

Date: 221/Mar/2024	REGRESSION AND FORECASTING ON WEATHER DATA
EXPERIMENT – 08	

AIM: To perform regression and forecasting on weather data

SOFTWARE REQUIRED: RStudio

R CODE:

```
rm(list=ls())
a <- read.csv('weatherHistory2016.csv')
mlr=

lm(Temperature..C.~Apparent.Temperature..C.+Humidity+Wind.Speed..k
m.h.,a)
summary(mlr)
qqnorm(mlr$resid)
data <- ts(a$Temperature..C., start=as.Date("2016-01-01"),
end=as.Date("2016-12-31"), frequency=24)
frequency(data)
summary(data)
plot(data)
plot(aggregate(data,FUN=mean))
boxplot(data~cycle(data))
library(forecast)
acf(data)
fit<- auto.arima(data)
accuracy(fit)
newdata<- forecast(fit, 240)
plot(newdata)
```

OUTPUT:

```
Console Terminal x Background Jobs x
R 4.3.3 . /cloud/project/
> rm(list=ls())
> a <- read.csv('weatherHistory2016.csv')
> mlr=
+ lm(Temperature..C.~Apparent.Temperature..C.+Humidity+Wind.Speed..km.h.,a)
> summary(mlr)

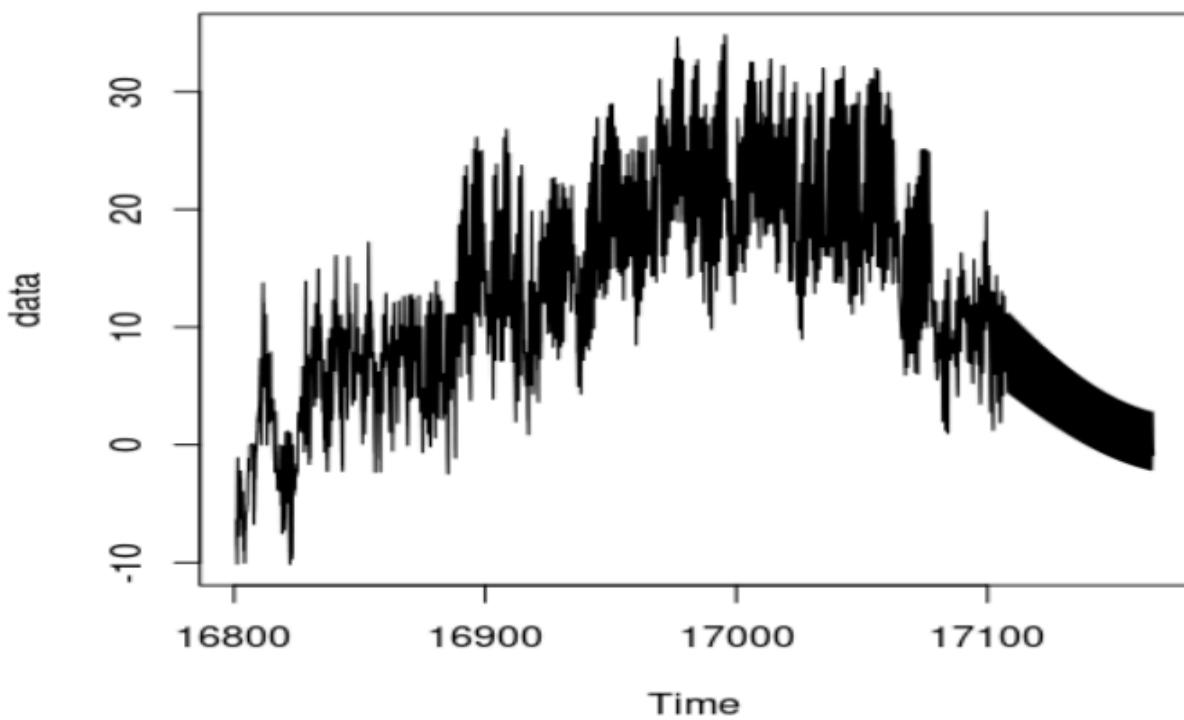
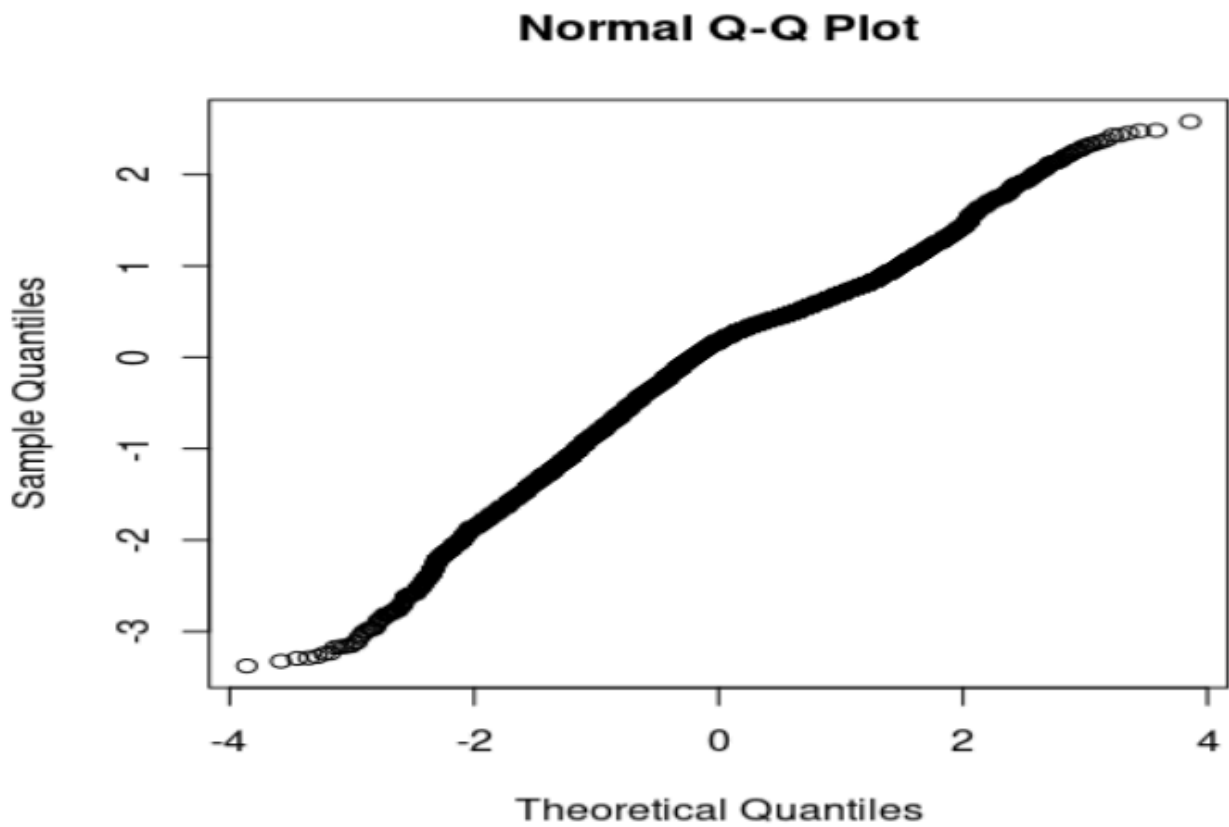
Call:
lm(formula = Temperature..C. ~ Apparent.Temperature..C. + Humidity +
    Wind.Speed..km.h., data = a)

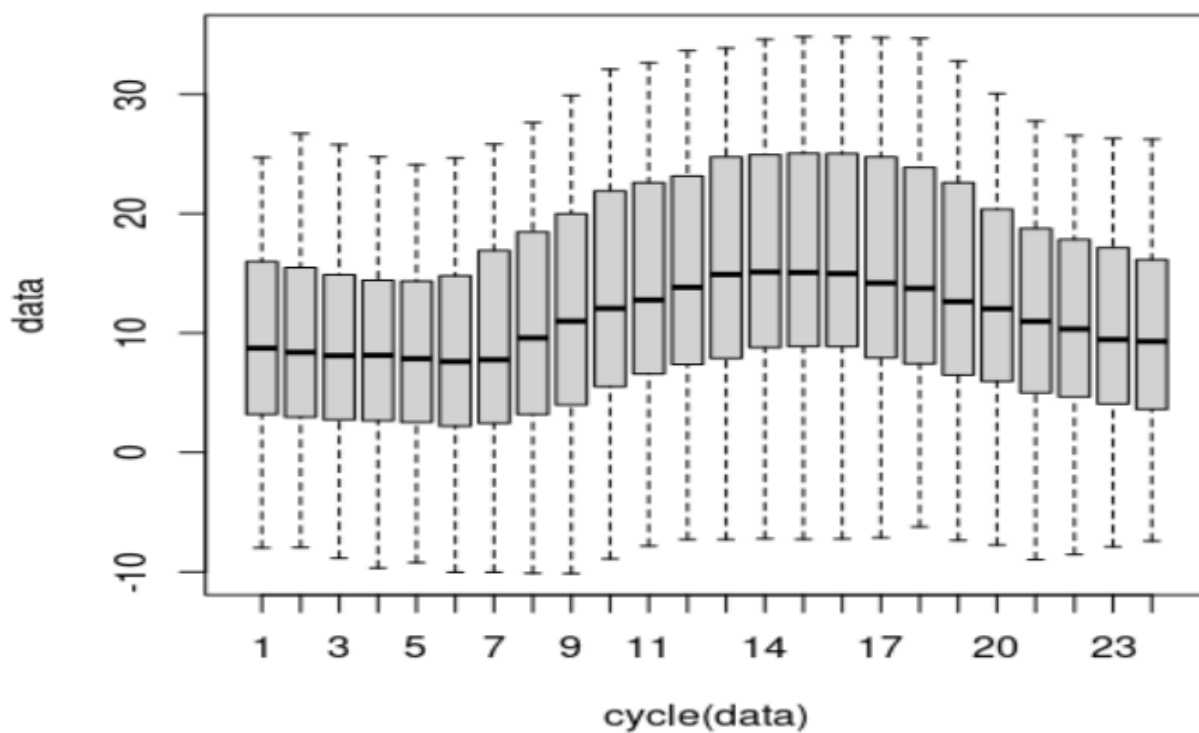
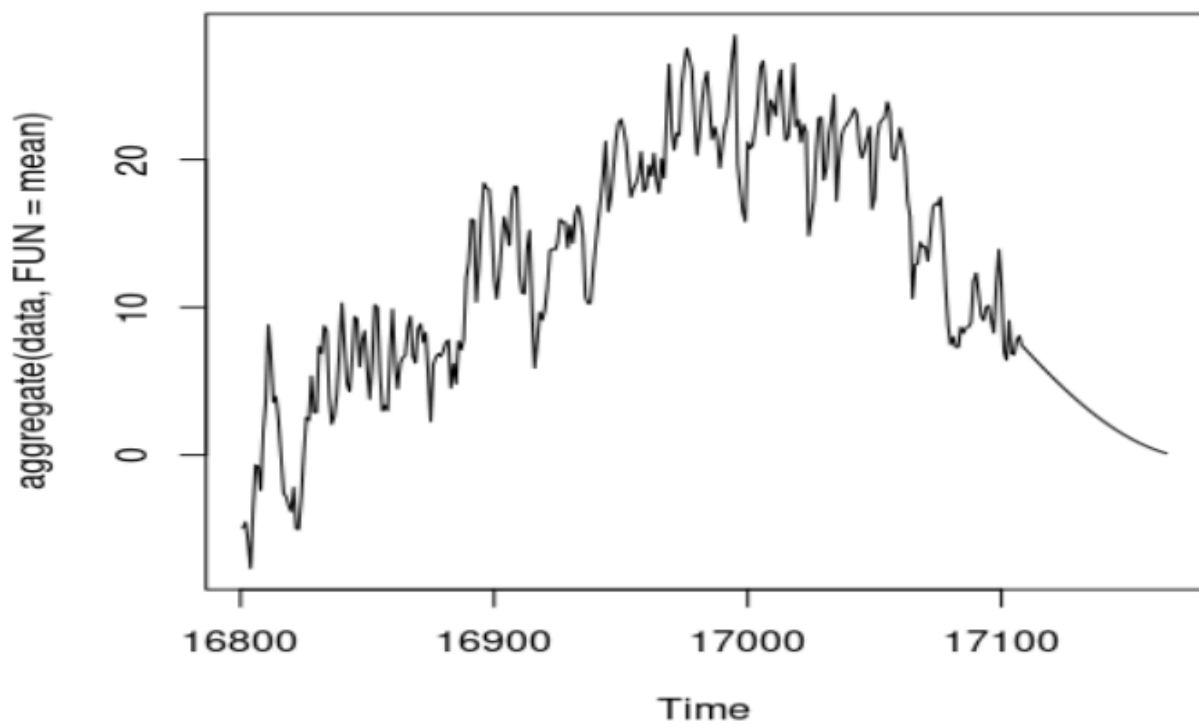
Residuals:
    Min       1Q   Median       3Q      Max
-3.3766 -0.4811  0.1755  0.5217  2.5771

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   3.216921   0.066288   48.53  <2e-16 ***
Apparent.Temperature..C. 0.863081   0.001148  751.63  <2e-16 ***
Humidity      -1.521075   0.065469  -23.23  <2e-16 ***
Wind.Speed..km.h.  0.053840   0.001501   35.86  <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

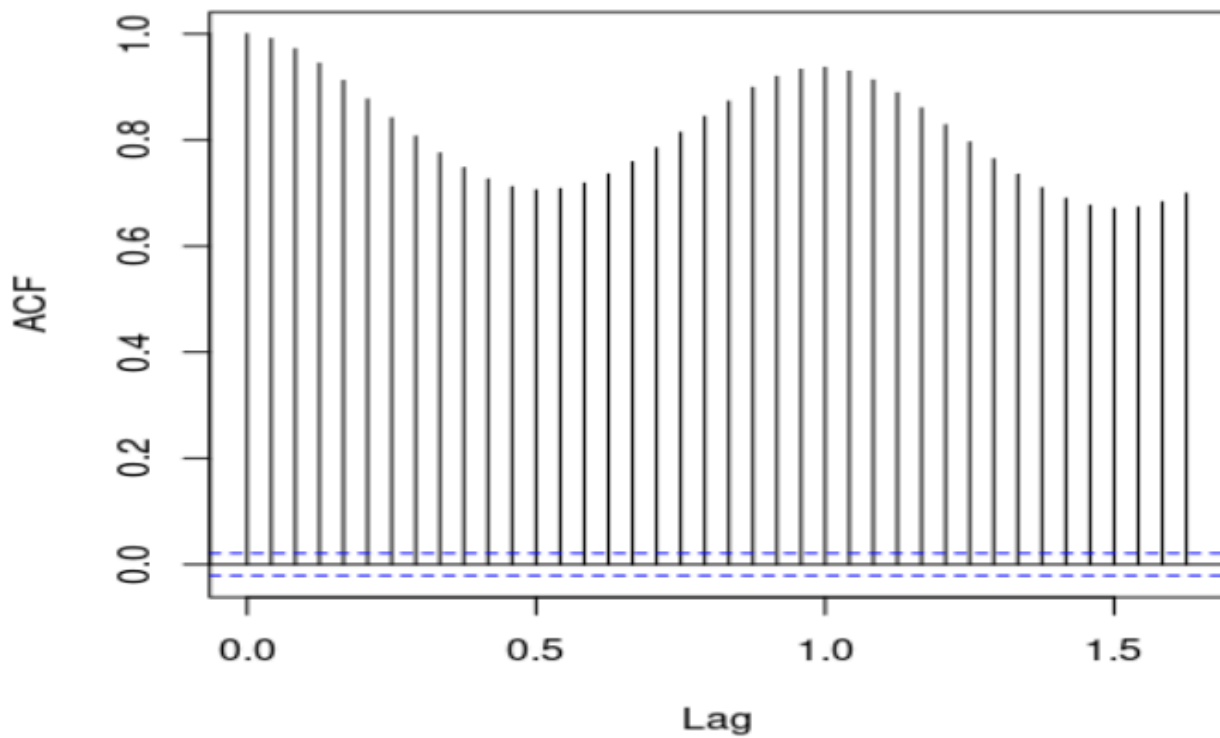
Residual standard error: 0.8203 on 8780 degrees of freedom
Multiple R-squared:  0.9918,    Adjusted R-squared:  0.9917
F-statistic: 3.519e+05 on 3 and 8780 DF,  p-value: < 2.2e-16

> qqnorm(mlr$resid)
> data <- ts(a$Temperature..C., start=as.Date("2016-01-01"), end=as.Date("2016-12-31"), frequency=24)
> frequency(data)
[1] 24
> summary(data)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
-10.133  4.839  11.111  12.016  18.811  34.811
> plot(data)
> plot(aggregate(data,FUN=mean))
> boxplot(data~cycle(data))
> library(forecast)
> acf(data)
> fit<- auto.arima(data)
> accuracy(fit)
              ME      RMSE      MAE  MPE  MAPE      MASE      ACF1
Training set 0.001361921 0.8586029 0.5773431 NaN  Inf  0.2691404 5.272405e-05
> newdata<- forecast(fit, 240)
> plot(newdata)
>
```





Series data



Forecasts from ARIMA(4,0,0)(2,1,0)[24]

