intra_day_model5

2023-05-01

Load 5-minute comprehensive preprocessed data from 2 Feb 2014 - 3 Feb 2015

```
source("notebooks/intra_day/Functions.R")

## Load the data
alldata <- read.csv("data/intra_day/original2014.csv")
alldata$WtdTemp <- wtdtemp(alldata$DSTTime, alldata$Temp)

## Split into regression data and out of sample test data.
fitdata <- alldata[((0*288)+1):(250*288),]

head(fitdata)
```

```
##   DescDate  StandardTime DescTime DSTAscTime Region TradedPrice  Demand Temp
## 1 03-02-14 03-02-14 0:05     0:00       1:00   NSW1    49.49018 7135.67 22.4
## 2 03-02-14 03-02-14 0:10     0:05       1:05   NSW1    49.44007 7154.87 22.5
## 3 03-02-14 03-02-14 0:15     0:10       1:10   NSW1    48.99061 7086.94 22.4
## 4 03-02-14 03-02-14 0:20     0:15       1:15   NSW1    48.99127 7042.09 22.5
## 5 03-02-14 03-02-14 0:25     0:20       1:20   NSW1    47.05000 6942.04 22.6
## 6 03-02-14 03-02-14 0:30     0:25       1:25   NSW1    49.06006 7017.70 22.6
##   Day..7.Sat. Month Holiday Count Index          Time     Year Day DST
## 1           2     2       0     0     0 -3.000000e-11 0.00e+00   0   1
## 2           2     2       0     1     1  3.472222e-03 9.51e-06   0   1
## 3           2     2       0     2     2  6.944445e-03 1.90e-05   0   1
## 4           2     2       0     3     3  1.041667e-02 2.85e-05   0   1
## 5           2     2       0     4     4  1.388889e-02 3.81e-05   0   1
## 6           2     2       0     5     5  1.736111e-02 4.76e-05   0   1
##      DSTTime AdjDSTTime ForecastTemp DiurnalTemp DOY         Key  WtdTemp
## 1 0.04166667  0.8750000     17.69124    19.35252  34 34-00:00:00 20.70223
## 2 0.04513889  0.8784722     17.67865    19.33793  34 34-00:05:00 20.72023
## 3 0.04861111  0.8819444     17.66606    19.32335  34 34-00:10:00 20.68078
## 4 0.05208333  0.8854167     17.65348    19.30879  34 34-00:15:00 20.69823
## 5 0.05555556  0.8888889     17.64091    19.29423  34 34-00:20:00 20.71500
## 6 0.05902778  0.8923611     17.62835    19.27969  34 34-00:25:00 20.70405
```

Fit and summarise Model 5.

```
library(mgcv)
```

```
## Loading required package: nlme
```

```
## This is mgcv 1.8-42. For overview type 'help("mgcv-package")'.
```

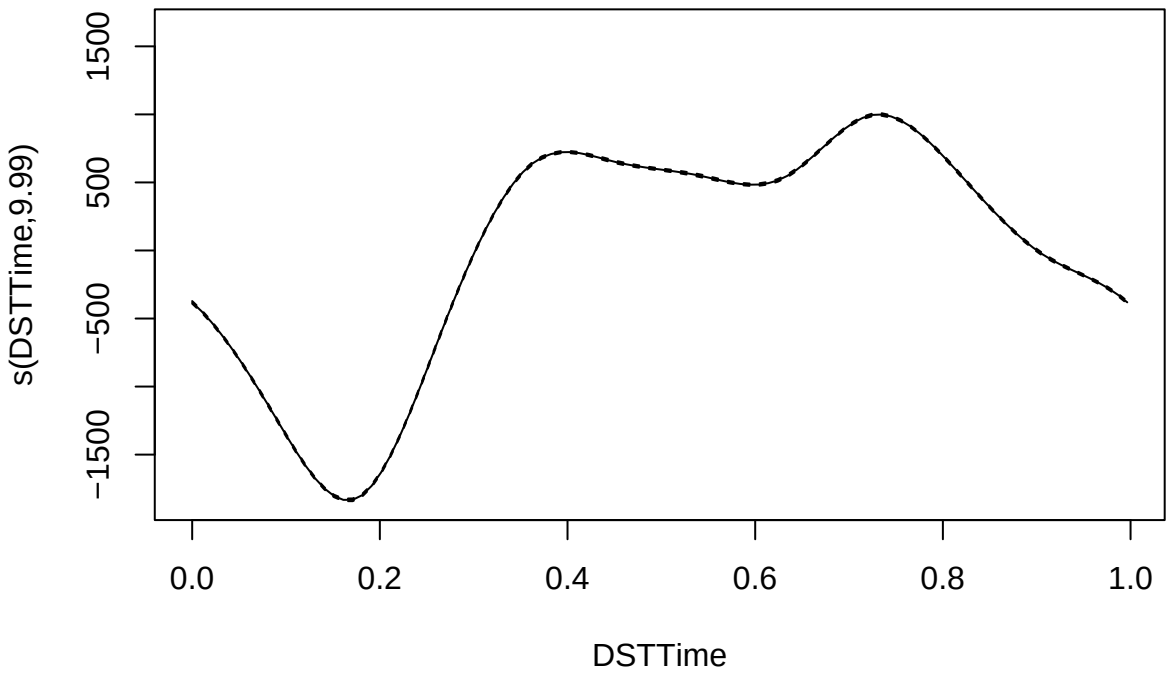
```
gamlwmod <- Demand ~  s(DSTTime, bs = "cc", k = 12) + s(WtdTemp, bs = "tp", k =8) + s(Year, bs = "tp", k
wtdyear <- gamm(gamlwmod,  data = fitdata)
print(summary(wtdyear$gam))
```

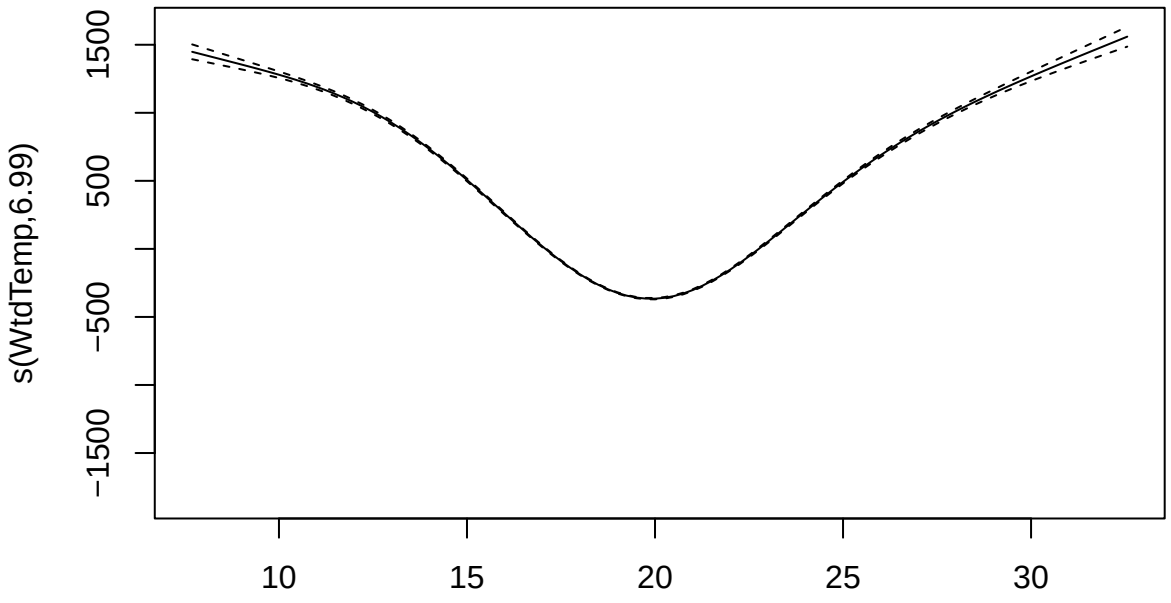
```
##
```

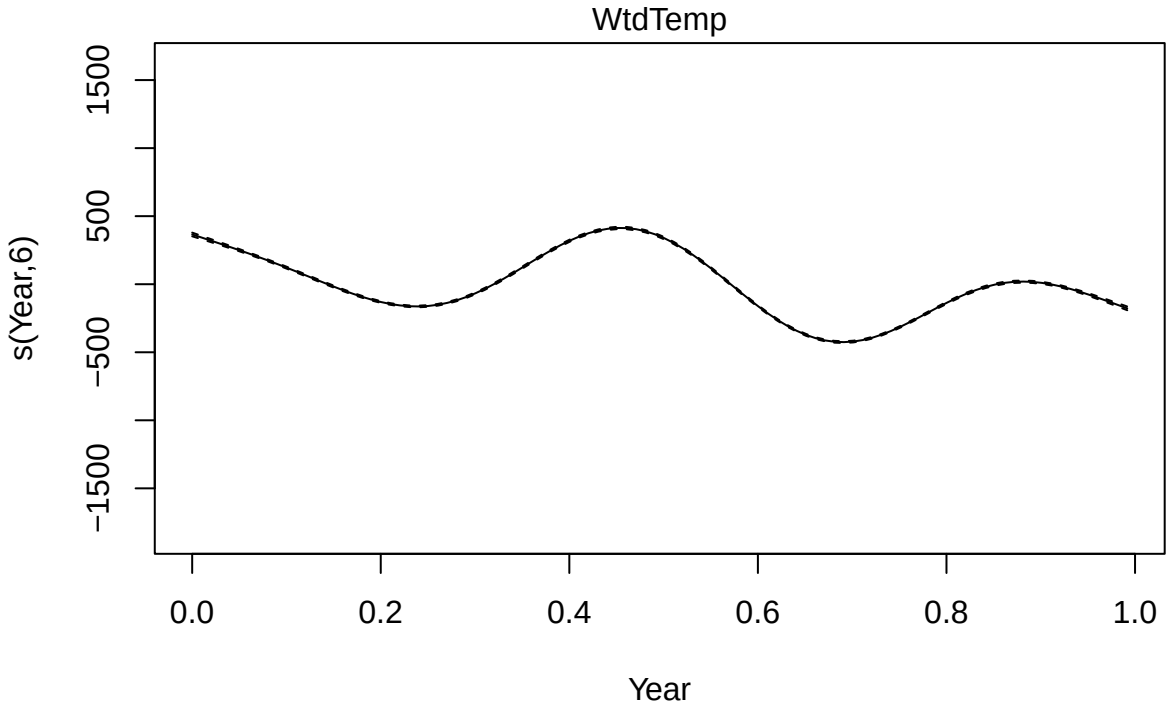
```
## Family: gaussian
## Link function: identity
##
## Formula:
## Demand ~ s(DSTTime, bs = "cc", k = 12) + s(WtdTemp, bs = "tp",
##     k = 8) + s(Year, bs = "tp", k = 7)
##
## Parametric coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 8156.805      1.361    5995   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##              edf Ref.df     F p-value
## s(DSTTime) 9.995 10.000 29302  <2e-16 ***
## s(WtdTemp) 6.987  6.987  8956  <2e-16 ***
## s(Year)    5.999  5.999  4305  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.898
##   Scale est. = 1.3331e+05  n = 72000
```

Plot each smooth term.

```
plot(wtdyear$gam, all.terms=T)
```







Check R^2 with temperature rounded to nearest integer.

```
## Load the data
alldata <- read.csv("data/intra_day/original2014.csv")
alldata$Temp <- round(alldata$Temp)
alldata$WtdTemp <- wtdtemp(alldata$DSTTime, alldata$Temp)

## Split into regression data and out of sample test data.
fitdata <- alldata[((0*288)+1):(250*288),]

gamlwmod <- Demand ~  s(DSTTime, bs = "cc", k = 12) + s(WtdTemp, bs = "tp", k =8) + s(Year, bs = "tp", k
wtdyear <- gamm(gamlwmod,  data = fitdata)
```

```r
print(summary(wtdyear$gam))
```

```
##
## Family: gaussian
## Link function: identity
##
## Formula:
## Demand ~ s(DSTTime, bs = "cc", k = 12) + s(WtdTemp, bs = "tp",
##     k = 8) + s(Year, bs = "tp", k = 7)
##
## Parametric coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 8156.805      1.365    5976   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##              edf Ref.df     F p-value
## s(DSTTime) 9.995 10.000 29199  <2e-16 ***
## s(WtdTemp) 6.986  6.986  8838  <2e-16 ***
## s(Year)    5.999  5.999  4297  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.897
##   Scale est. = 1.3414e+05  n = 72000
```