

# Package ‘forestControl’

February 16, 2018

**Type** Package

**Title** Approximate False Positive Rate Control in Selection Frequency  
for Random Forest

**Version** 0.1.1

**Date** 2018-02-16

**Description** Approximate false positive rate control in selection frequency for  
random forest using the methods described by En-  
der Konukoglu and Melanie Ganz (2015) <arXiv:1410.2838>.  
Methods for calculating the selection frequency threshold at false positive rates  
and selection frequency false positive rate feature selection.

**Imports** Rcpp

**Suggests** testthat, randomForest, ranger

**License** MIT + file LICENSE

**Encoding** UTF-8

**LazyData** true

**URL** <https://github.com/aberHRML/forestControl>

**BugReports** <https://github.com/aberHRML/forestControl/issues>

**RoxygenNote** 6.0.1

**LinkingTo** Rcpp

**Roxygen** list(markdown = TRUE)

**NeedsCompilation** yes

**Author** Tom Wilson [aut, cre],  
Jasen Finch [aut]

**Maintainer** Tom Wilson <tpw2@aber.ac.uk>

## R topics documented:

forestControl-package . . . . .	2
extract_params . . . . .	2

fpr_fs . . . . .	3
selection_freqs . . . . .	4
sft . . . . .	4
<b>Index</b>	<b>6</b>

---

forestControl-package	<i>False Positive Rate Control in Selection Frequency for Random Forest</i>
-----------------------	-----------------------------------------------------------------------------

---

**Description**

This package is an implementation of the methods described by Ender Konukoglu and Melanie Ganz in *Konukoglu, E. and Ganz, M., 2014. Approximate false positive rate control in selection frequency for random forest. arXiv preprint arXiv:1410.2838 <https://arxiv.org/abs/1410.2838>.*

---

extract_params	<i>Extract forest parameters</i>
----------------	----------------------------------

---

**Description**

For a randomForest or ranger classification object, extract the parameters needed to calculate an approximate selection frequency threshold

**Usage**

extract\_params(x)

**Arguments**

x                      a randomForest or ranger object

**Value**

- a list of four elements
- **Fn** The number of features considered at each internal node (mtry)
  - **Ft** The total number of features in the data set
  - **K** The average number of binary tests/internal nodes across the entire forest
  - **Tr** The total number of trees in the forest

**Author(s)**

Tom Wilson <tpw2@aber.ac.uk>

**Examples**

```
library(randomForest)
data(iris)
iris.rf <- randomForest(iris[,-5], iris[,5], forest = TRUE)

iris.params <- extract_params(iris.rf)
print(iris.params)
```

---

fpr\_fs*False Postivie Rate Feature Selection*

---

**Description**

Calculate the False Positive Rate (FPR) for each feature using it's selection frequency

**Usage**

```
fpr_fs(x)
```

**Arguments**

x                      a randomForest or ranger object

**Value**

a data.frame of selection frequencies and their false positive rate

**Author(s)**

Jasen Finch <jsf9@aber.ac.uk>

**Examples**

```
library(randomForest)
data(iris)
iris.rf <- randomForest(iris[,-5], iris[,5], forest = TRUE)

iris.features <- fpr_fs(iris.rf)
print(iris.features)
```

---

selection_freqs	<i>Variable Selection Frequencies</i>
-----------------	---------------------------------------

---

**Description**

Extract variable selection frequencies from randomForest and ranger model objects

**Usage**

```
selection_freqs(x)
```

**Arguments**

x                      a randomForest or ranger object

**Value**

data.frame of variable selection frequencies

**Examples**

```
library(randomForest)
data(iris)
iris.rf <- randomForest(iris[,-5], iris[,5], forest = TRUE)

iris.freqs <- selection_freqs(iris.rf)
print(iris.freqs)
```

---

sft	<i>Selection Frequency Threshold</i>
-----	--------------------------------------

---

**Description**

Determine the selecton frequency threshold of a model at a specified false positive rate

**Usage**

```
sft(x, alpha)
```

**Arguments**

x                      a randomForest or ranger object  
alpha                  a false positive rate (ie, 0.01)

**Value**

a list of two elements

- **sft** The selection frequency threshold
- **probs\_atsft** The estimated false positive rate

**Author(s)**

Tom Wilson <tpw2@aber.ac.uk>

**Examples**

```
library(randomForest)
data(iris)
iris.rf <- randomForest(iris[,-5], iris[,5], forest = TRUE)

# For a false positive rate of 1%
iris.sft <- sft(iris.rf, 0.01)
print(iris.sft)

# To iterate through a range of alpha values

alpha <- c(0.01,0.05, 0.1,0.15,0.2, 0.25)
threshold <- NULL
for(i in seq_along(alpha)){
  threshold[i] <- sft(iris.rf, alpha[i])$sft
}

plot(alpha, threshold, type = 'b')
```

# Index

`extract_params`, [2](#)  
`forestControl-package`, [2](#)  
`fpr_fs`, [3](#)  
`selection_freqs`, [4](#)  
`sft`, [4](#)