policy_tree

2024-04-07

```
library(grf)
```

```
## Warning: 程辑包'grf'是用R版本4.3.3 来建造的
```

```
# library(policytree)
library(constrainedpolicytree)
library(policytree)
```

```
## Warning: 程辑包'policytree'是用R版本4.3.3 来建造的
```

```
## Registered S3 methods overwritten by 'policytree':
##   method              from
##   plot.policy_tree    constrainedpolicytree
##   predict.policy_tree constrainedpolicytree
##   print.policy_tree   constrainedpolicytree
```

```
##
## 载入程辑包：'policytree'
```

```
## The following object is masked from 'package:constrainedpolicytree':
##
##     policy_tree
```

```
# read inspire_CTS data
cts_data <- read.csv("inspire_CTS_0_120_icuhalfday.csv")
# sample size
sample_size <- 858
# covariate X, treatments W, outcome Y
X <- cts_data[,4:40]
#W <- as.factor(cts_data[,46])
W <- cts_data[,41]
Y <- cts_data[,1]
# translation of Y so that all Y are positive
C <- max(Y)+1
Y <- C-Y
# read IPW trained by sklearn.linear_model
IPW <- read.csv("IPW.csv")
# DR <- read.csv("DR.csv")
#c.forest <- grf::multi_arm_causal_forest(X, Y, W)
#dr.scores <- double_robust_scores(c.forest)
#write.csv(dr.scores, file = "dr_scores.csv", row.names = FALSE)
# train the policy tree
tree_cts <- constrainedpolicytree::policy_tree(X, IPW, max_treatment_size = c(344,172,258,858),
depth = 2)
```

```
## The values of max_treatment_size_vector: 344 172 258 858
```

```
# tree_cts <- policytree::policy_tree(X, DR,depth = 1)
print(tree_cts)
```

```
## policy_tree object
## Tree depth:  2
## Actions:  1: X0 2: X1 3: X2 4: X3
## Variable splits:
## (1) split_variable: spo2  split_value: 98
##   (2) split_variable: alt  split_value: 20
##     (4) * action: 4
##     (5) * action: 3
##   (3) split_variable: weight  split_value: 60
##     (6) * action: 2
##     (7) * action: 1
```

```
print(tree_cts$`_tree_array`)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    8   98    2    3
## [2,]   12   20    4    5
## [3,]    3   60    6    7
## [4,]   -1    4    0    0
## [5,]   -1    3    0    0
## [6,]   -1    2    0    0
## [7,]   -1    1    0    0
```

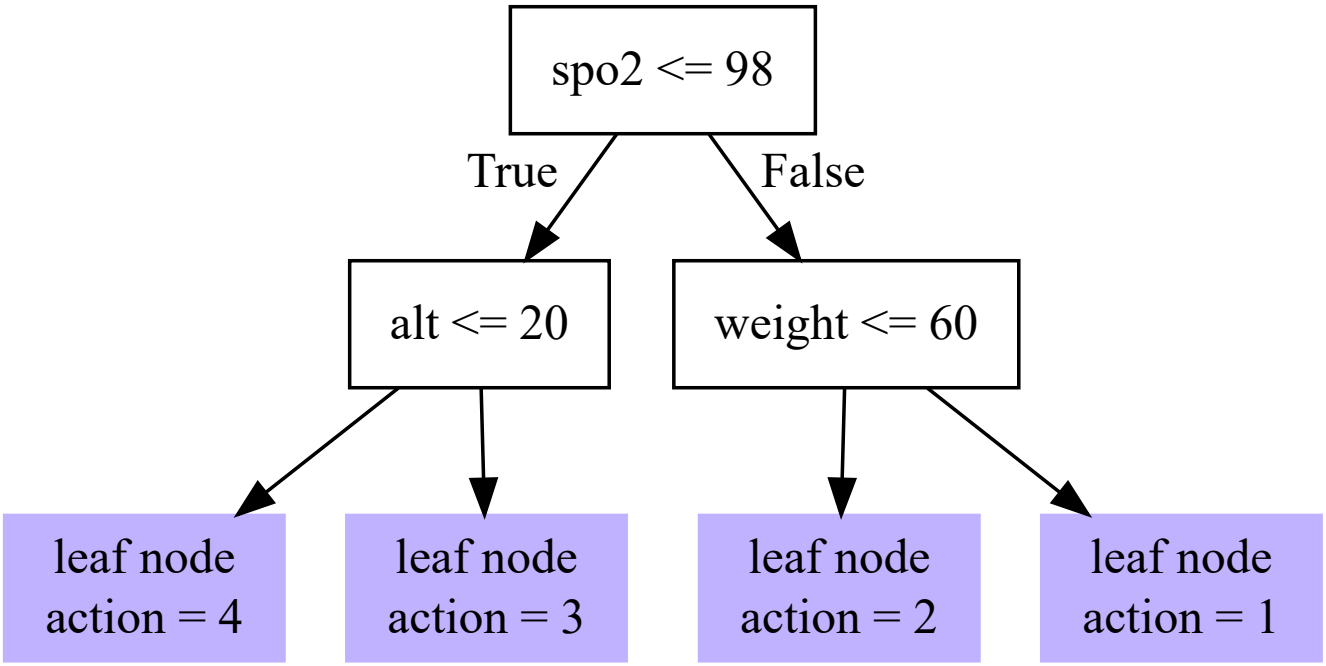
```
# Y before translation
# IPW_true<-read.csv("IPW_true.csv")
# Sum of outcome Y in data
sum = 0
sum_true = 0
for (i in 1:sample_size) {
  sum = sum+(IPW[i,predict(tree_cts, X)[i]])
# sum = sum+(IPW[i,predict(tree_cts, X)[i]])
# sum_true = sum_true+(IPW_true[i,predict(tree_cts, X)[i]])
}
# number of samples under each treatment
num_in_trt <- c(0,0,0,0)
print(sum)
```

```
## [1] 63230.29
```

```
for (j in 1:4) {
  for (i in 1:sample_size) {
    if (predict(tree_cts, X)[i]==j){
      num_in_trt[j] = num_in_trt[j]+1
    }
  }
}
print(num_in_trt)
```

```
## [1] 106 143 226 383
```

```
plot(tree_cts)
```




```
```