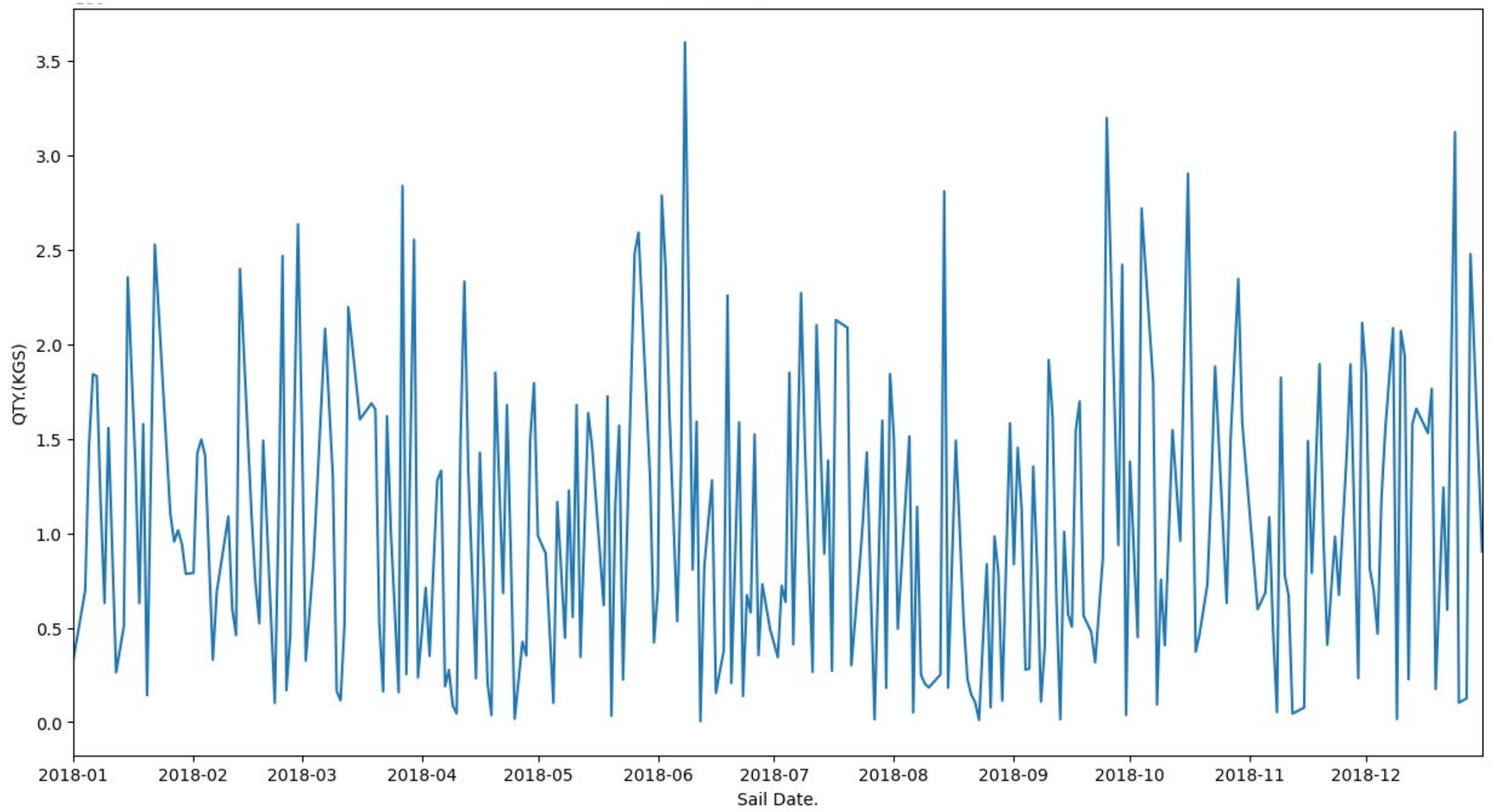
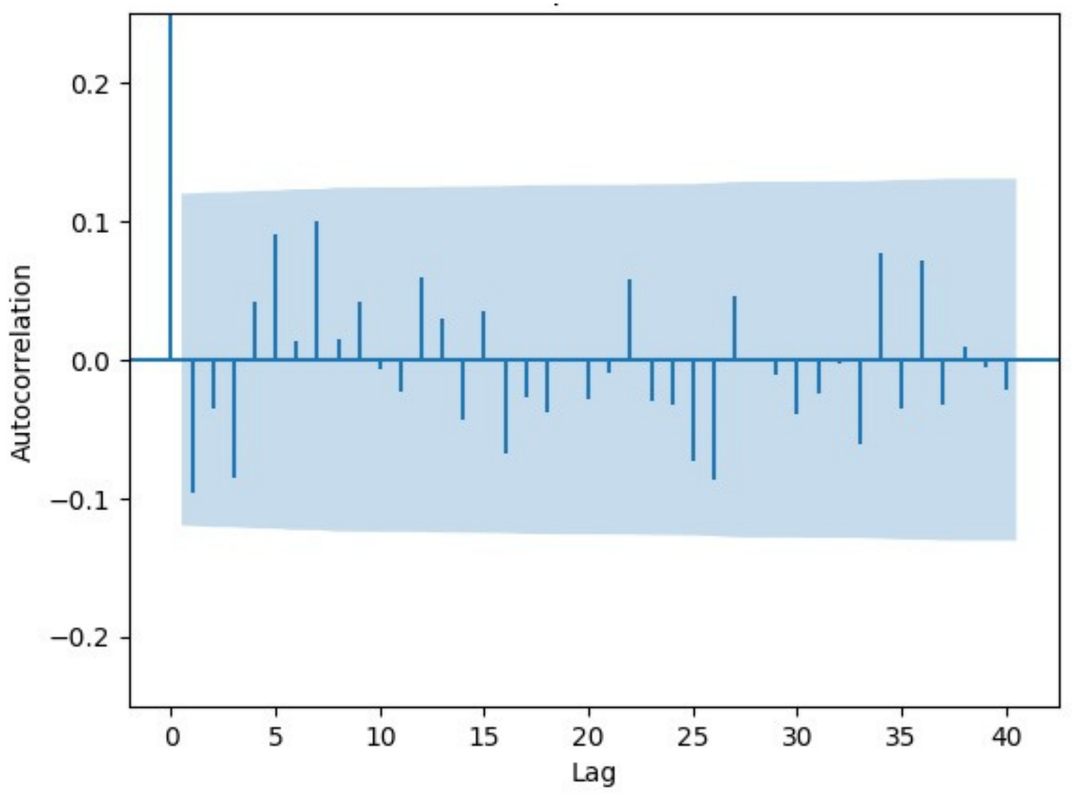
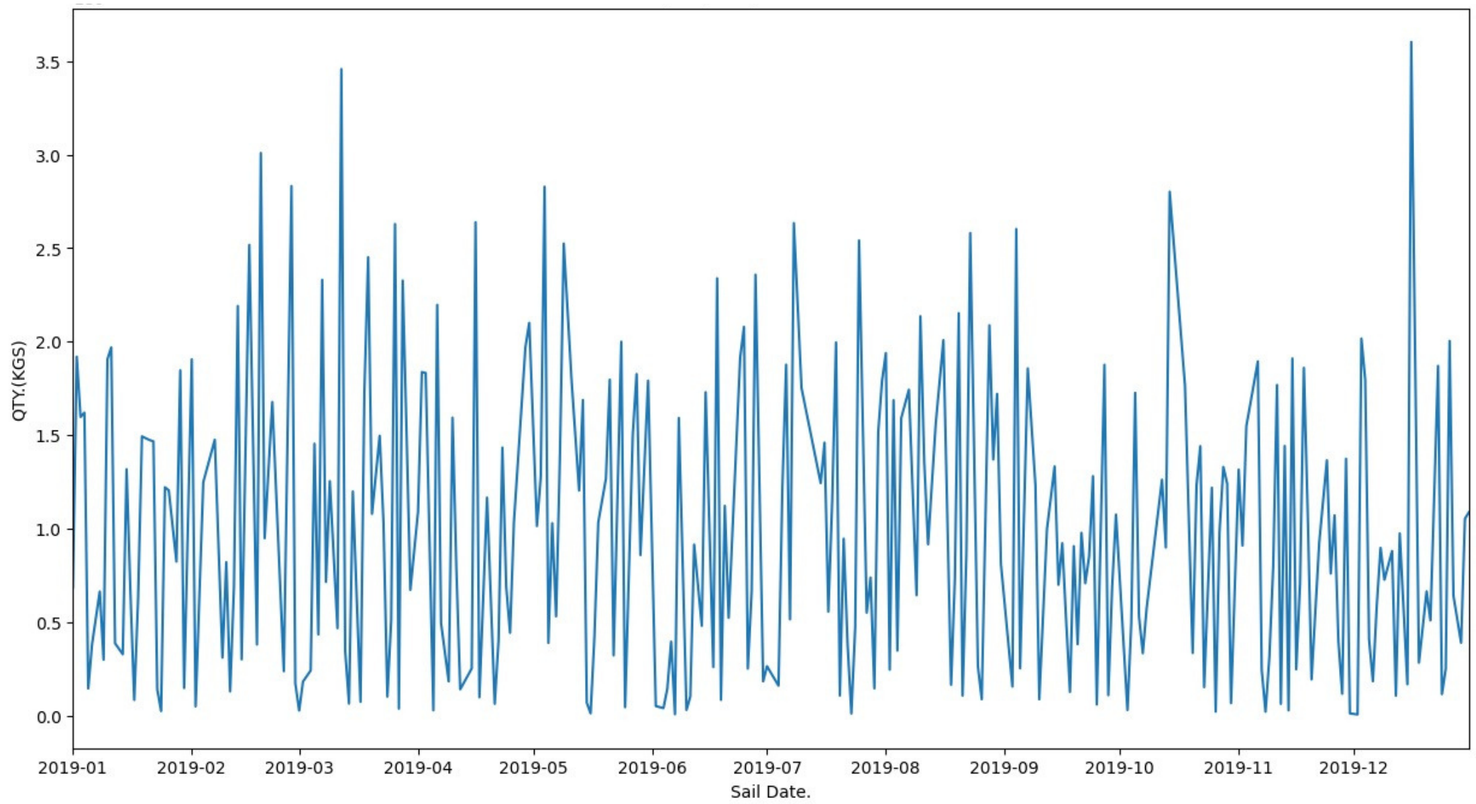
Preliminary Report 2018-2022
Agro Products

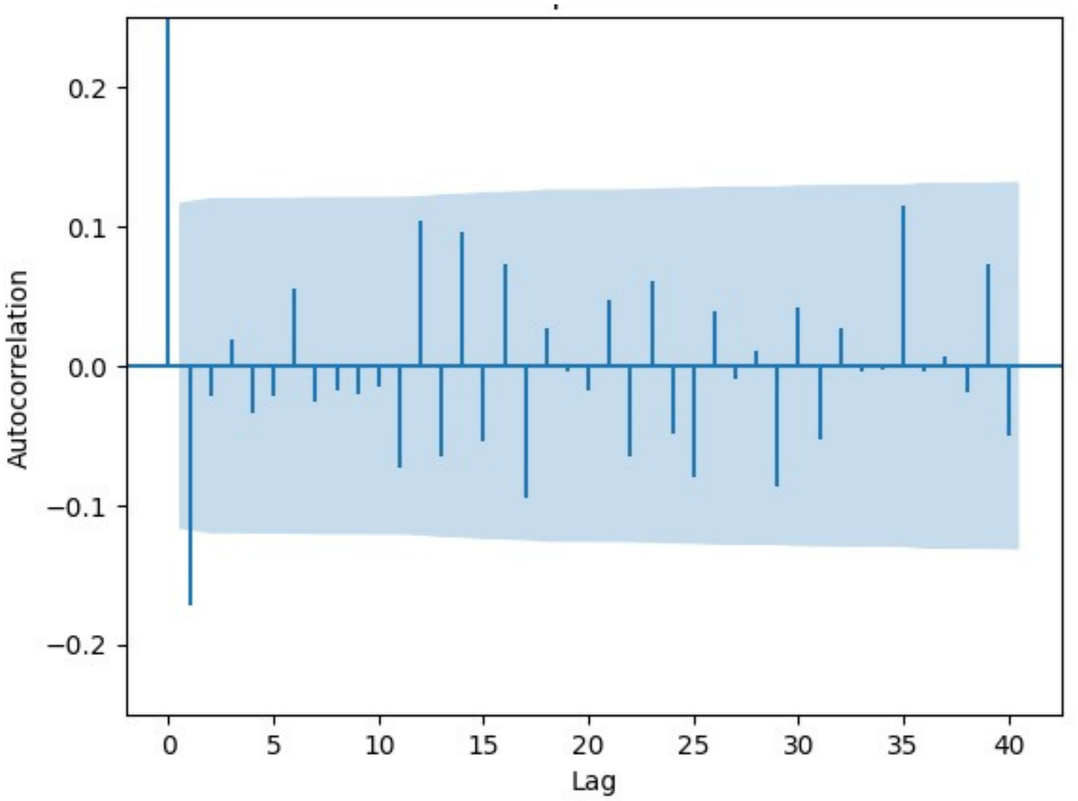
2018


QTY.(KGS)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2018-01
2018-02
2018-03
2018-04
2018-05
2018-06
2018-07
2018-08
2018-09
2018-10
2018-11
2018-12
Sail Date.

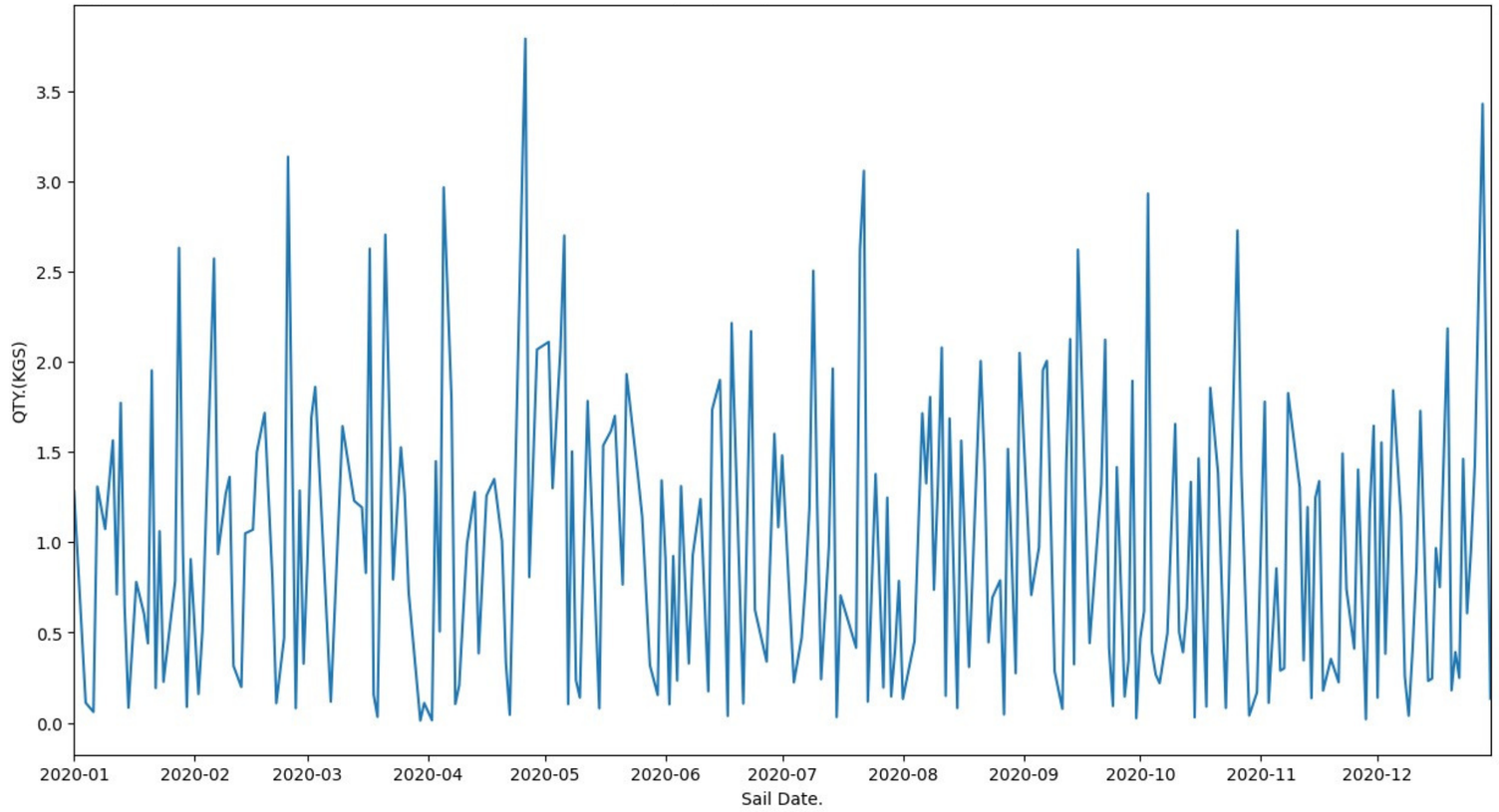

Autocorrelation
0.2
0.1
0.0
−0.1
−0.2
0
5
10
15
20
25
30
35
40
Lag

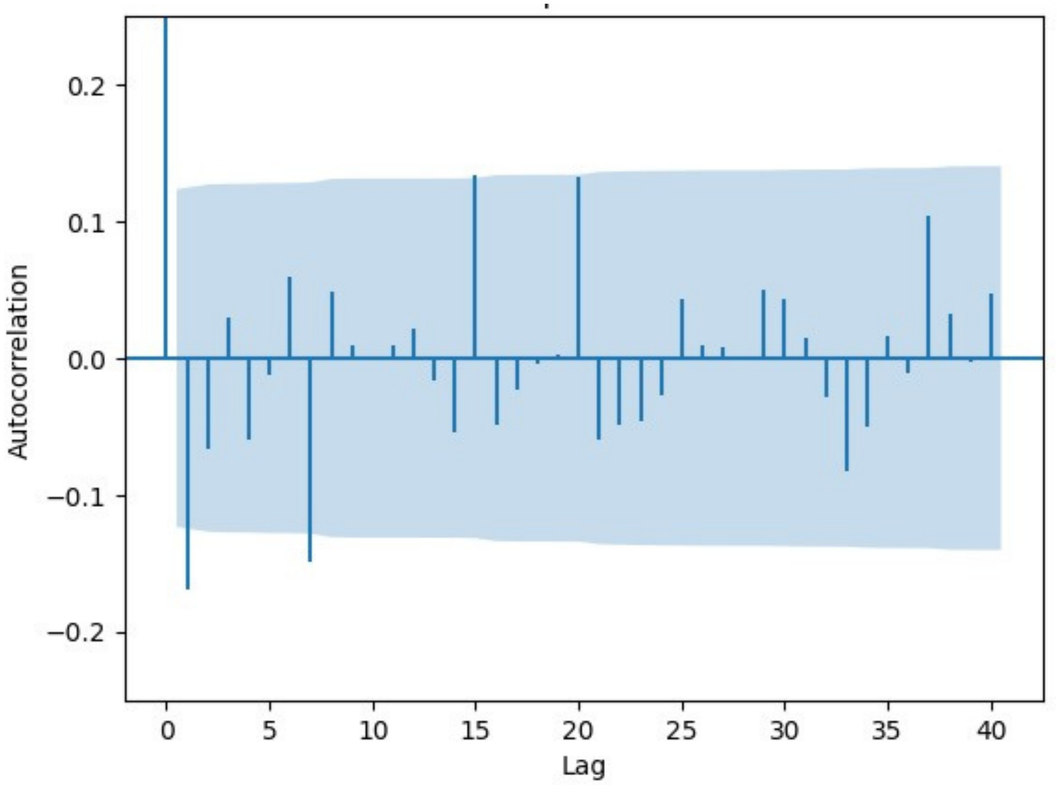
2019


QTY.(KGS)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2019-01
2019-02
2019-03
2019-04
2019-05
2019-06
2019-07
2019-08
2019-09
2019-10
2019-11
2019-12
Sail Date.

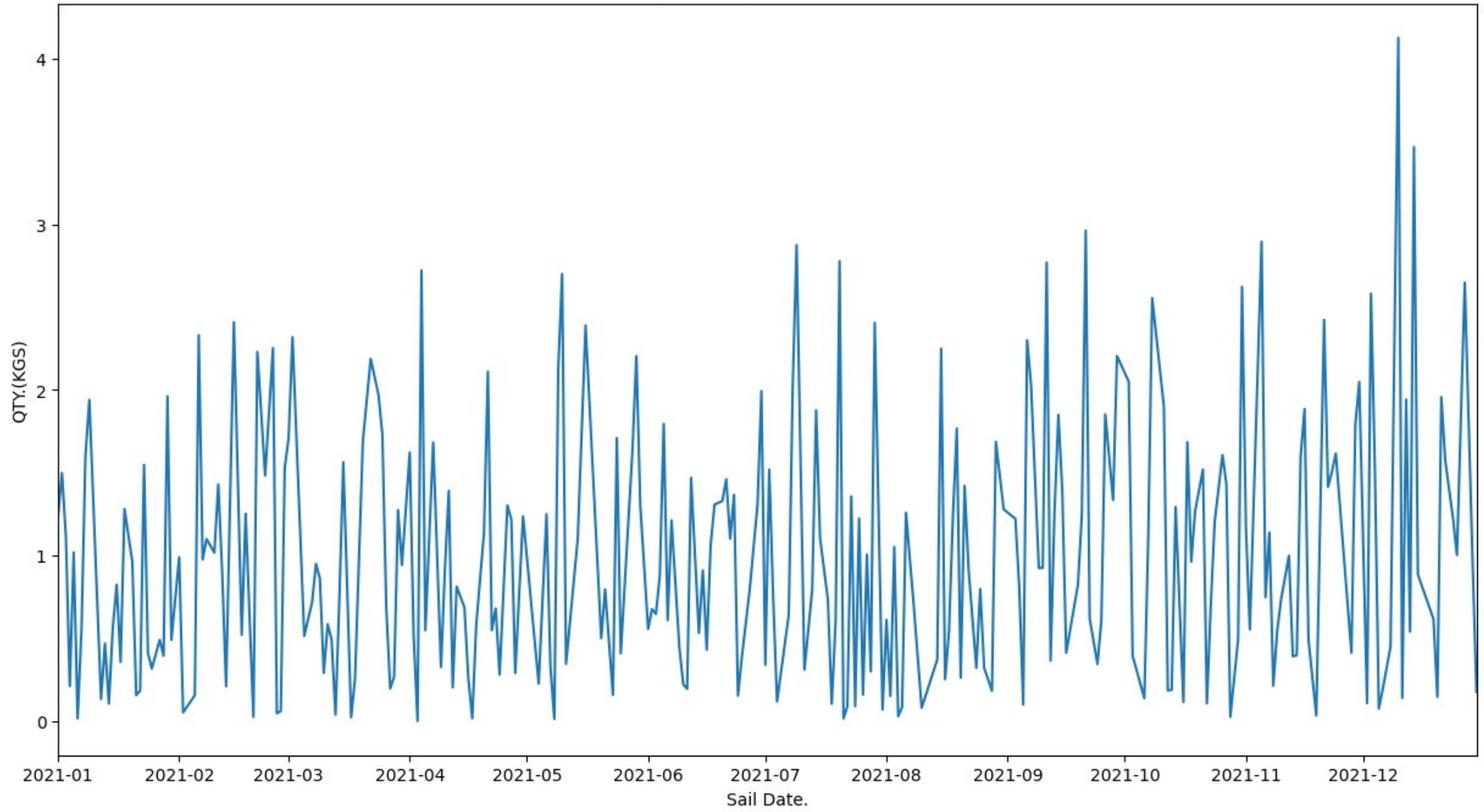

Autocorrelation
0.2
0.1
0.0
−0.1
−0.2
0
5
10
15
20
25
30
35
40
Lag

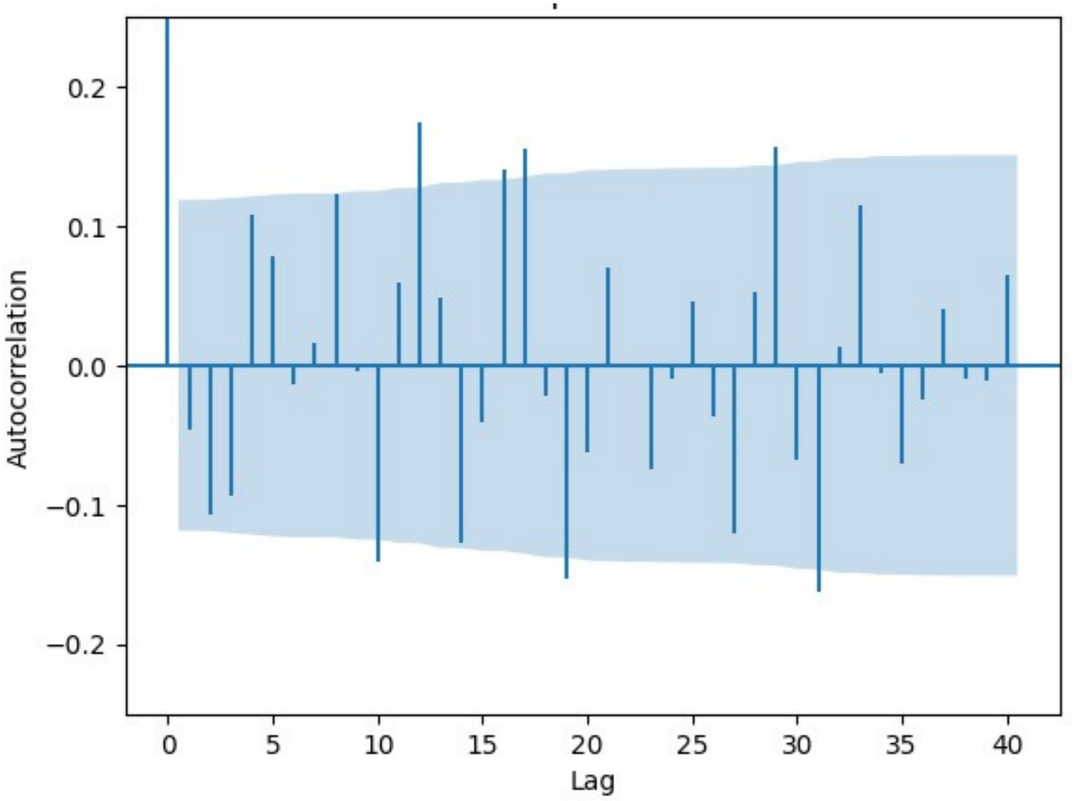
2020


QTY.(KGS)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2020-01
2020-02
2020-03
2020-04
2020-05
2020-06
2020-07
2020-08
2020-09
2020-10
2020-11
2020-12
Sail Date.

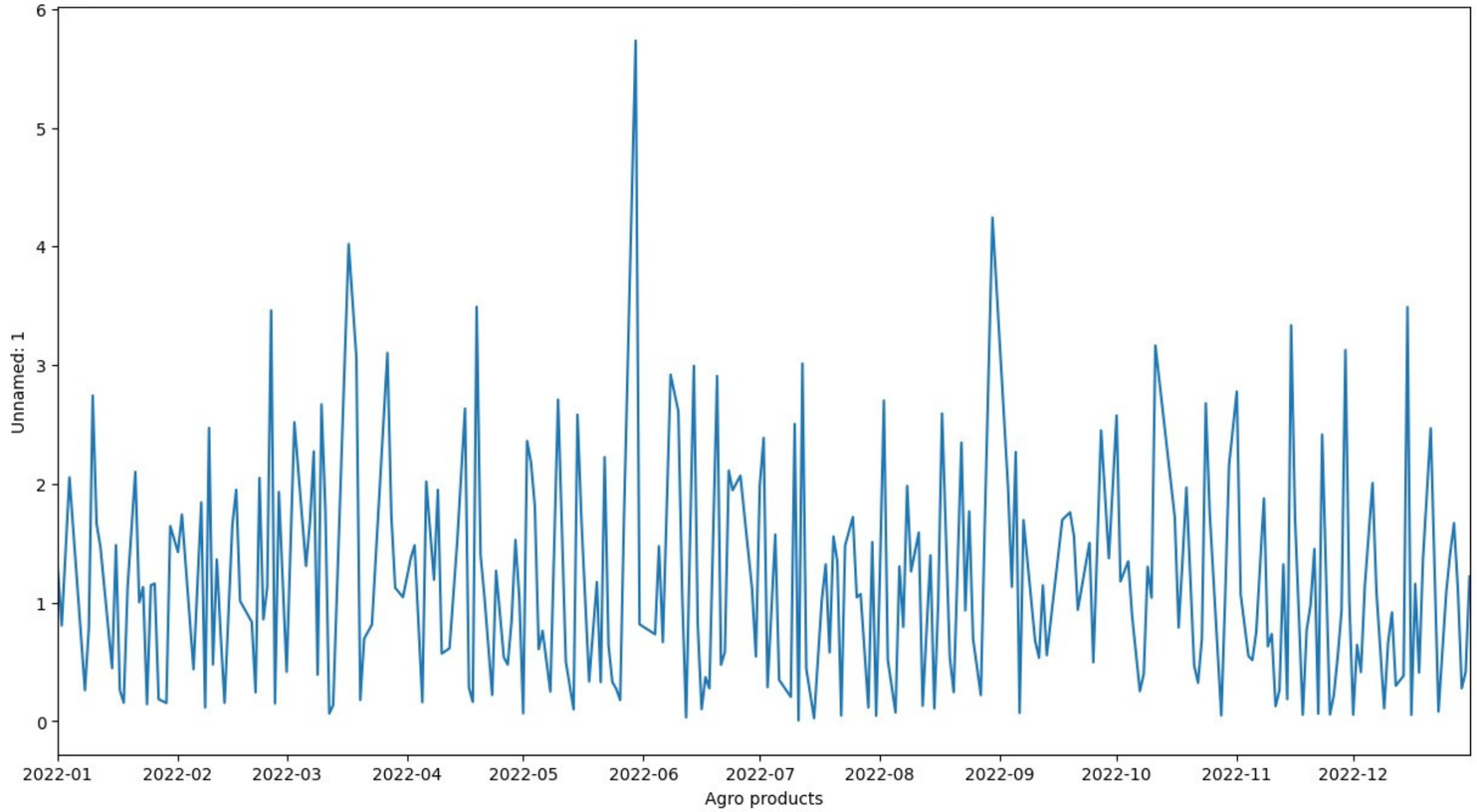

Autocorrelation
0.2
0.1
0.0
−0.1
−0.2
0
5
10
15
20
25
30
35
40
Lag

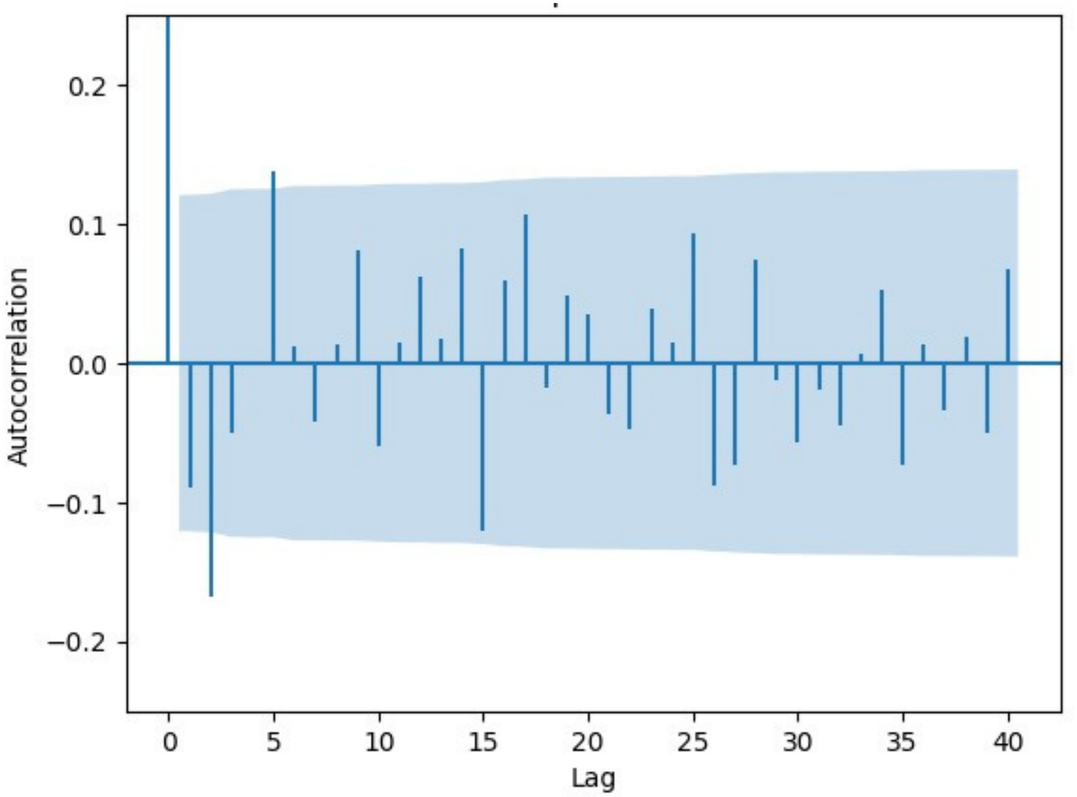
2021


QTY.(KGS)
4
3
2
1
0
2021-01
2021-02
2021-03
2021-04
2021-05
2021-06
2021-07
2021-08
2021-09
2021-10
2021-11
2021-12
Sail Date.


Autocorrelation
0.2
0.1
0.0
−0.1
−0.2
0
5
10
15
20
25
30
35
40
Lag

2022

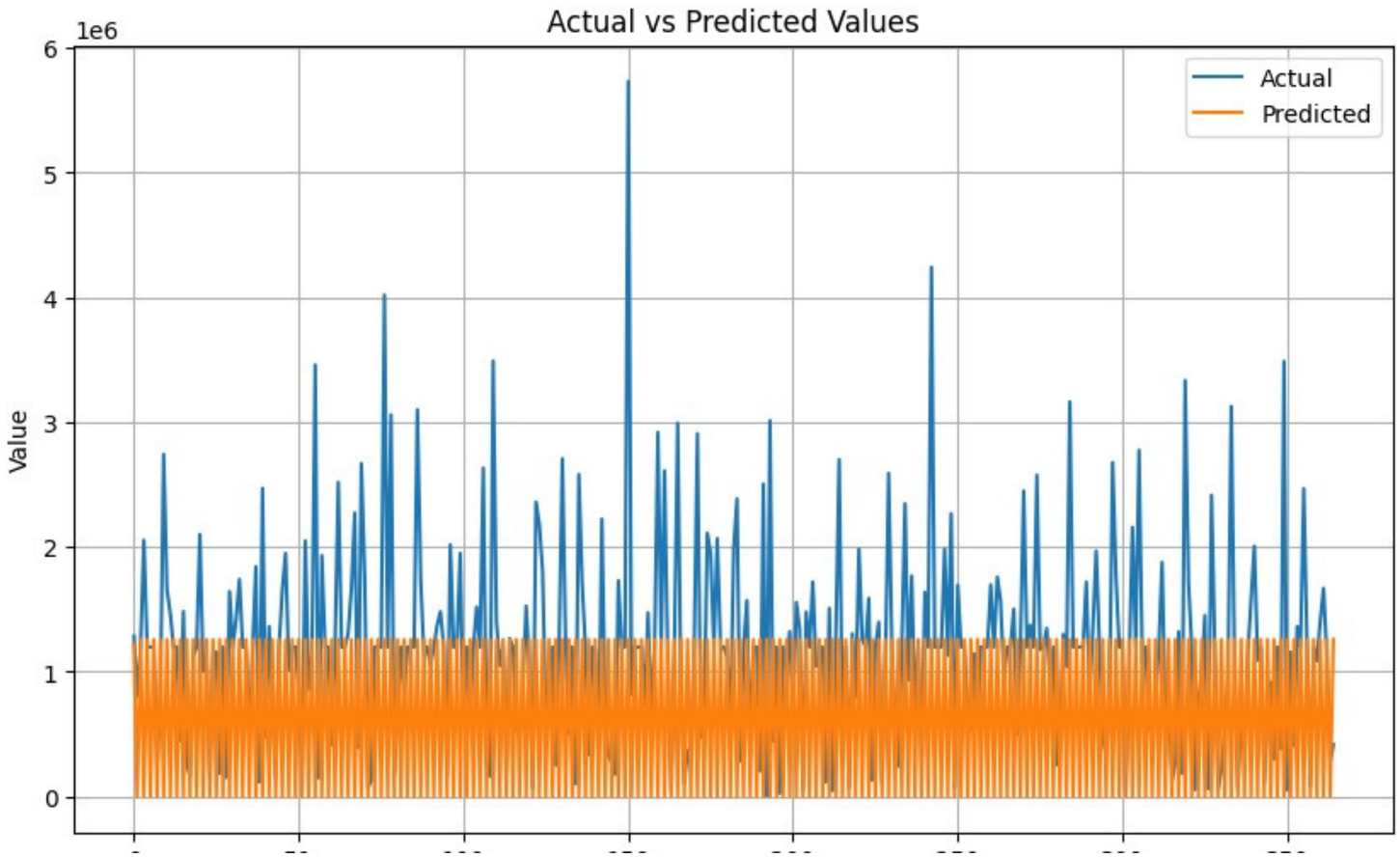

Unnamed: 1
Agro products
2022-01
2022-02
2022-03
2022-04
2022-05
2022-06
2022-07
2022-08
2022-09
2022-10
2022-11
2022-12
0
1
2
3
4
5
6


Autocorrelation
Lag
0.2
0.1
0.0
−0.1
−0.2
0
5
10
15
20
25
30
35
40

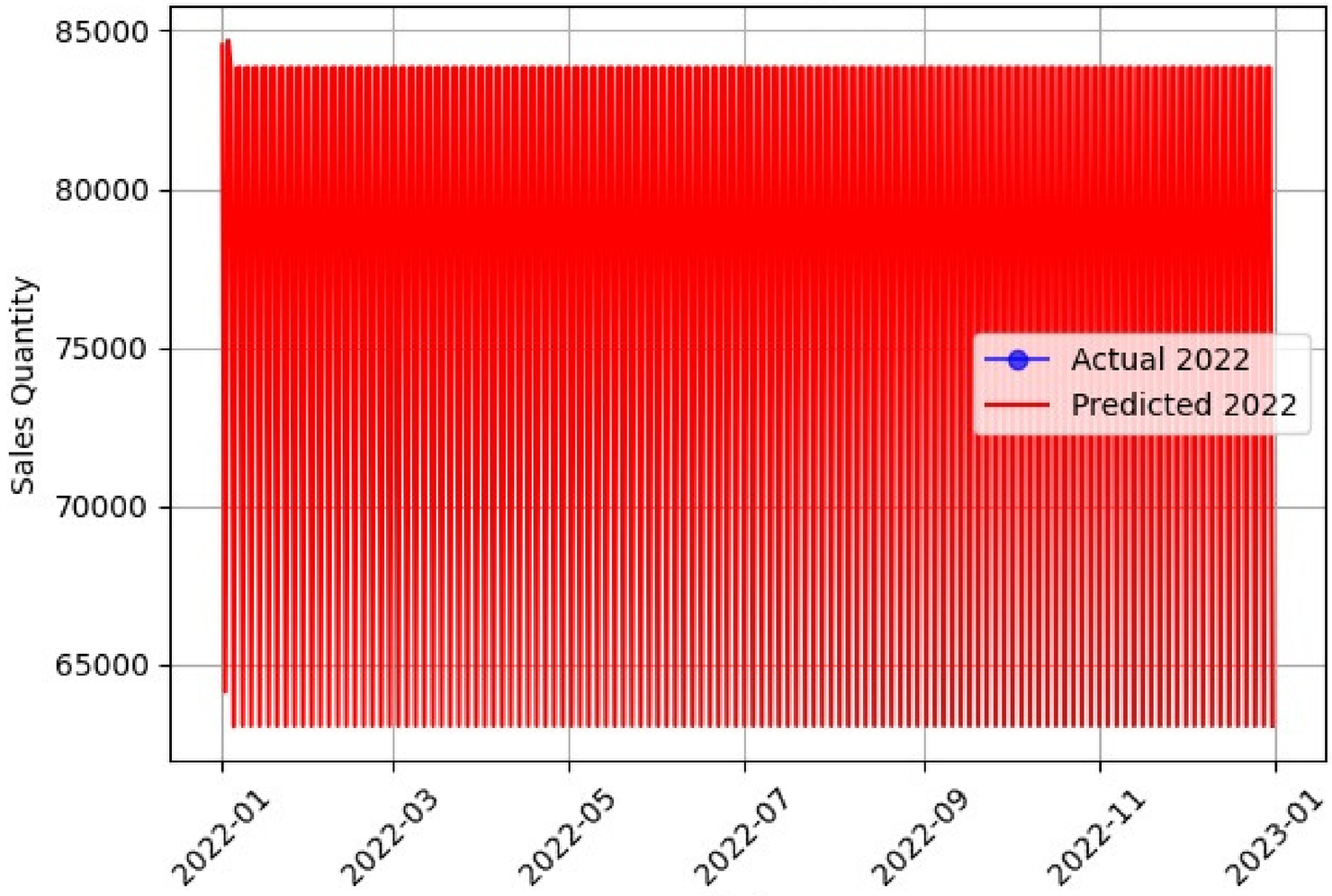
Model evaluation on 2022 data: Results

using 2018-2021 data

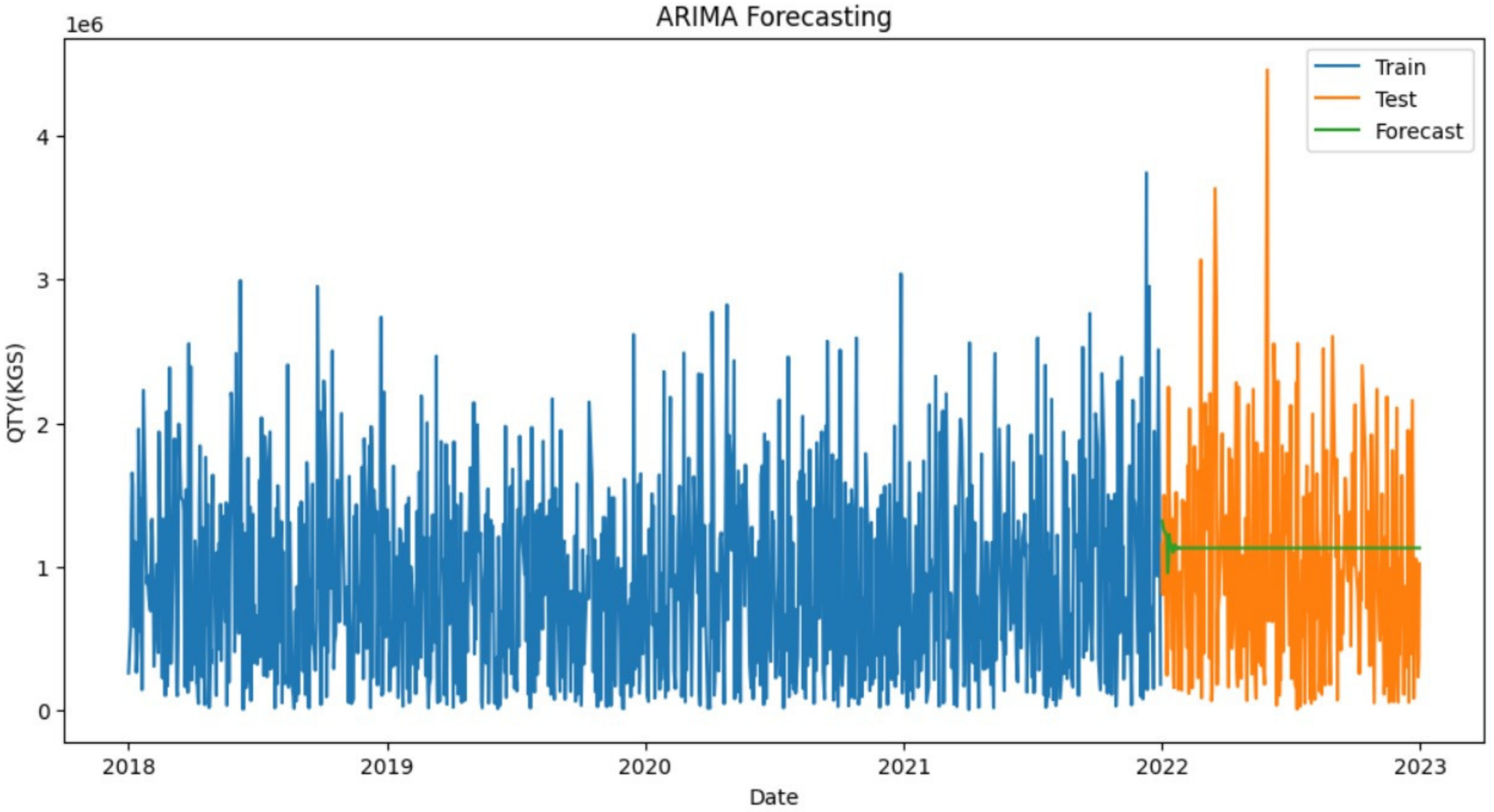
Gated Recurrent Unit (GRU)



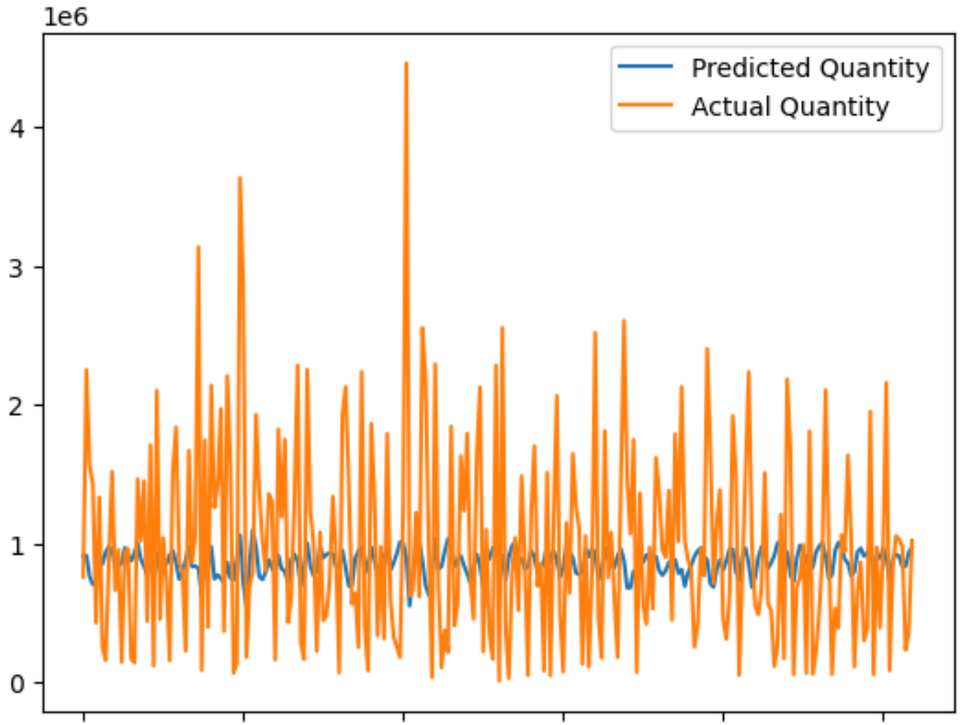
Recurrent Neural Network (RNN)

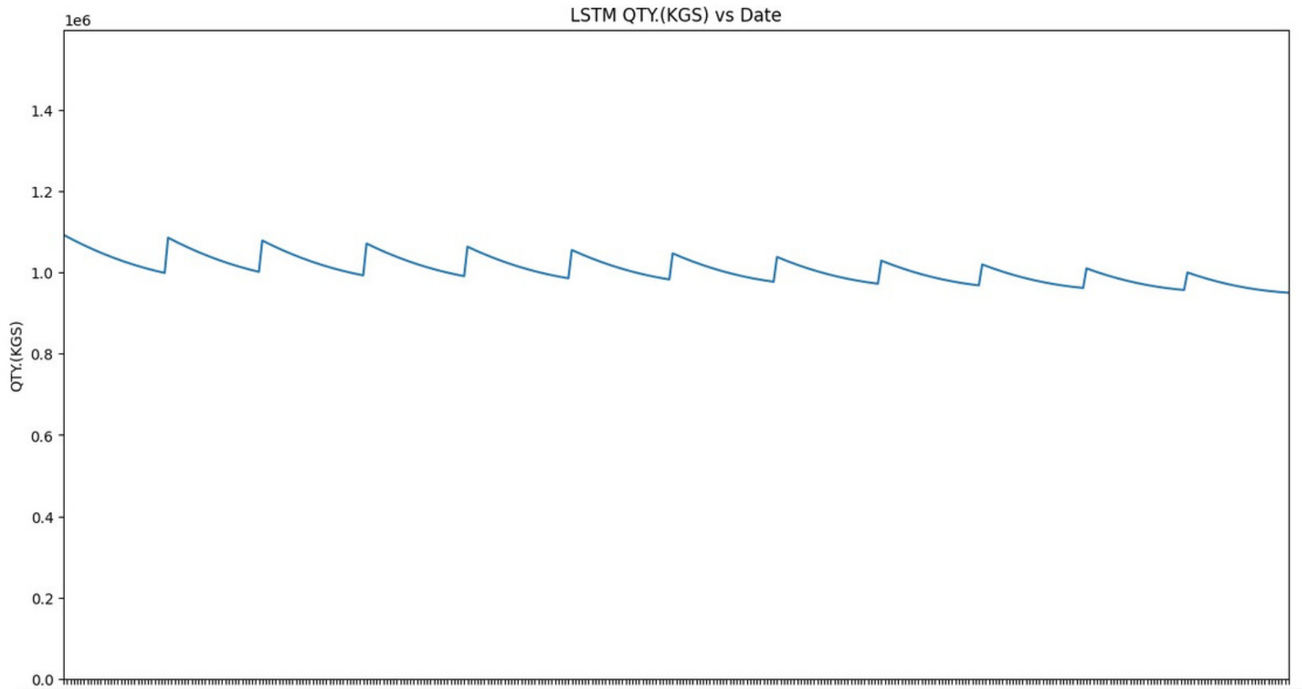


ARIMA

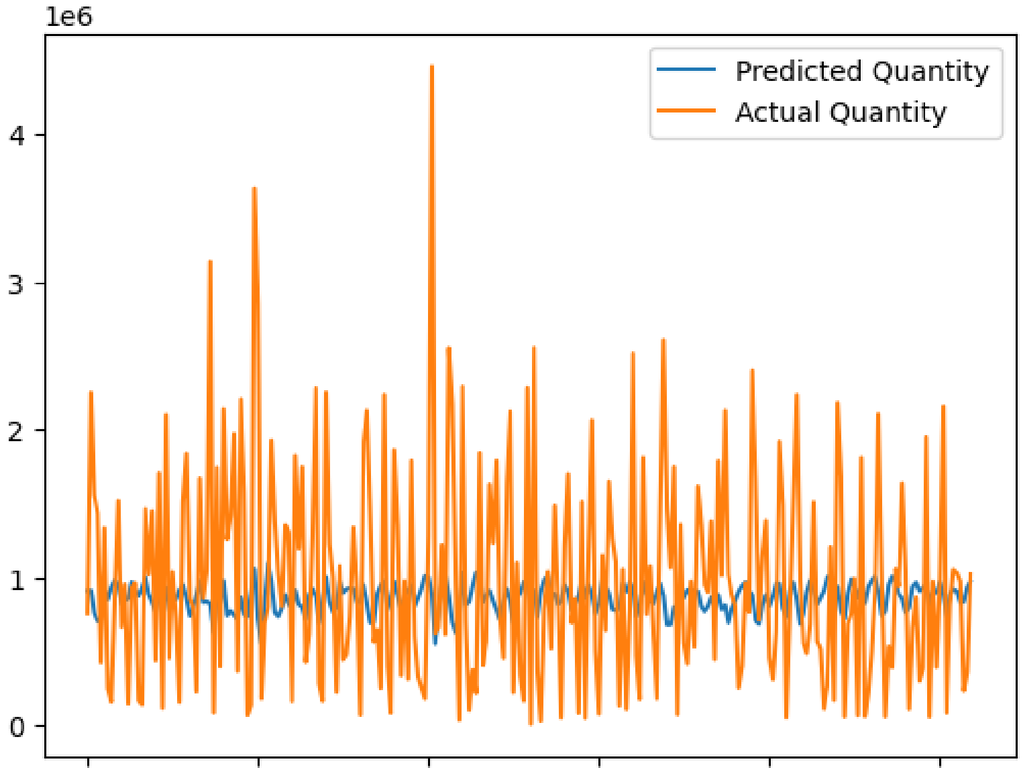

ARIMA Forecasting
1e6
Train
Test
Forecast
QTY(KGS)
0
1
2
3
4
2018
2019
2020
2021
2022
2023
Date

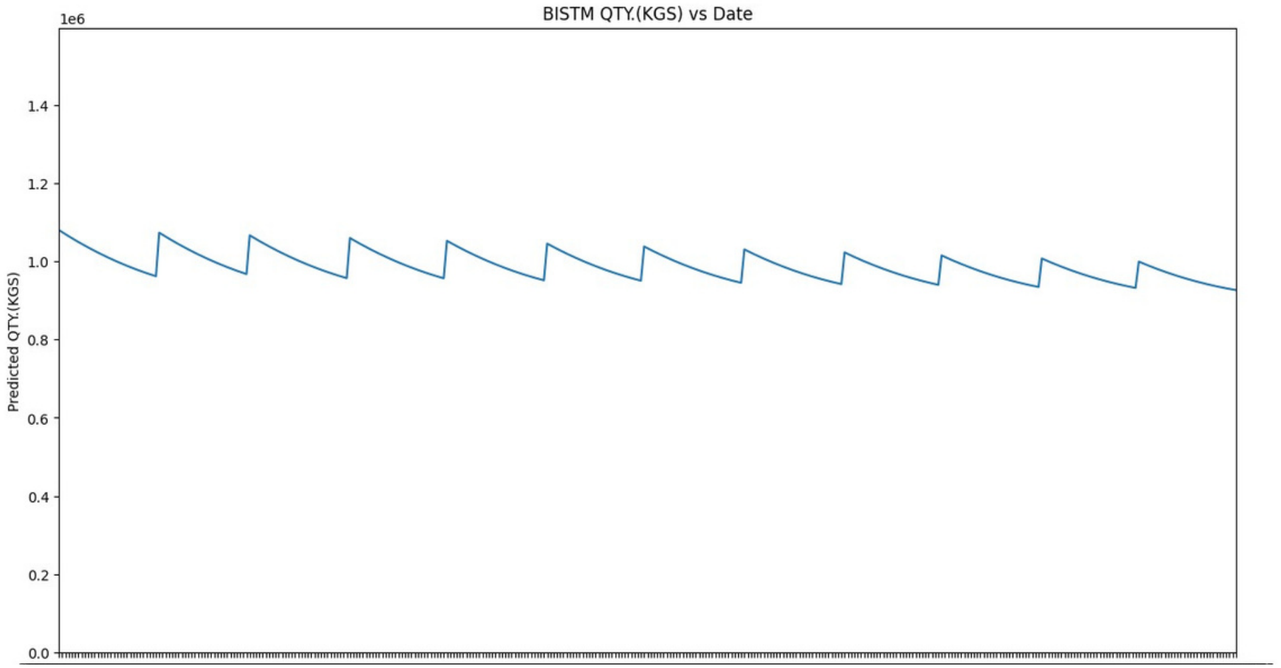
LSTM model


1e6
Predicted Quantity
Actual Quantity
4
3
2
1
0

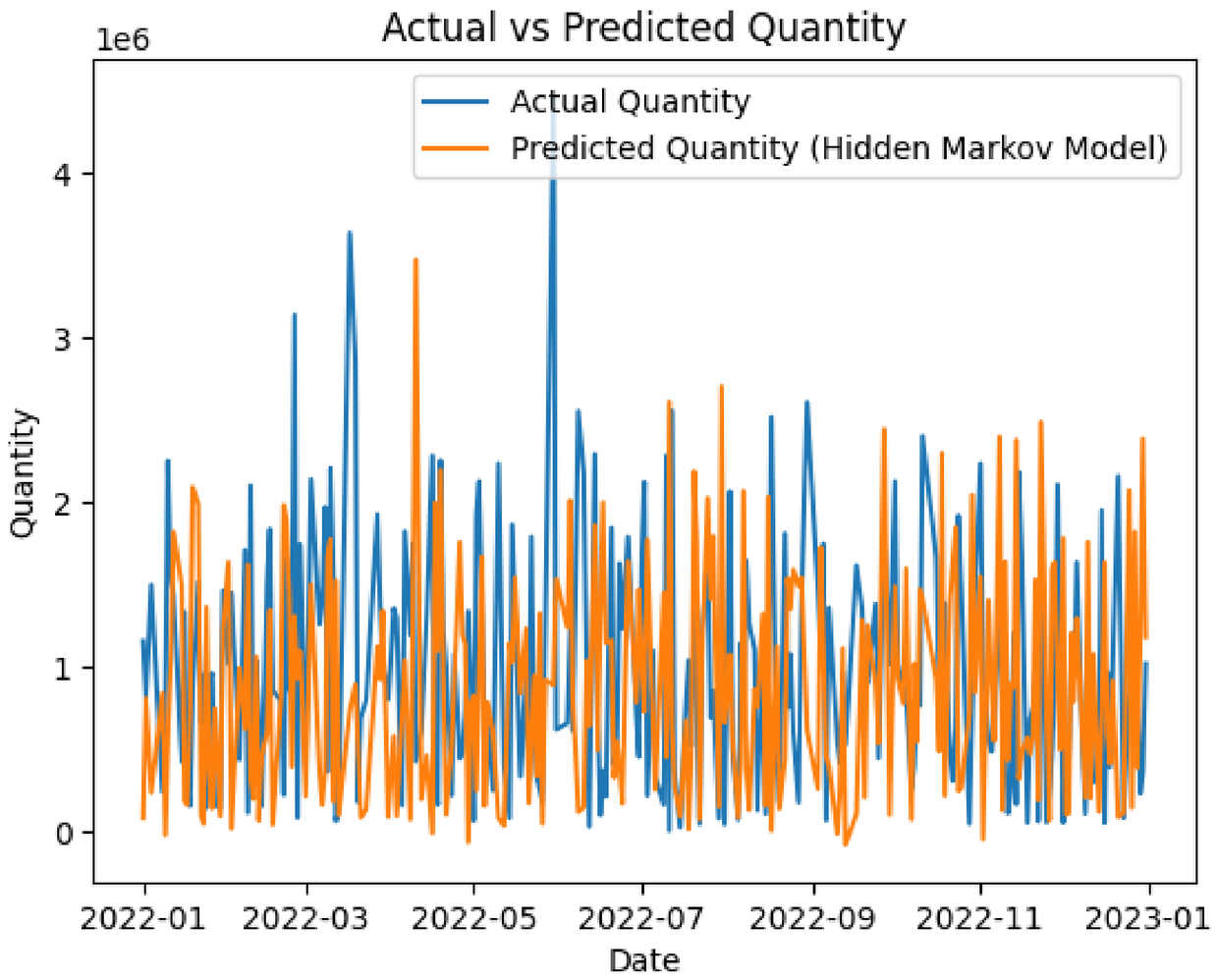

LSTM QTY.(KGS) vs Date
1e6
QTY.(KGS)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

BiLSTM model





Hidden Markov Model



Augmented Dickey-Fuller Test

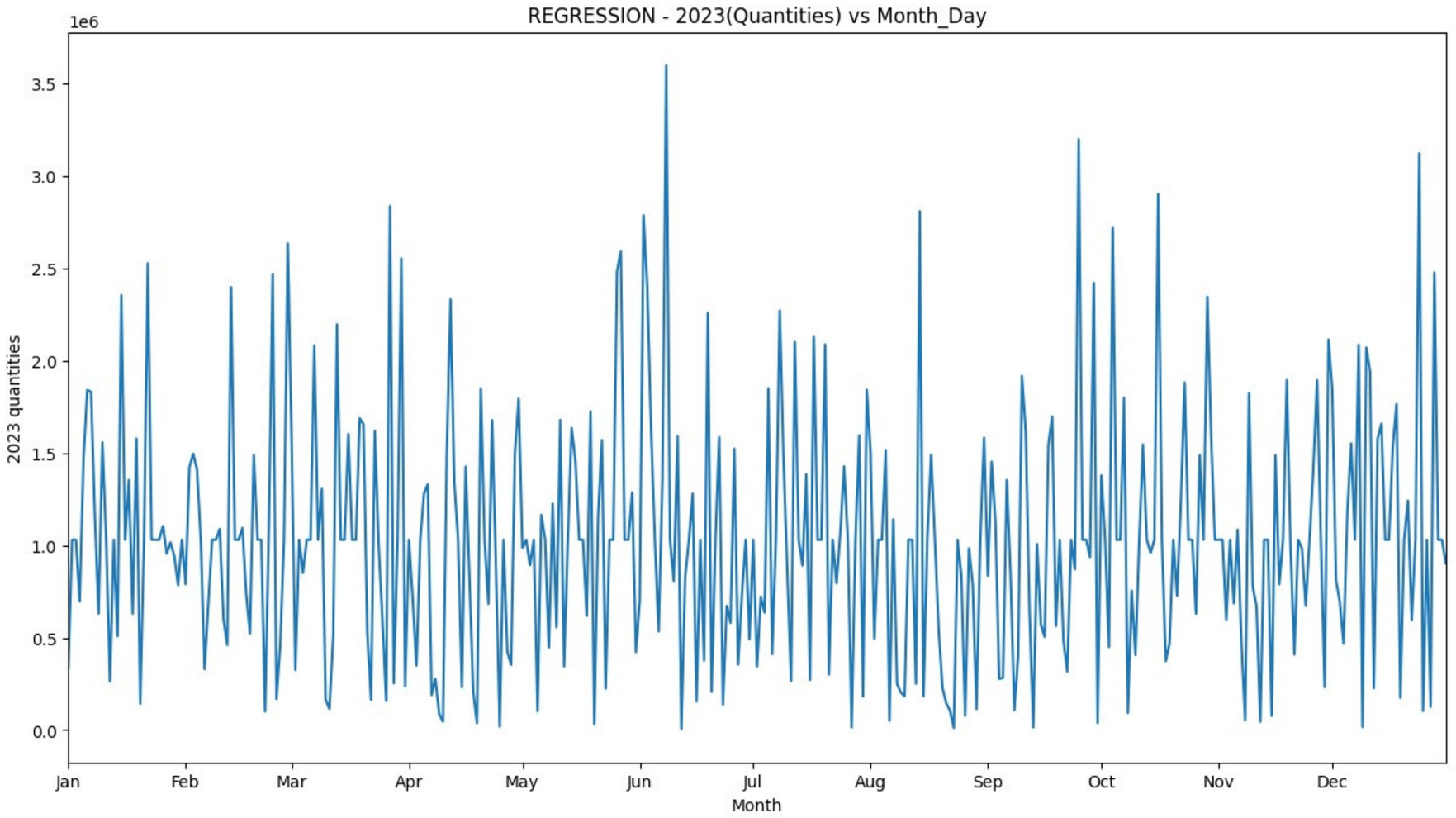
ADF Test Statistic: -8.5703708716011
p-value: 8.228727147964481e-14
#Lags Used: 11
Number of Observations: 1326
Strong evidence against the null hypothesis(Ho), reject the null hypothesis.
Data is stationary

Modeling 2023 data

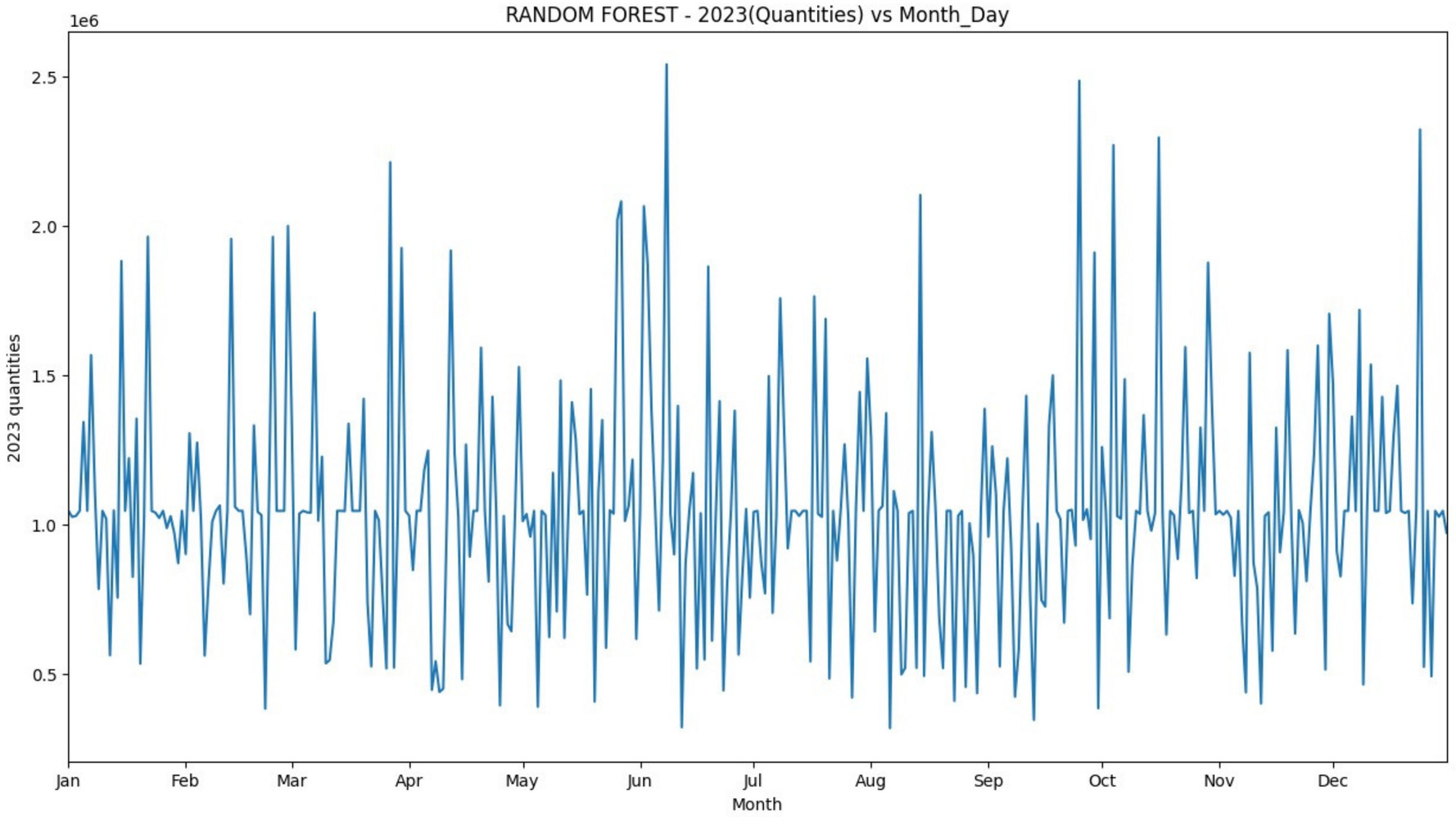
using 2018-2022 data

Subject to change under addition 2015-2017 datasets

Regression


REGRESSION - 2023(Quantities) vs Month_Day
1e6
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2023 quantities
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

Random Forest

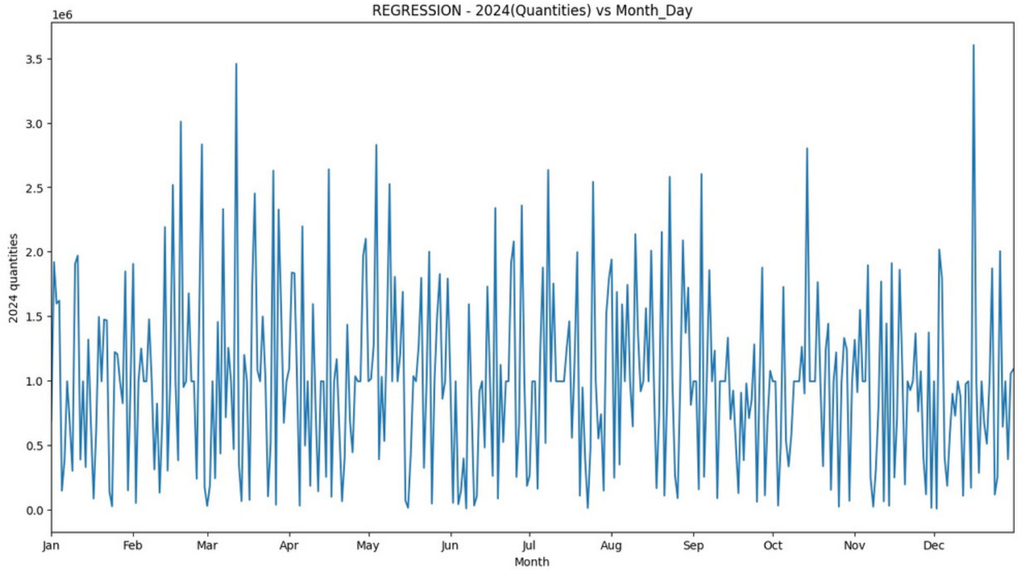


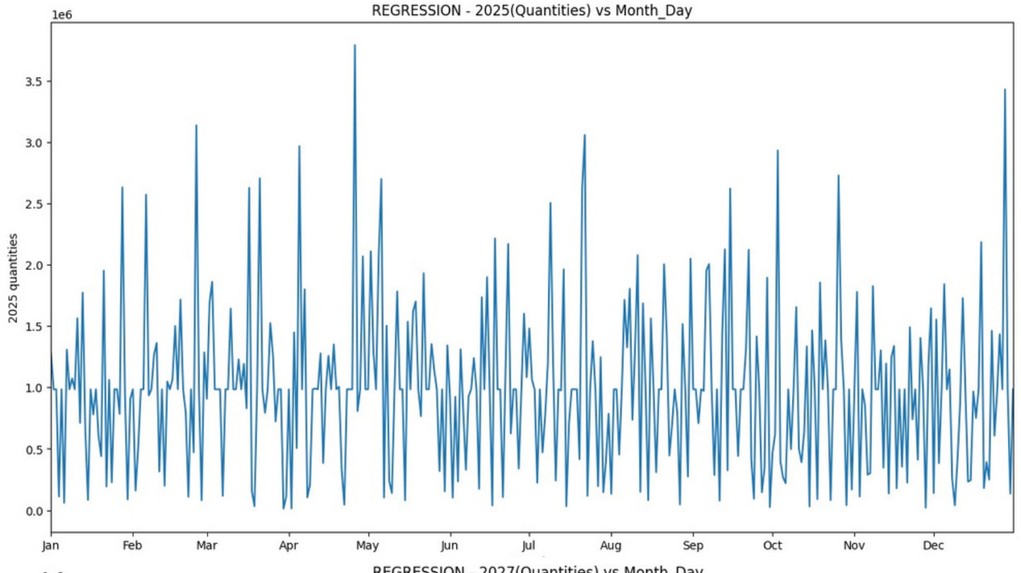
Forecasting 2024-2027

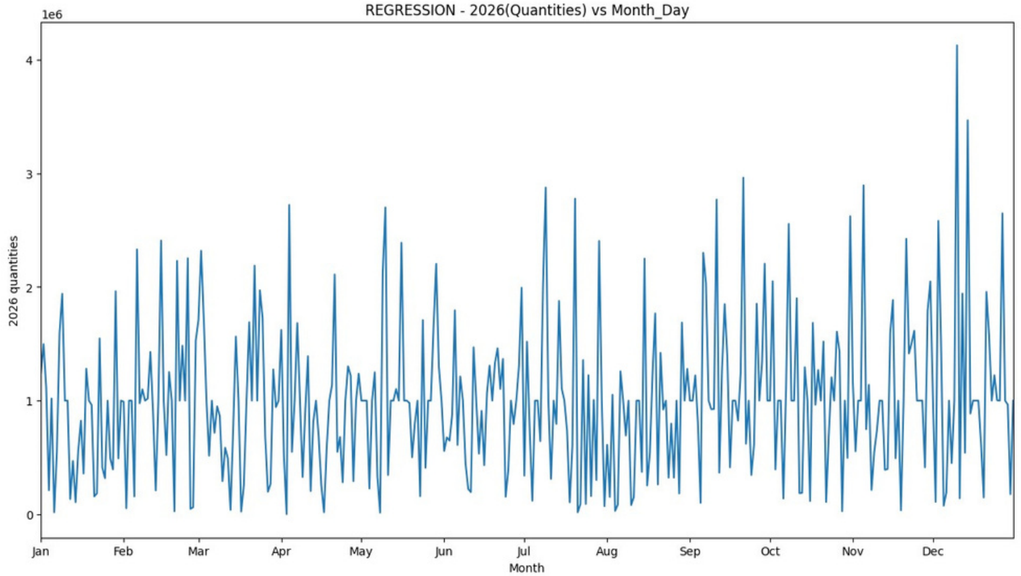
using 2018-2022 data

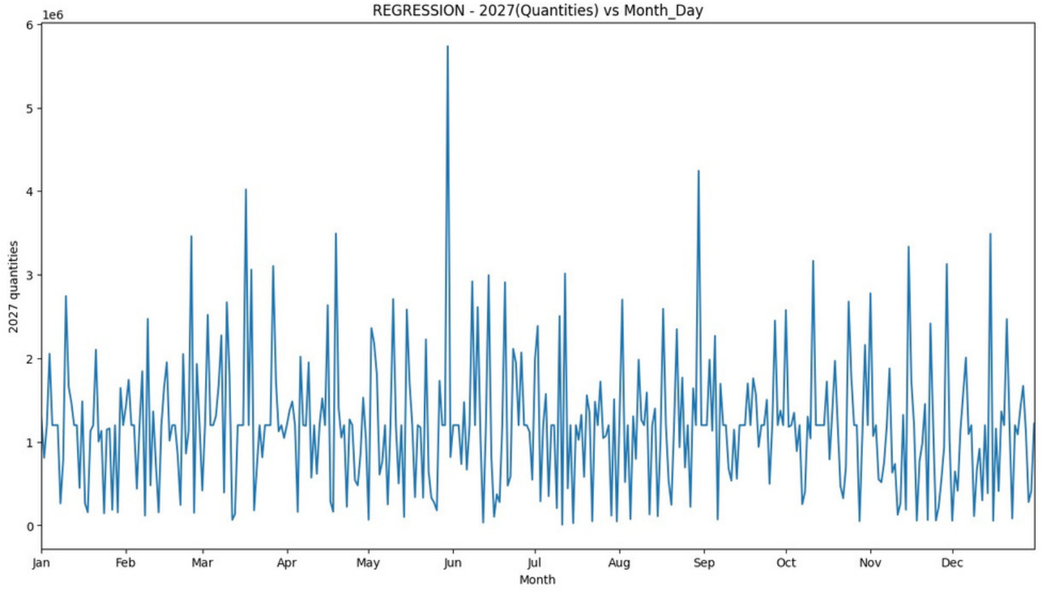
Subject to change under the additional 2015-2017 and 2023 datasets

Regression

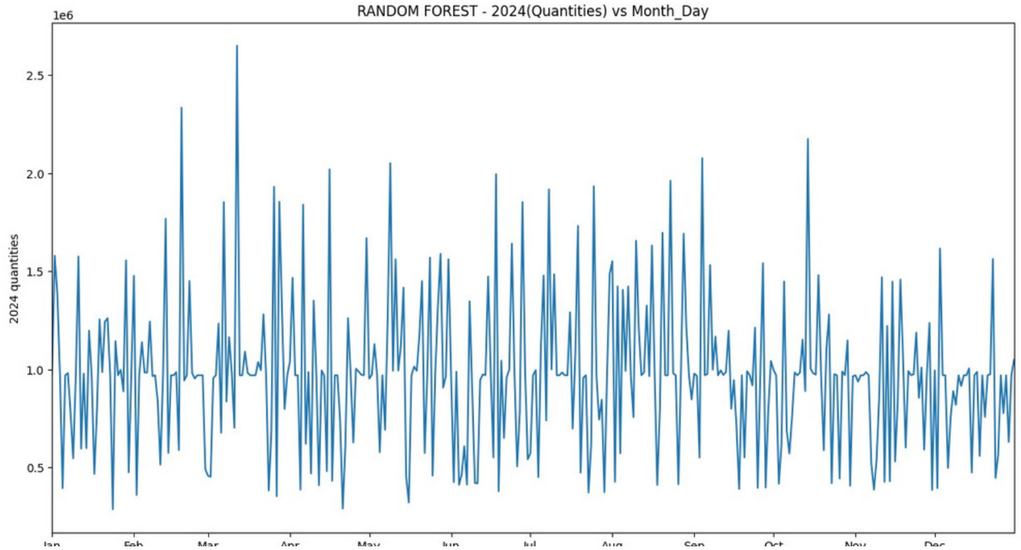

REGRESSION - 2024(Quantities) vs Month_Day
1e6
2024 quantities
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

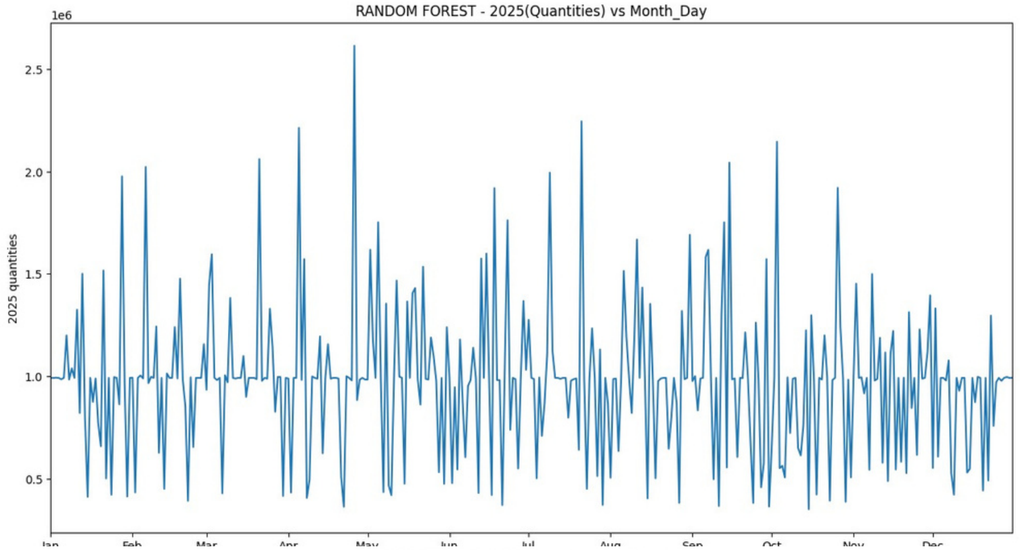

REGRESSION - 2025(Quantities) vs Month_Day
1e6
2025 quantities
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

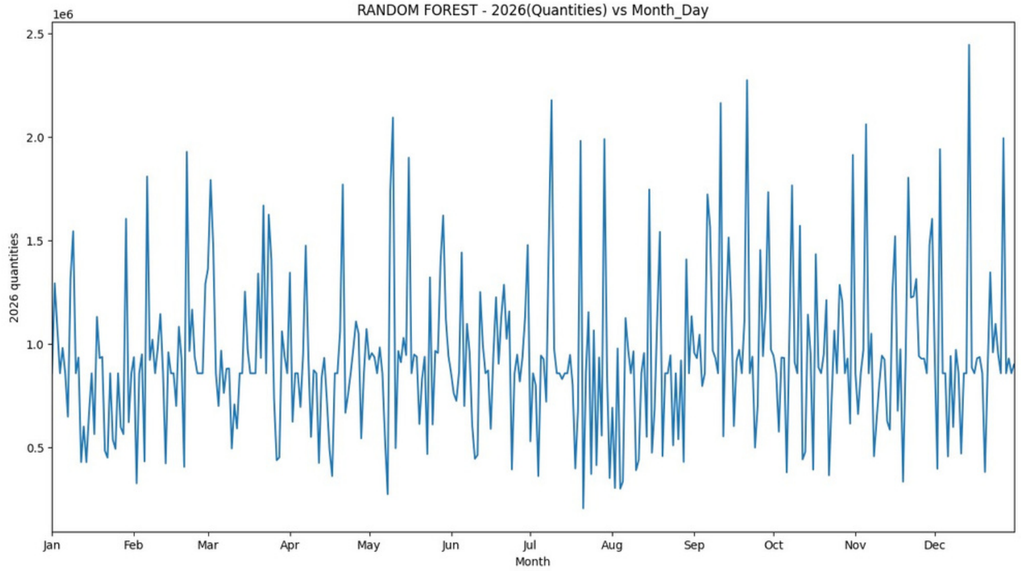

REGRESSION - 2026(Quantities) vs Month_Day
1e6
2026 quantities
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

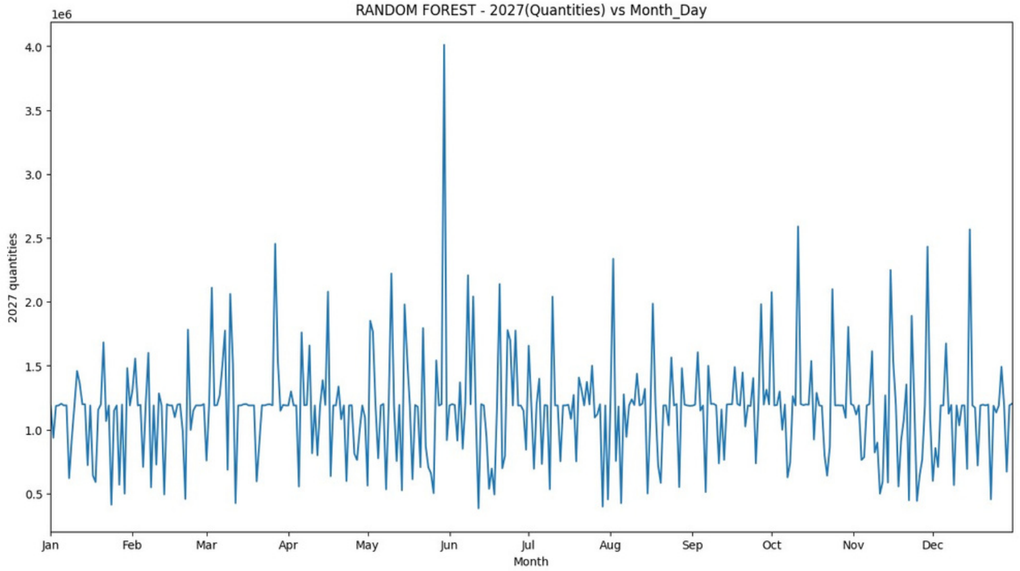

REGRESSION - 2027(Quantities) vs Month_Day
1e6
2027 quantities
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Random Forest









Summary of techniques used

1. GRU
2. RNN
3. ARIMA
4. Hidden Markov
5. LSTM
6. BiLSTM
7. Random Forest
8. Regression
9. Augmented Dickey-Fuller test

Techniques to look out for

1. SVM
2. SARIMA
3. Prophet
4. NeuralProphet (Facebook)
5. LightGBM
6. XGBoost
7. NGBoost
8. CatBoost
9. Vector Autoregression