Seasonal Naïve

Introduction

Apply a Seasonal Naïve Model to forecast benzene concentration levels for the next 25 days.

Create Seasonal Naïve Model

```
##
## Forecast method: Seasonal naive method
##
## Model Information:
## Call: snaive(y = df, h = forecast_horizon)
##
## Residual sd: 5.0993
##
## Error measures:
##                        ME     RMSE      MAE       MPE     MAPE MASE      ACF1
## Training set -0.05694091 5.099325 3.767019 -17.54513 46.60928    1 0.6092231
##
## Forecasts:
##          Point Forecast         Lo 80    Hi 80        Lo 95    Hi 95
## 53.28571      11.404065  4.8690166476 17.93911   1.40957093 21.39856
## 53.42857       6.362130 -0.1729189276 12.89718  -3.63236465 16.35662
## 53.57143       3.868054 -2.6669949581 10.40310  -6.12644068 13.86255
## 53.71429       5.132276 -1.4027720947 11.66732  -4.86221781 15.12677
## 53.85714      10.267807  3.7327582143 16.80286   0.27331249 20.26230
## 54.00000      11.318509  4.7834604740 17.85356   1.32401475 21.31300
## 54.14286       9.930469  3.3954200977 16.46552  -0.06402562 19.92496
## 54.28571      11.404065  2.1621109174 20.64602  -2.73028414 25.53841
## 54.42857       6.362130 -2.8798246578 15.60408  -7.77221971 20.49648
## 54.57143       3.868054 -5.3739006883 13.11001 -10.26629574 18.00240
## 54.71429       5.132276 -4.1096778249 14.37423  -9.00207288 19.26663
## 54.85714      10.267807  1.0258524841 19.50976  -3.86654257 24.40216
## 55.00000      11.318509  2.0765547438 20.56046  -2.81584031 25.45286
## 55.14286       9.930469  0.6885143675 19.17242  -4.20388069 24.06482
## 55.28571      11.404065  0.0850290967 22.72310  -5.90690666 28.71504
## 55.42857       6.362130 -4.9569064785 17.68117 -10.94884223 23.67310
## 55.57143       3.868054 -7.4509825090 15.18709 -13.44291826 21.17903
## 55.71429       5.132276 -6.1867596456 16.45131 -12.17869540 22.44325
## 55.85714      10.267807 -1.0512293366 21.58684  -7.04316509 27.57878
## 56.00000      11.318509 -0.0005270768 22.63755  -5.99246283 28.62948
## 56.14286       9.930469 -1.3885674532 21.24950  -7.38050321 27.24144
## 56.28571      11.404065 -1.6660318783 24.47416  -8.58492332 31.39305
## 56.42857       6.362130 -6.7079674535 19.43223 -13.62685889 26.35112
```

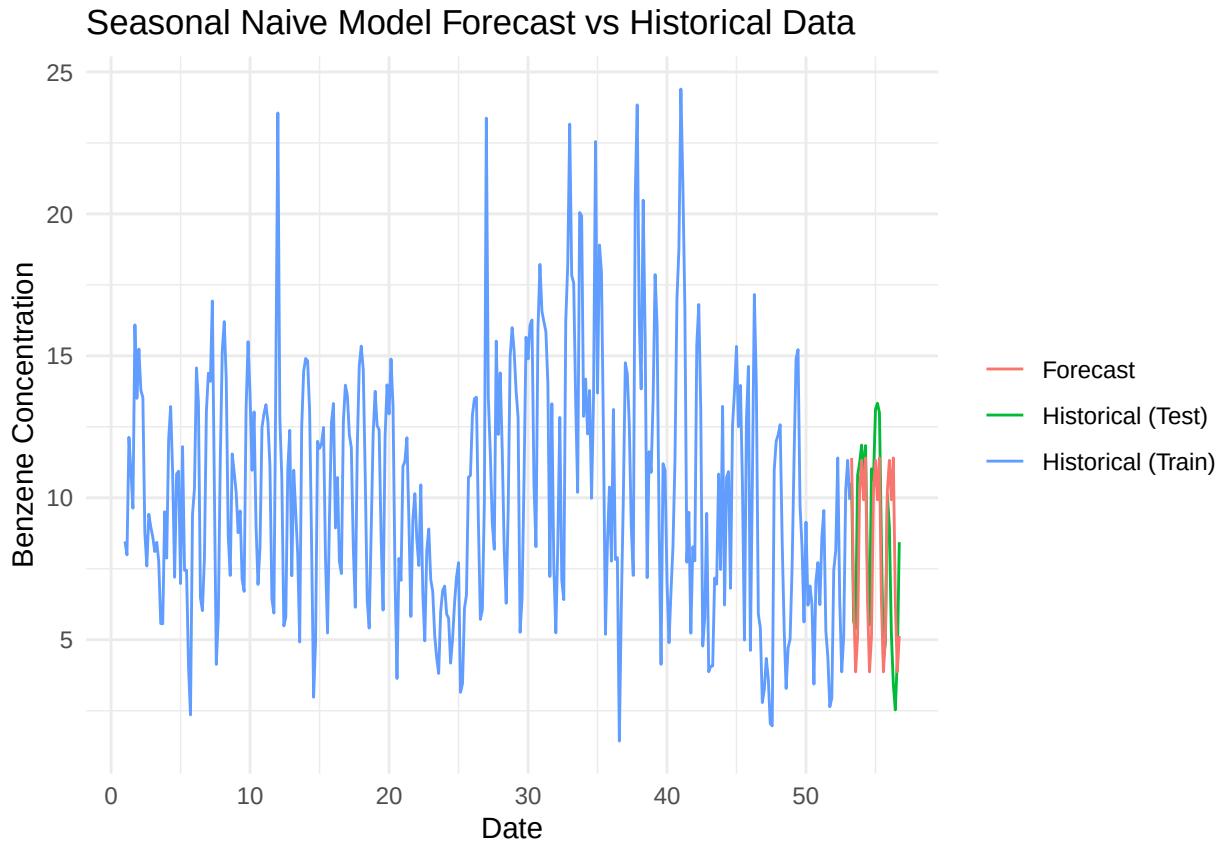
```
## 56.57143       3.868054 -9.2020434840 16.93815 -16.12093492 23.85704
## 56.71429       5.132276 -7.9378206206 18.20237 -14.85671206 25.12126
```

Forecast the Next 25 Days (Test Dataset Length)

```
model_1_forecast_values <- forecast_seasonal_naive(model_1_seasonal_naive, forecast_horizon = nrow(ts_t
```

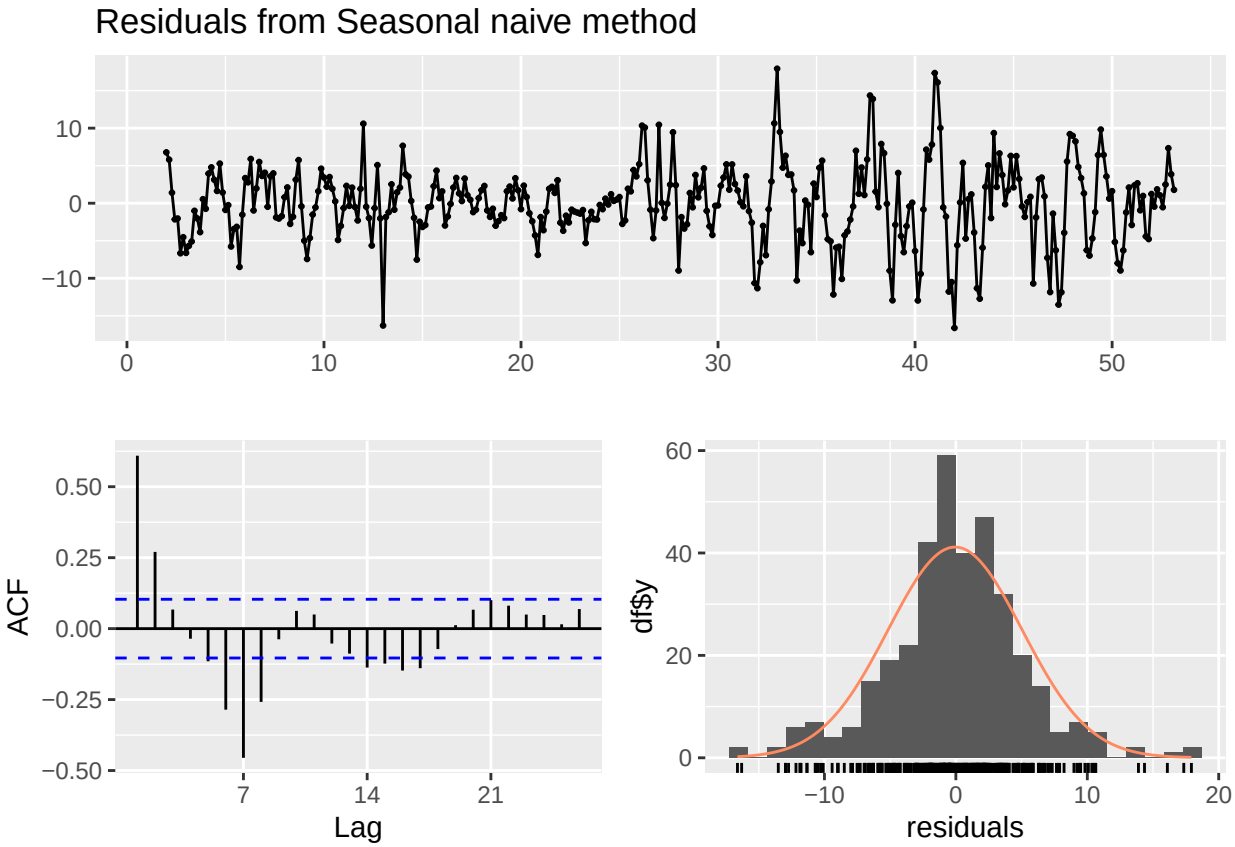
Plot Forecast vs Historical Data

```
plot_seasonal_naive_forecast(model_1_seasonal_naive$mean, ts_train_data, ts_test_data)
```



Model Residuals

```
checkresiduals(model_1_seasonal_naive)
```



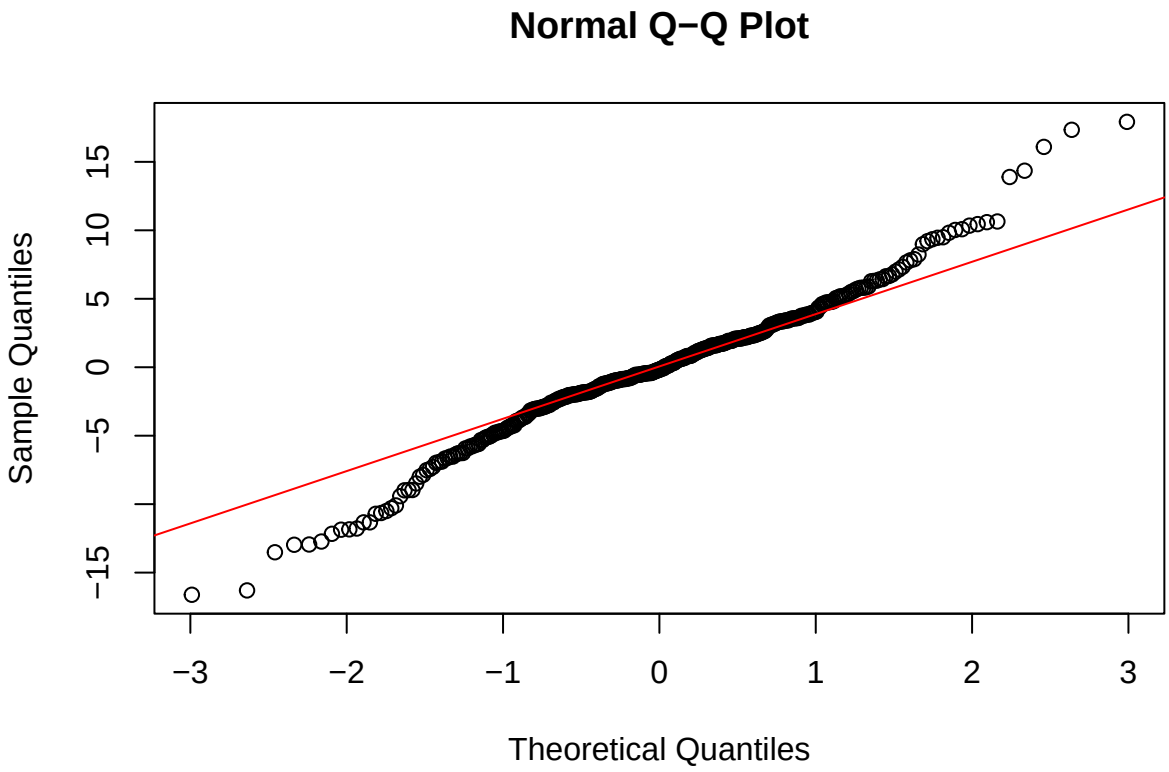

```
##
##  Ljung-Box test
##
## data:  Residuals from Seasonal naive method
## Q* = 312.53, df = 14, p-value < 2.2e-16
##
## Model df: 0.   Total lags used: 14
```

Model Residuals Test

```
seasonal_naive_residuals <- residuals(model_1_seasonal_naive)
residuals_test(seasonal_naive_residuals)
```

```
##
##  Box-Ljung test
##
## data:  residuals
## X-squared = 274.02, df = 7, p-value < 2.2e-16
##
##
##  Shapiro-Wilk normality test
##
```

```
## data:  residuals
## W = 0.97851, p-value = 3.445e-05
```



Evaluation Metrics

```
evaluation_metrics(as.numeric(ts_test_data), model_1_forecast_values$mean)
```

```
## [1] "MRE: 0.347818863371023"
## [1] "MAE: 2.10826864515093"
## [1] "MSE: 8.60409628764969"
## [1] "RMSE: 2.93327398782481"
```