

ESM 232, Assignment 8

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```
sager = read.table("R/sager.txt", header = T)

# add date from the existing columns of day, month, year
sager = sager %>%
  mutate(date = make_date(year = year, month = month, day = day))

sager1 = sager %>%
  gather(key = "source", value = "streamflow", -date, -month, -day, -wy, -wyd, -year)

# multiple results - lets say we've run the model for multiple years, each column is streamflow for a d
msage = read.table("R/sagerm.txt", header = T)

# lets say we know the start date from our earlier output
msage$date = sager$date
msage$month = sager$month
msage$year = sager$year
msage$day = sager$day
msage$wy = sager$wy

# add observed data from sager.txt
msage$obs = sager$obs

# to turn all the columns of different outputs into a single column identified by "run"
msage1 = msage %>%
  gather(key = "run", value = "streamflow", -date, -month, -day, -year, -wy, -obs)
```

Our performance metric: finding the minimum of the area under the curve of the modeled streamflow data subtracted from the area under the curve of the observed streamflow data.

```
# Performance Metric
source("R/AUCdiff.R")

AUCdiff

## function (m, o)
## {
##   xvals = seq(from = 1, to = length(m), by = 1)
##   auco = trapz(xvals, o)
##   aucm = trapz(xvals, m)
##   AUCdiff = abs(auco - aucm)
##   return(AUCdiff)
## }
```

```

#store results
res = msage %>%
  select(-date, -month, -day, -year, -wy, -obs) %>%
  map_dbl(~AUCdiff(m = .x, o = msage$obs))

summary(res)

##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  10.82  880.98 1533.71 1875.44 2621.73 5421.26

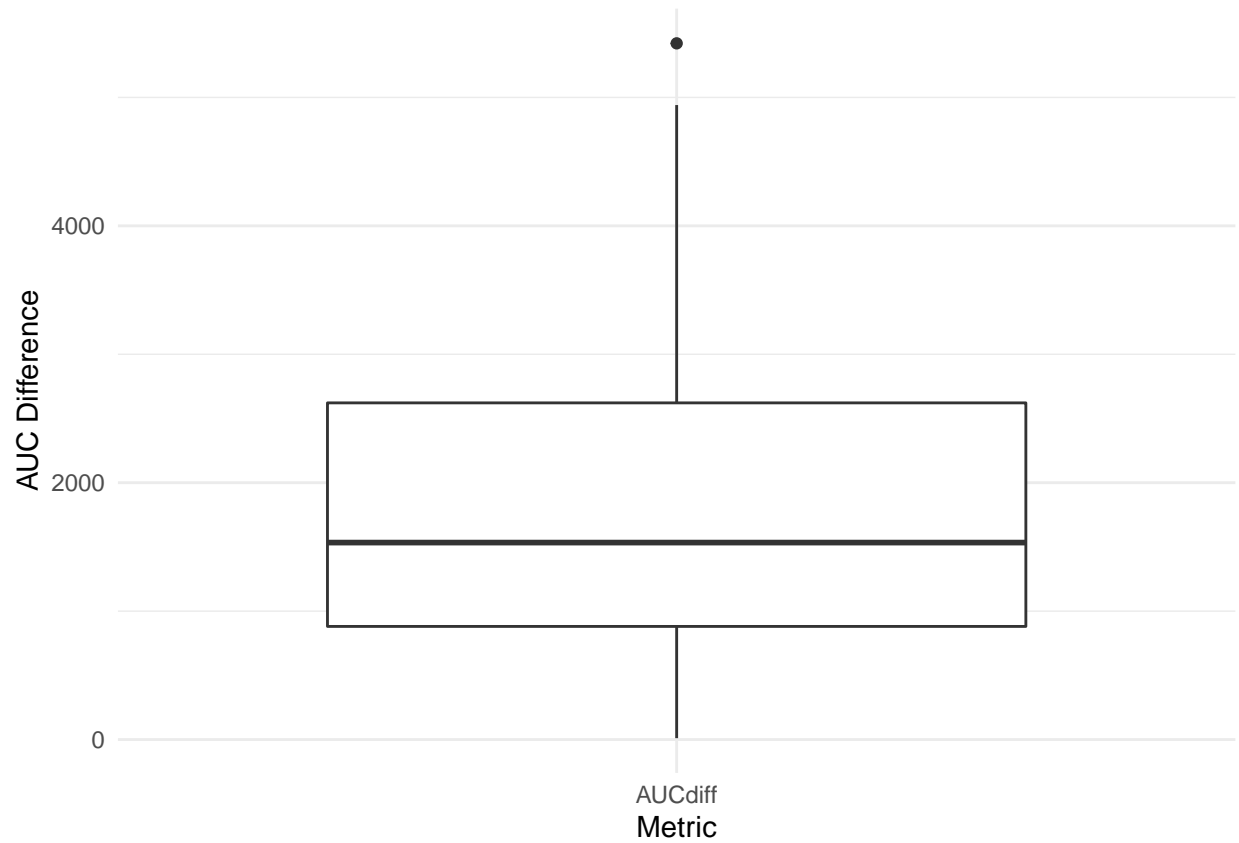
simnames = names(msage %>%
  select(-date, -month, -day, -year, -wy, -obs))

results = cbind.data.frame(simnames = simnames, AUCdiff = res)

#plot boxplot of results from performance metric:
resultsl = results %>%
  gather(key = "metric", value = "value", -simnames)

ggplot(data = resultsl, aes(x = metric, y = value)) +
  geom_boxplot() +
  facet_wrap(~metric, scales = "free") +
  labs(x = "Metric",
    y = "AUC Difference") +
  theme_minimal() +
  theme(strip.placement = "none",
    strip.text = element_blank())

```



```
#find which model yields minimum AUCdiff:  
resultsl$simnames[which.min(resultsl$value)]
```

```
## [1] "V151"
```

```
""
```