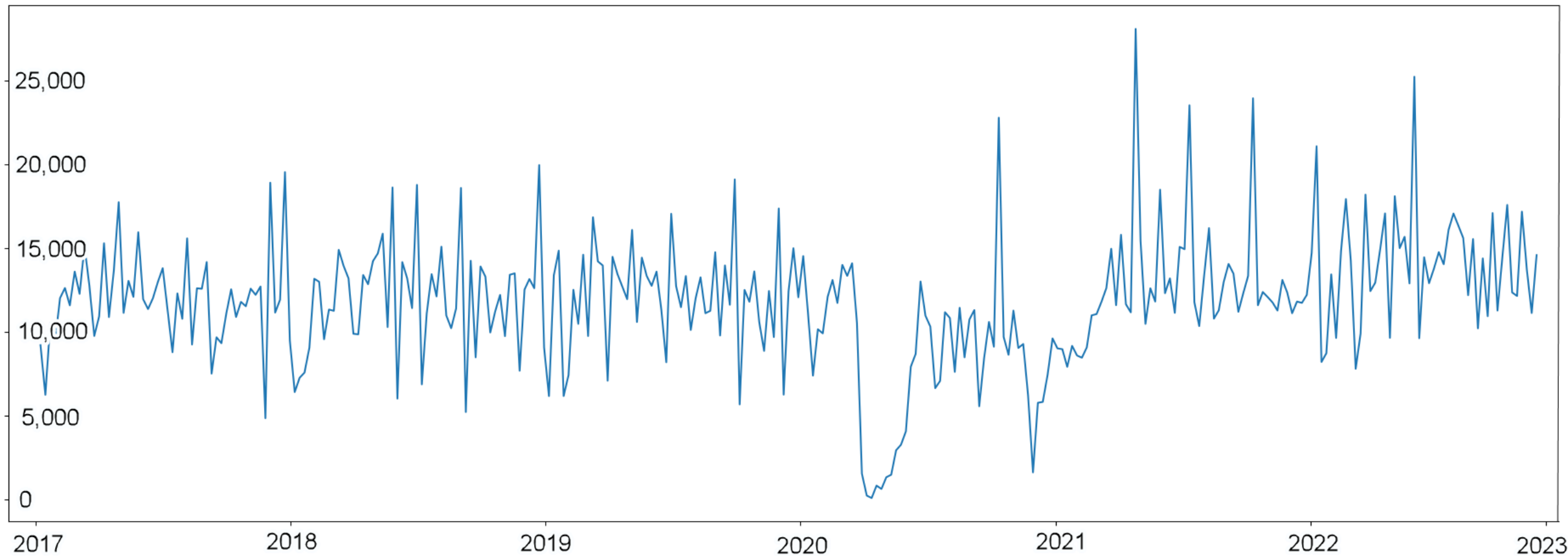
project target: the number of bottles sold in each transaction

results: predictions for various popular liquor categories throughout 2024 on a weekly basis

data source

- originally downloaded from [Iowa's open data page](#)
- features data from all Iowan liquor retailers dating back to 2012
- this project narrows the scope to **Iowa's busiest store dating to 2017**
- this data subset contains **well over 17 million transactions**

inventory sold 2017-2023 (all categories)



modeling methodology

- 1.**isolate** the 'Date' & 'Bottles Sold' columns
- 2.**set aside** the last year of data as a **test set** (2023)
- 3.**train the model** on the first five years' data (2017-2022)
- 4.**compare** the model's performance on **train & test sets**
- 5.**forecast** for 2024 using all six years' data

evaluating predictions

Akaike Information Criterion (AIC)

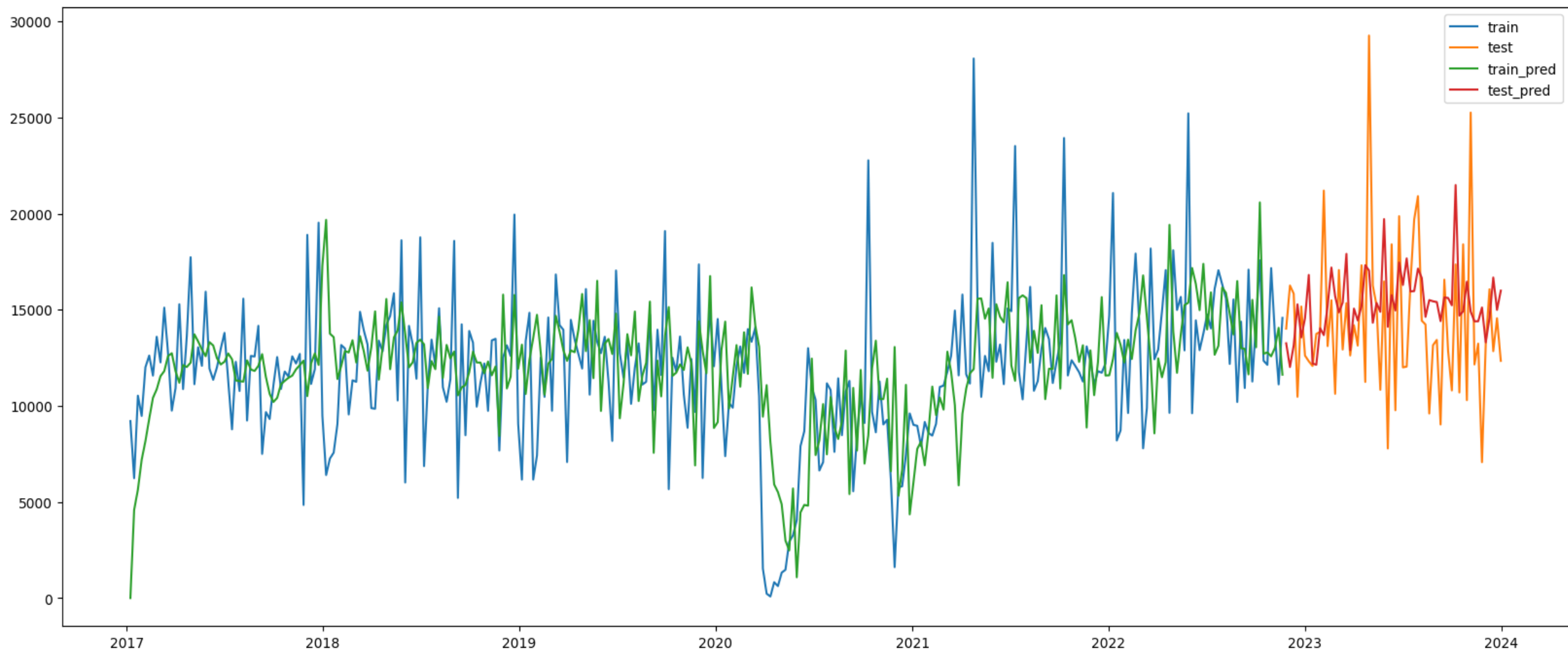
- **balances** model accuracy & complexity
- helps **optimize** models

Root Mean Square Error (RMSE)

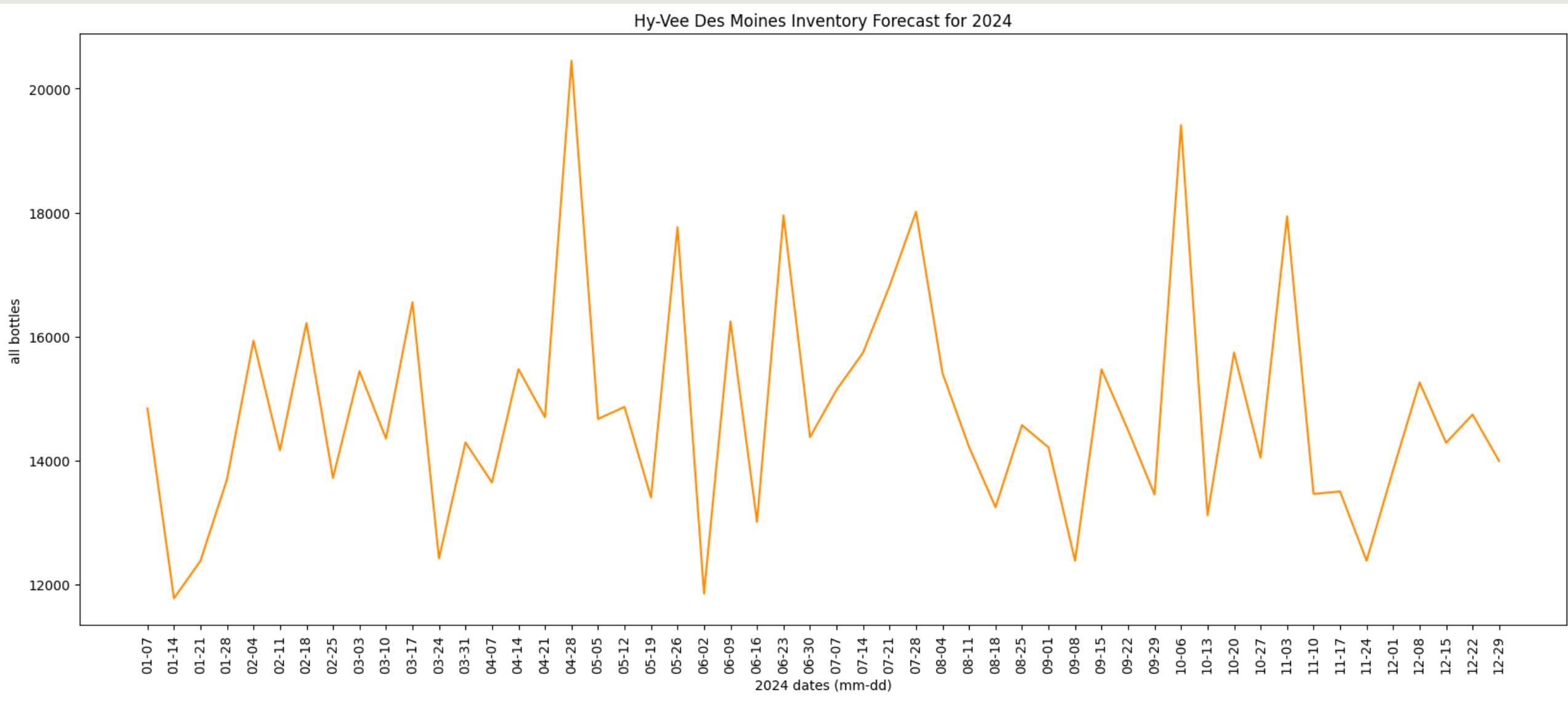
- **only** measures model prediction accuracy
- helps **evaluate** models

overall inventory predictions for Hy-Vee #3

train & test set predictions



overall 2024 inventory **forecast** for Hy-Vee #3

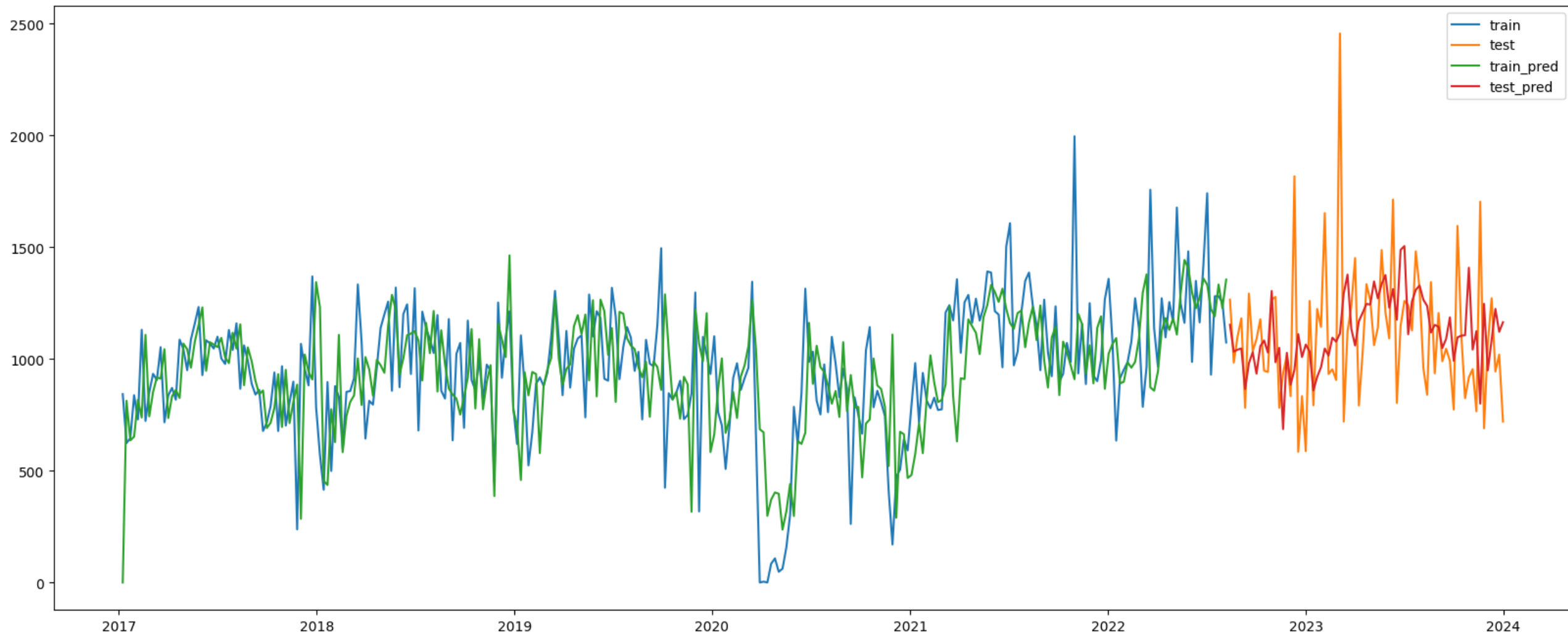


liquor category	# of bottles sold 2017-2023
flavored vodka	23,299
liqueurs	19,167
tequila	14,833
rum	13,019
non-flavored vodka	11,507
schnapps	9,310
bourbon	9,195
gin	6,753
blended & other whiskies	5,893

popular liquor
categories

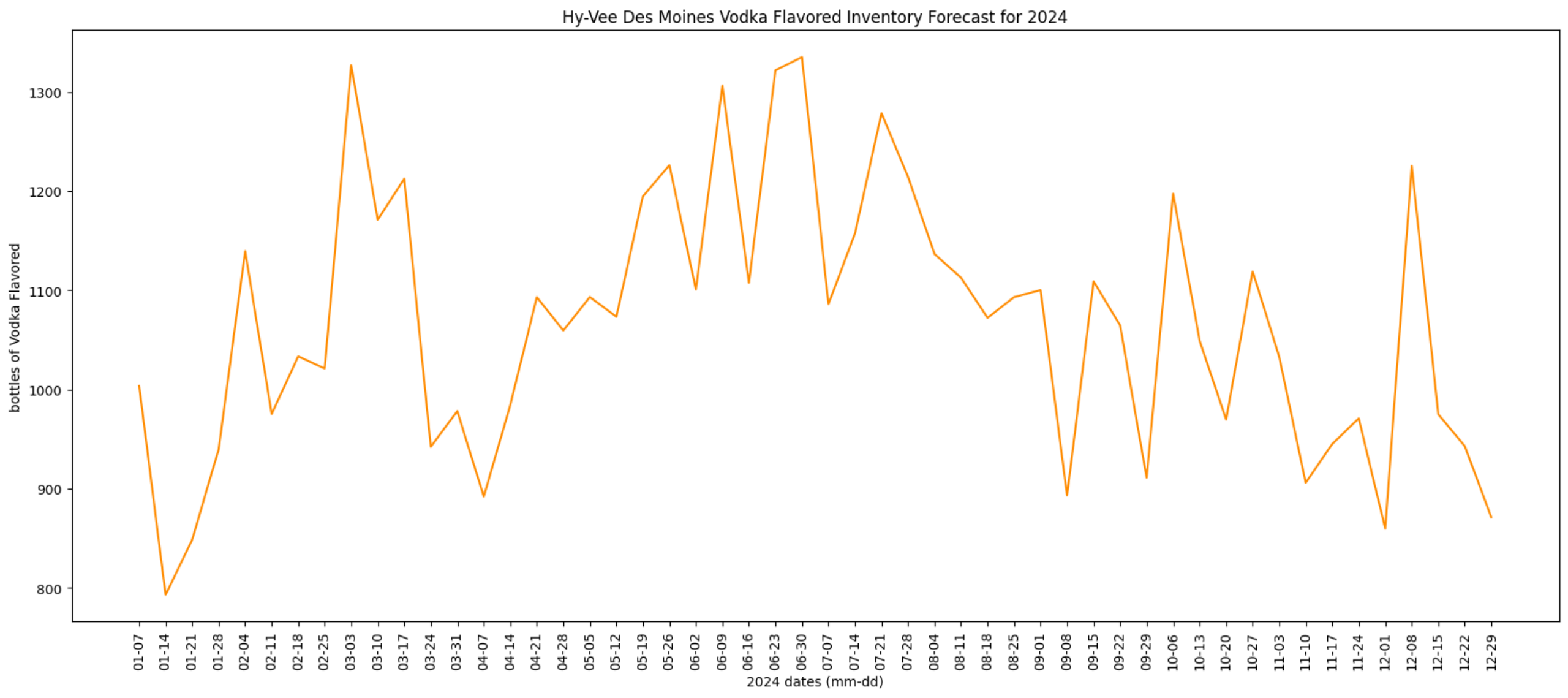
flavored vodka

train & test set predictions



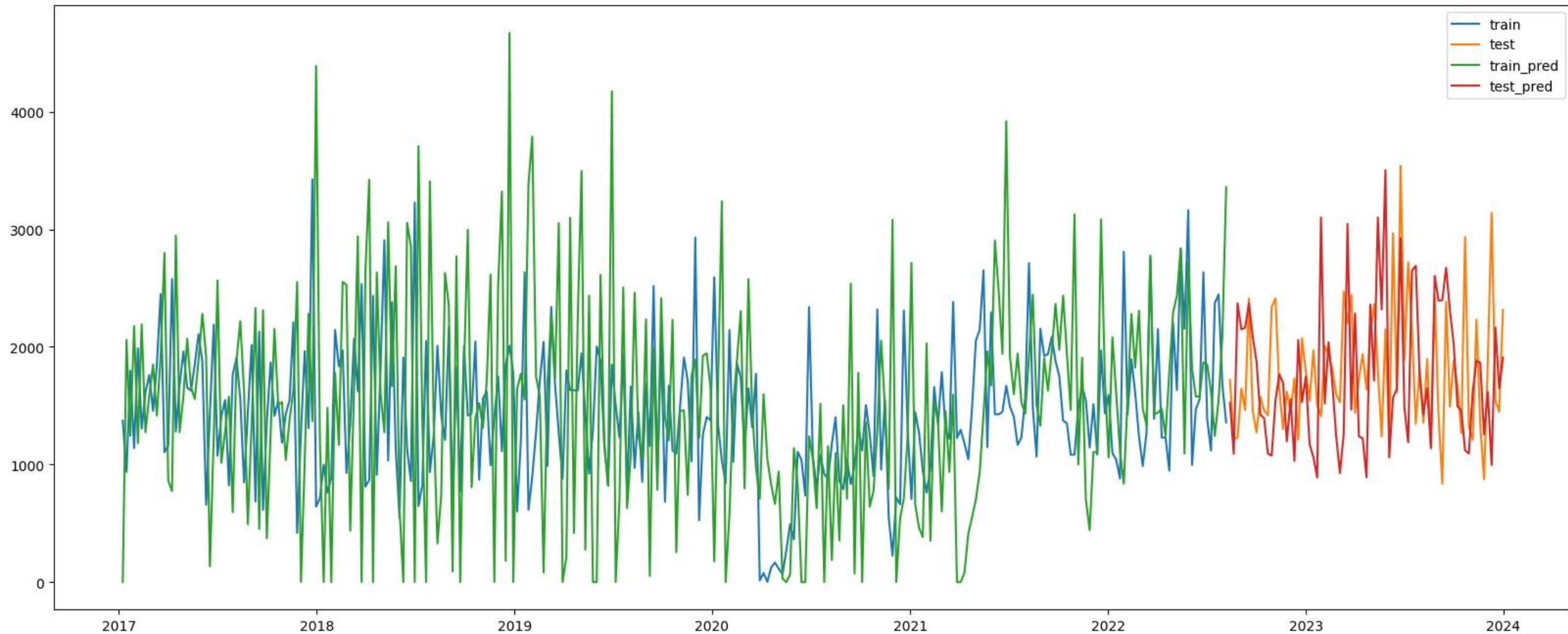
flavored vodka

forecast for 2024



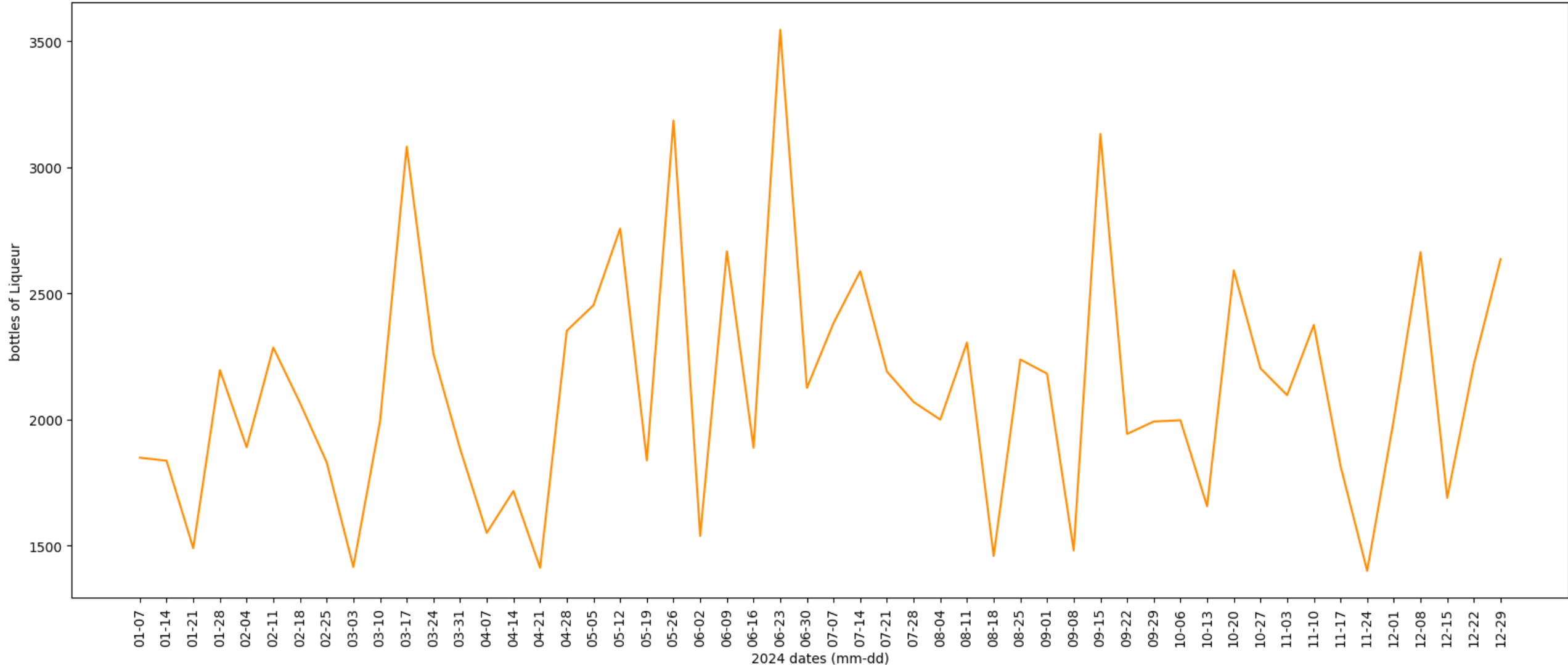
liqueurs

train & test set predictions



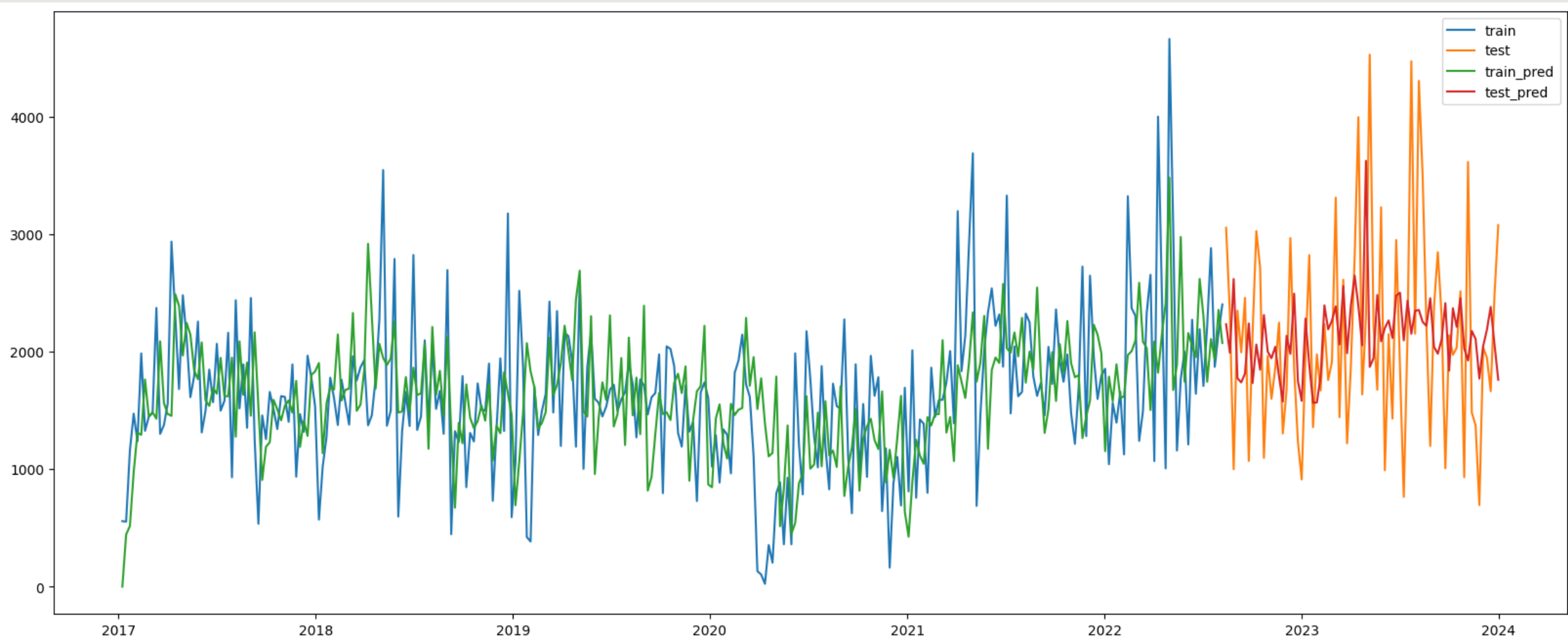
liqueurs

Hy-Vee Des Moines Liqueur Inventory Forecast for 2024



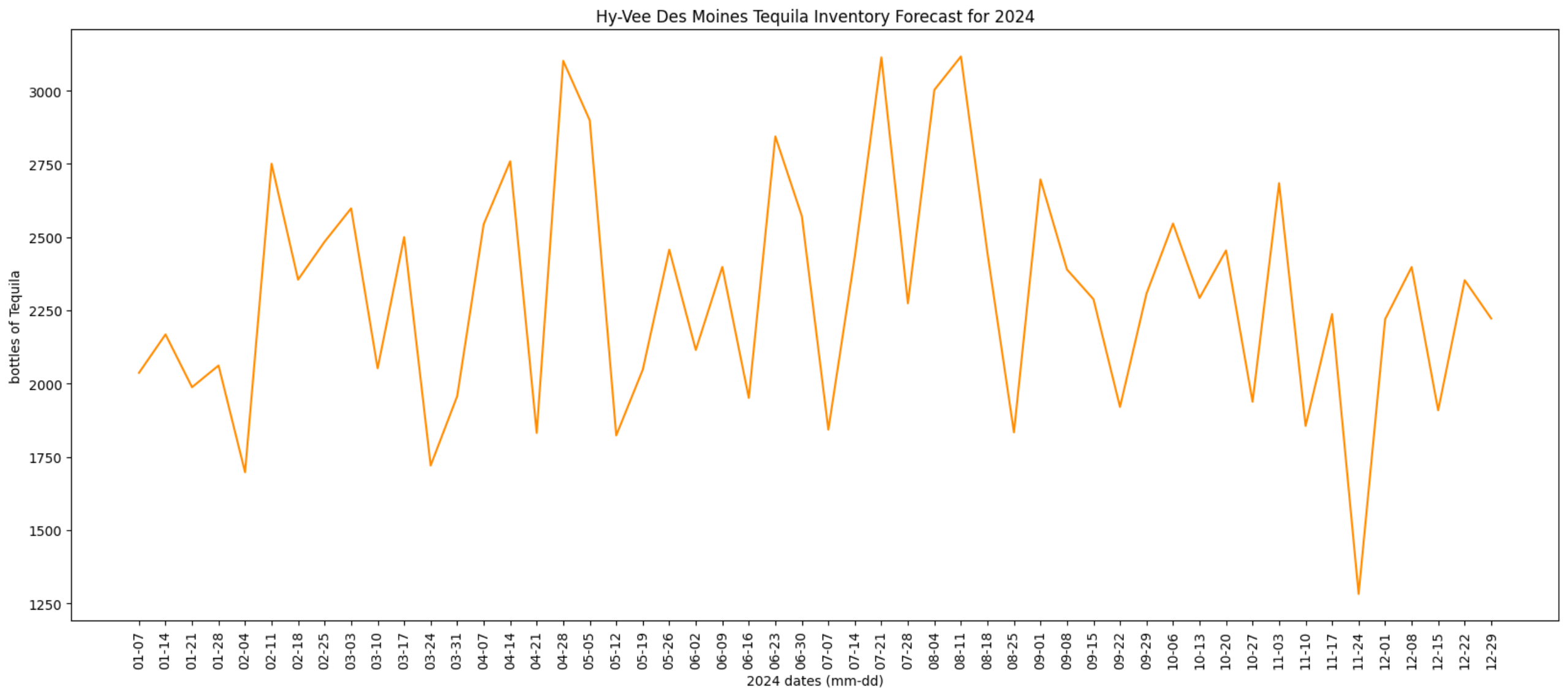
tequila

train & test set predictions



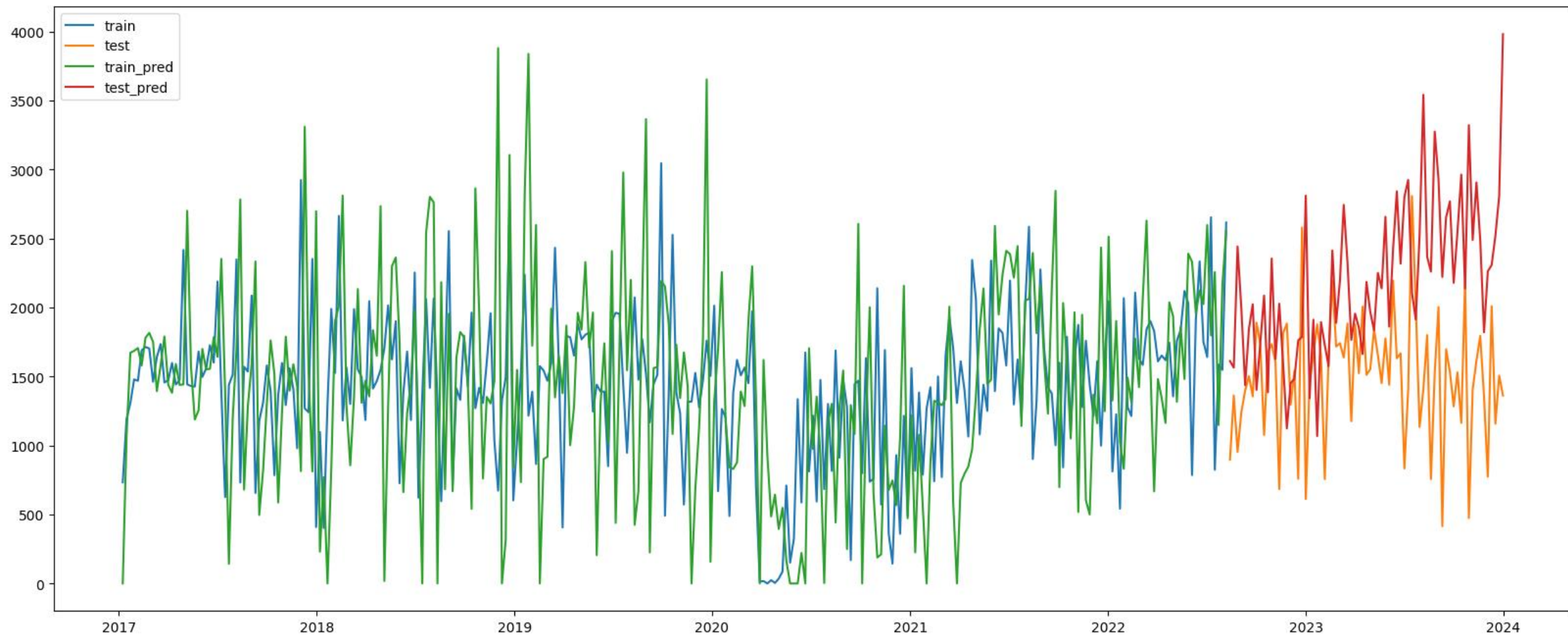
tequila

forecast for 2024



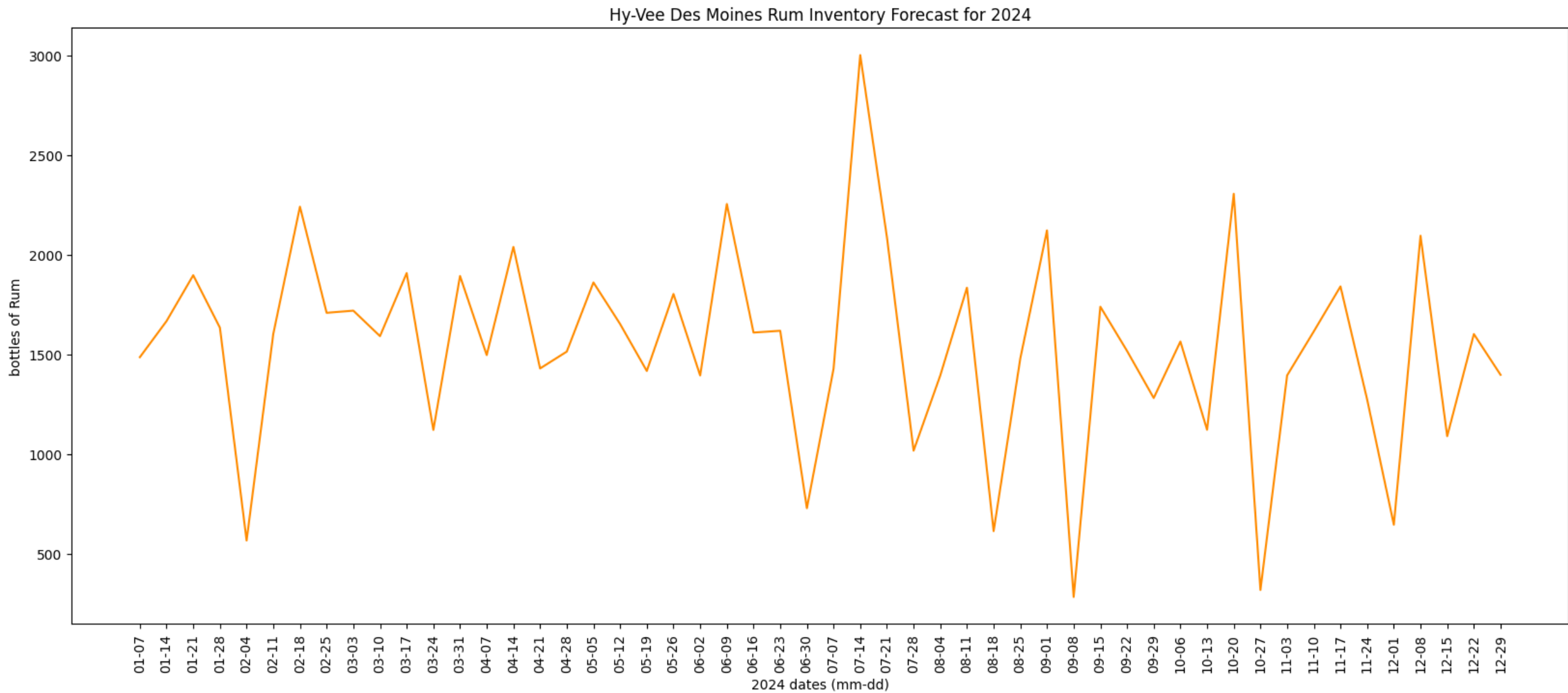
rum

train & test set predictions



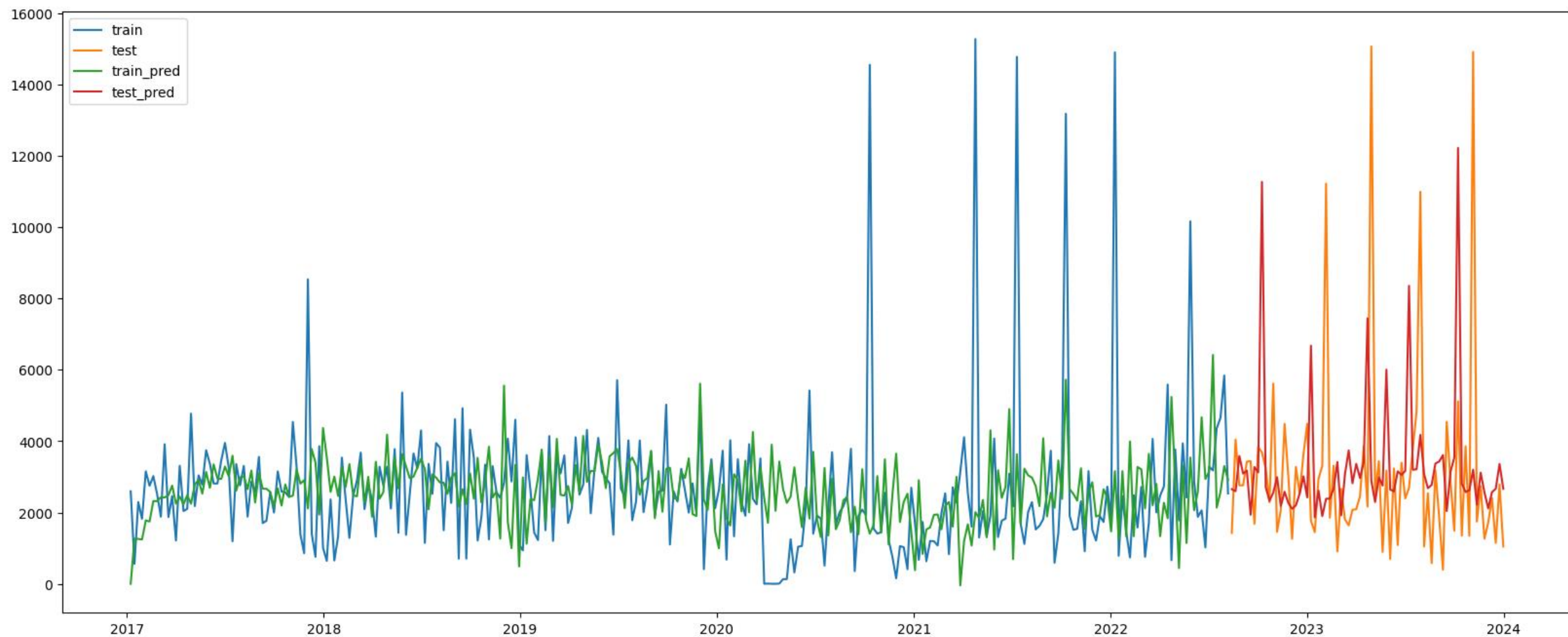
rum

forecast for 2024



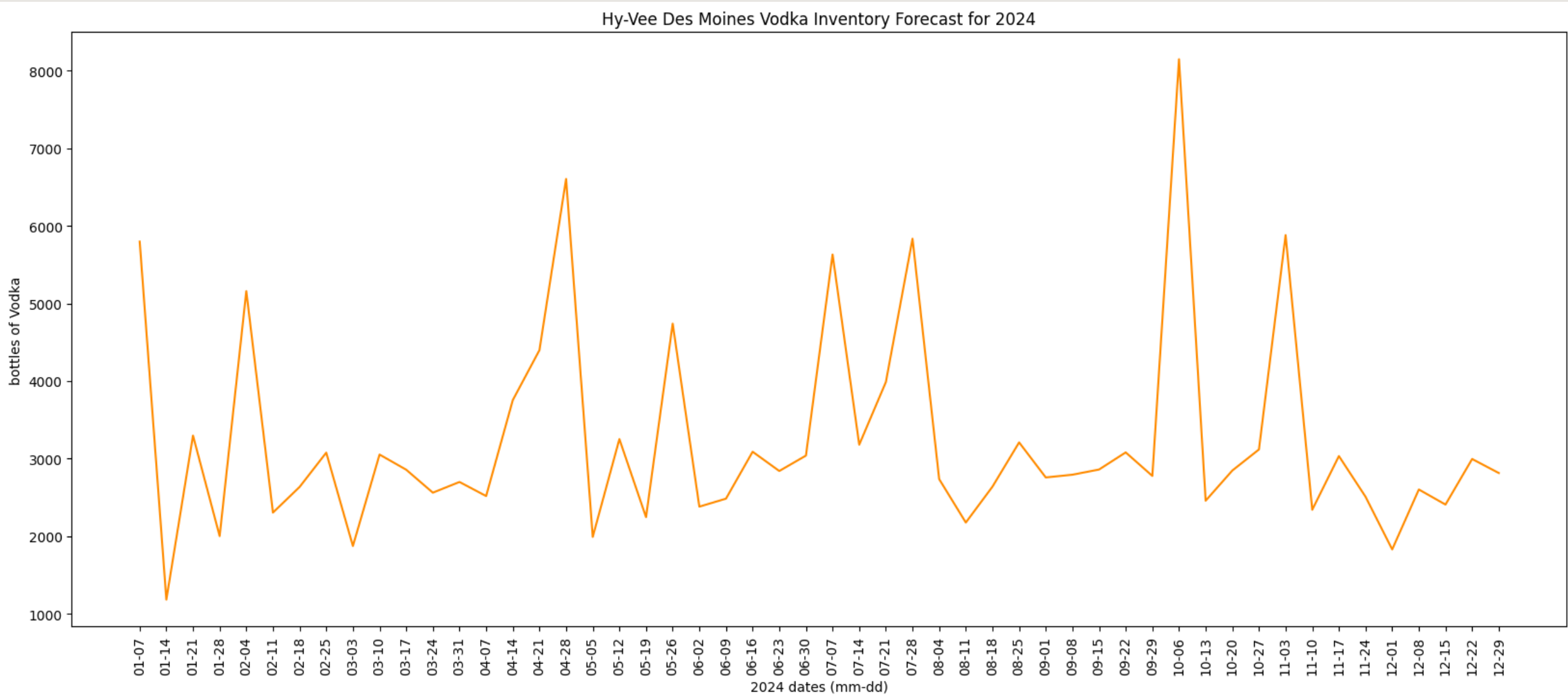
non-flavored vodka

train & test set predictions



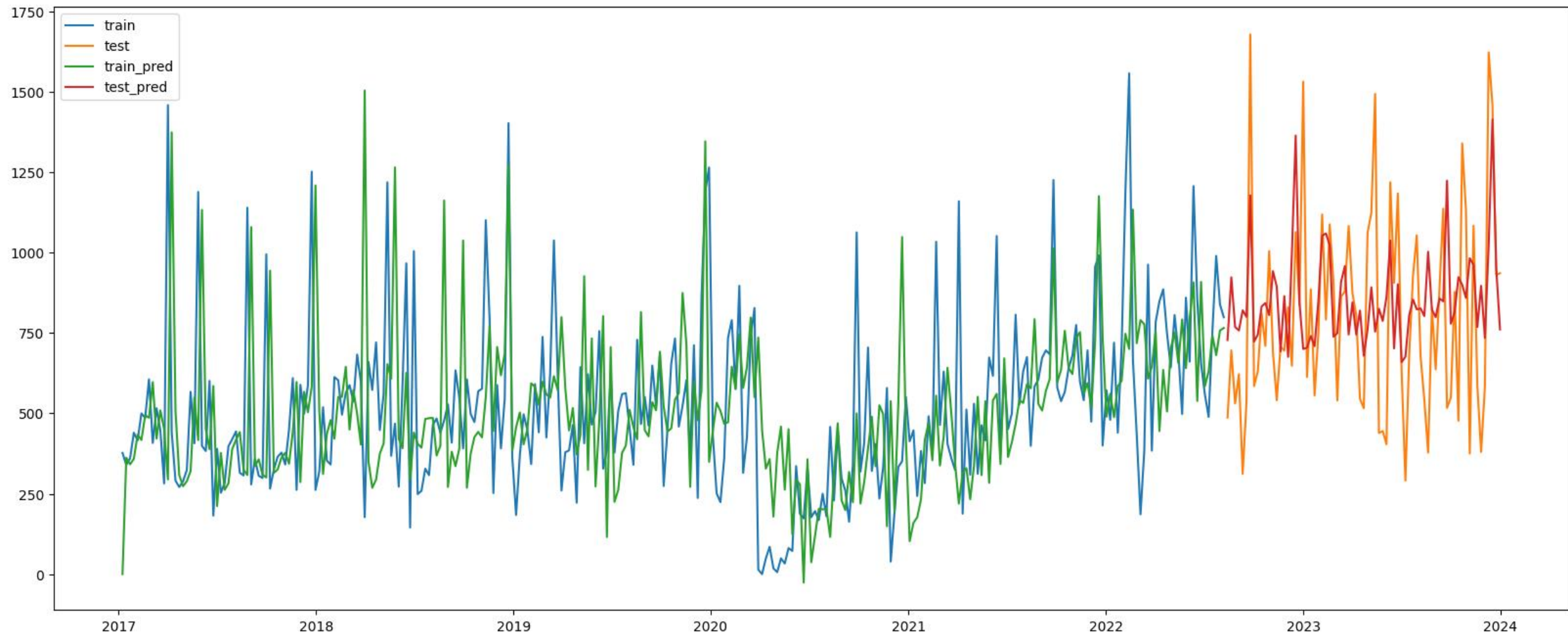
non-flavored vodka

forecast for 2024



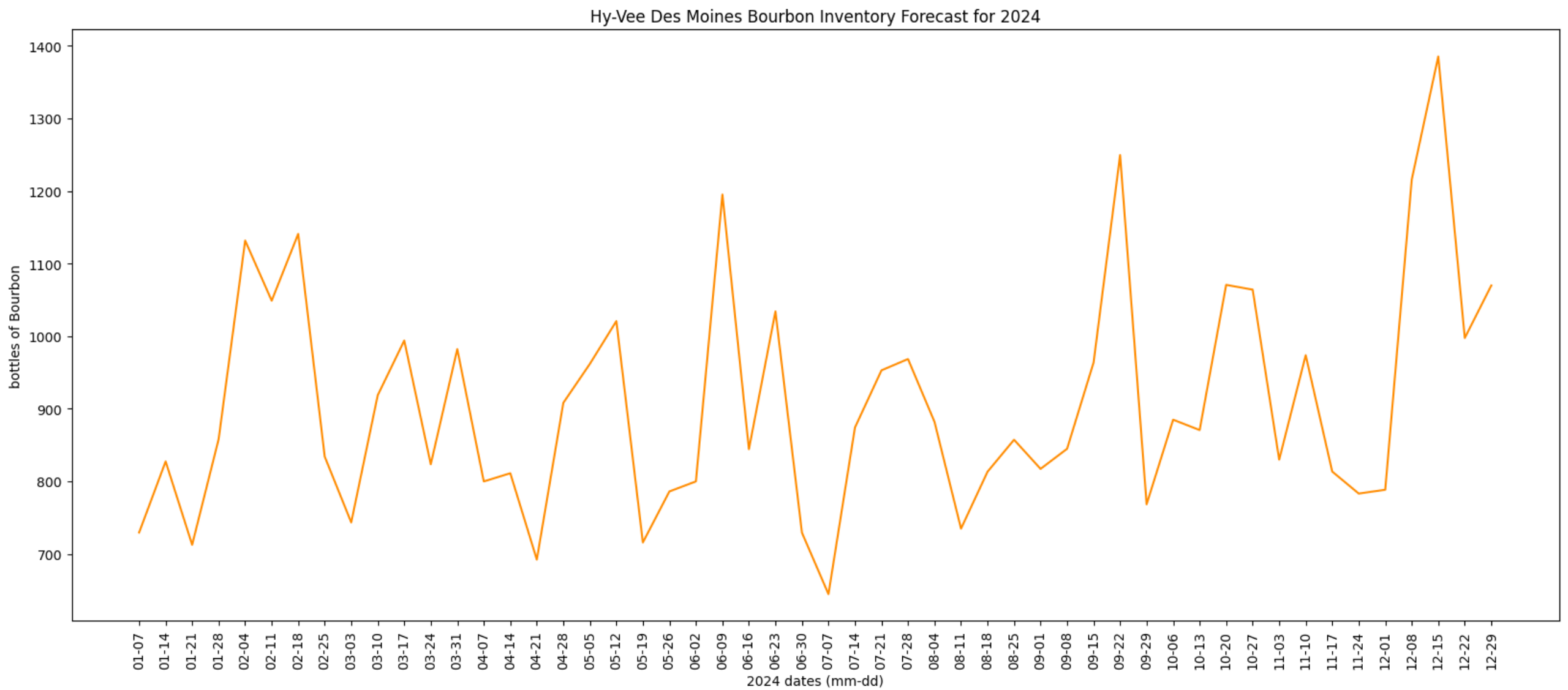
bourbon

train & test set predictions



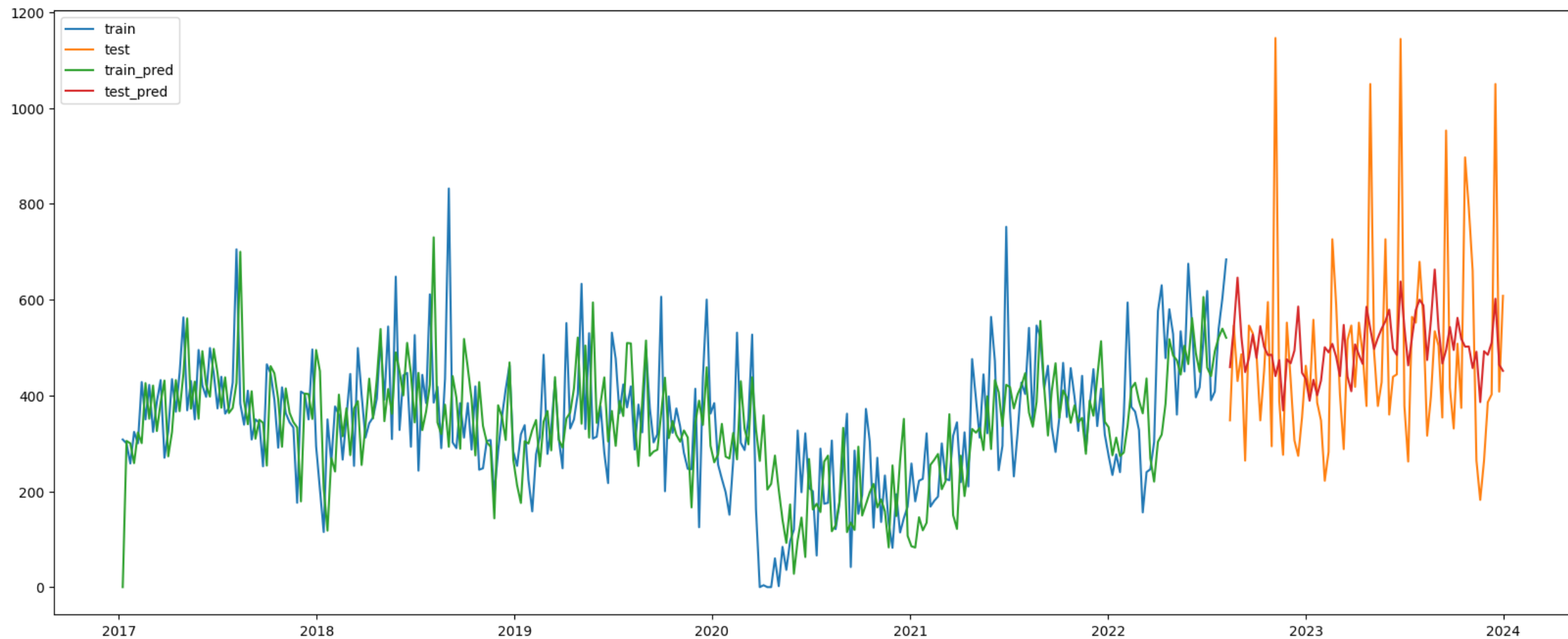
bourbon

forecast for 2024



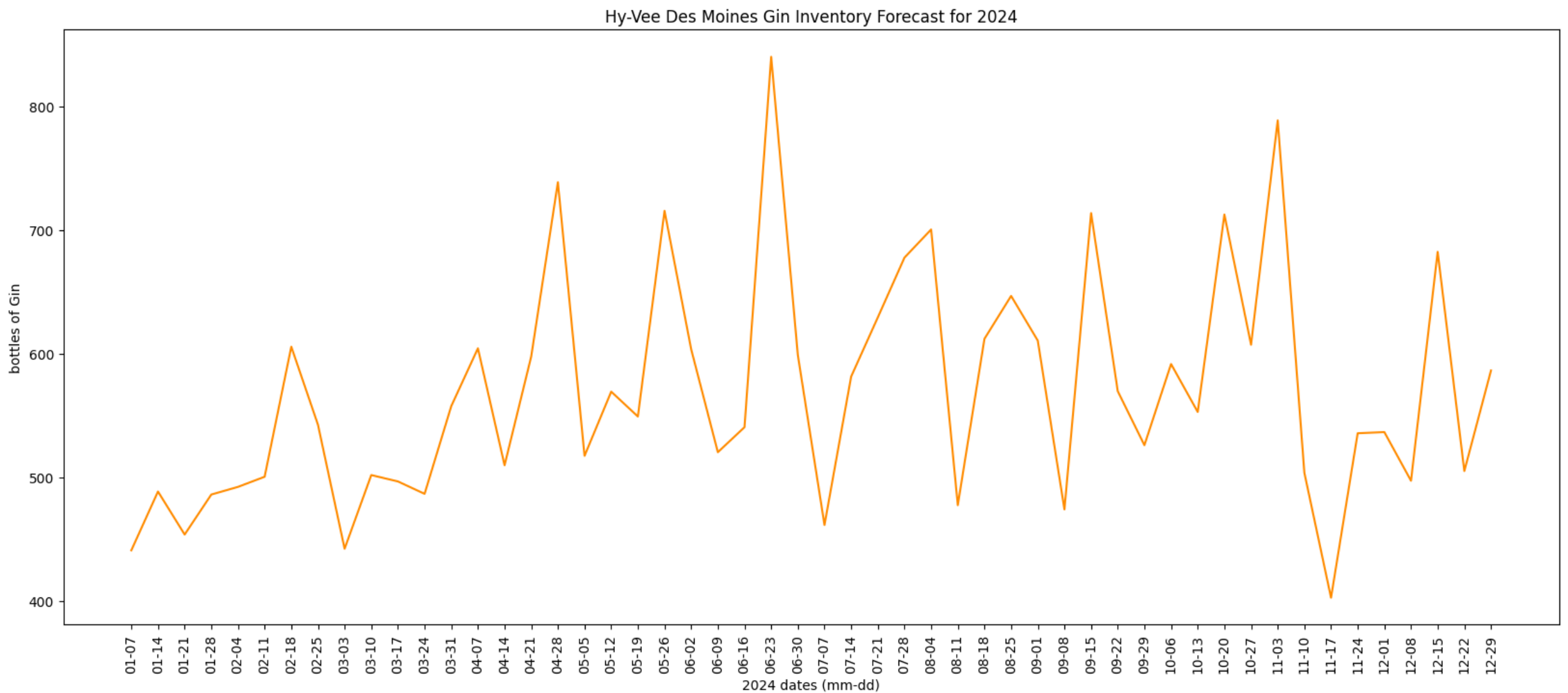
gin

train & test set predictions



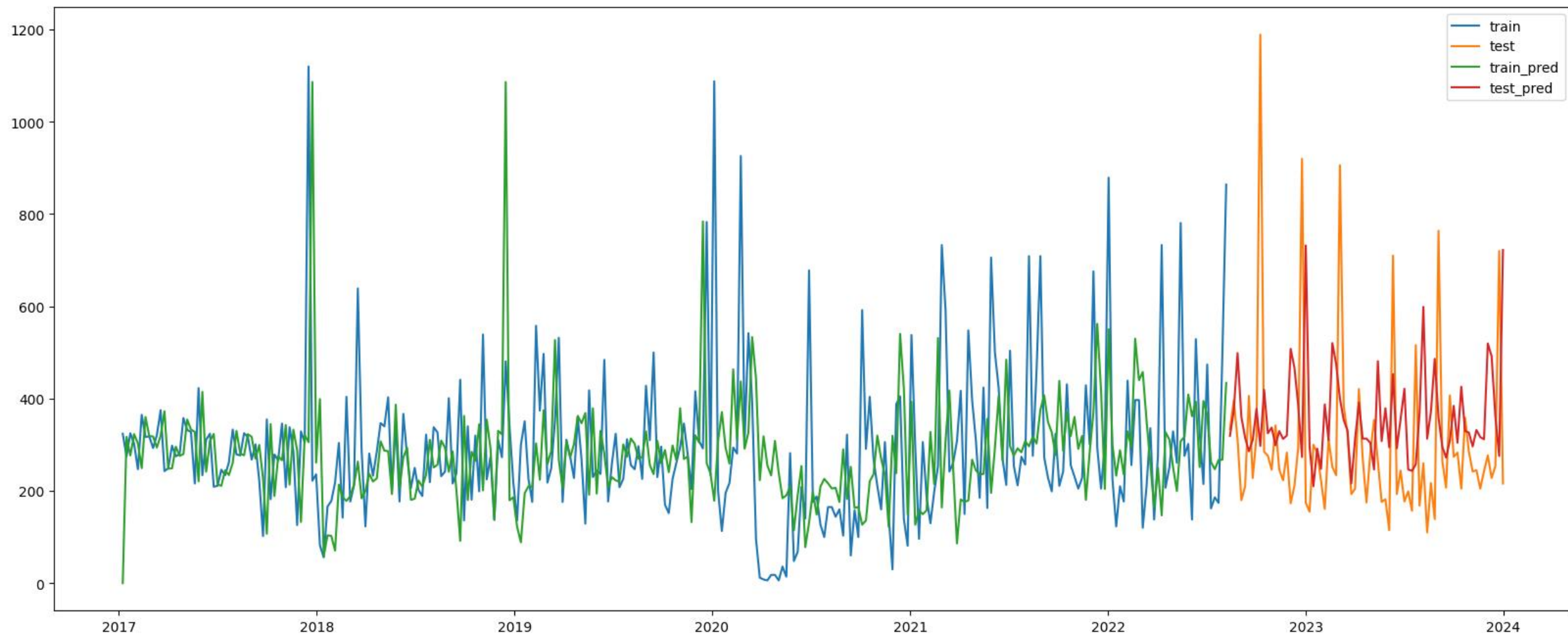
gin

forecast for 2024



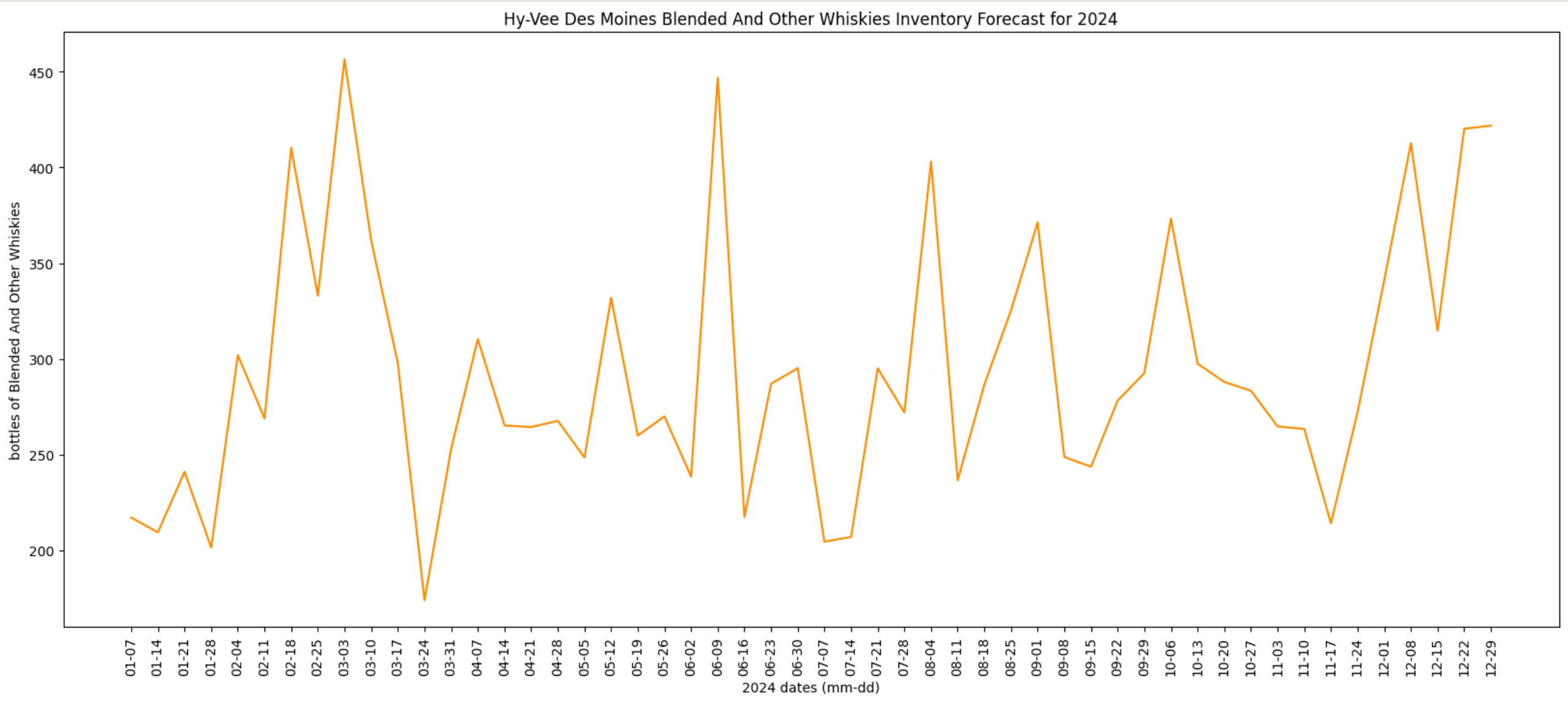
blended & other whiskies

train & test set predictions



blended & other whiskies

forecast for 2024



model/category	train RMSE	test RMSE	# of bottles sold	test accuracy
all categories	4431.5	4079.8	132,822	96.9%
flavored vodka	272.1	334.7	23,229	98.6%
liqueur	1107.2	768.4	19,167	96.0%
tequila	643.3	877.8	14,833	94.1%
rum	839.2	1031.7	13,019	92.1%
non-flavored vodka	2129.4	3145.3	11,507	72.7%
bourbon	300	303.1	9,195	96.7%
gin	129.8	200.9	6,753	97.0%
blended & other whiskies	189.7	232.4	5,893	96.1%

MODEL EVALUATIONS



Thank You



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