Package 'SVMDO'

April 4, 2025

Title Identification of Tumor-Discriminating mRNA Signatures via Support Vector Machines Supported by Disease Ontology

Version 1.7.0

Date 2024-08-30

Depends R(>= 4.4), shiny (>= 1.7.4)

Imports shinyFiles (>= 0.9.3), shinytitle (>= 0.1.0), golem (>= 0.3.5), nortest (>= 1.0-4), e1071 (>= 1.7-12), BSDA (>= 1.2.1), data.table (>= 1.14.6), sjmisc (>= 2.8.9), klaR (>= 1.7-1), caTools (>= 1.18.2), caret (>= 6.0-93), survival (>= 3.4-0), DT (>= 0.33.0), DOSE (>= 3.24.2), AnnotationDbi (>= 1.60.0), org.Hs.eg.db (>= 3.16.0), dplyr (>= 1.0.10), SummarizedExperiment (>= 1.28.0), grDevices, graphics, stats, utils

Description It is an easy-to-use GUI using disease information for detecting tumor/normal sample discriminating gene sets from differentially expressed genes. Our approach is based on an iterative algorithm filtering genes with disease ontology enrichment analysis and wilk and wilks lambda criterion connected to SVM classification model construction. Along with gene set extraction, SVMDO also provides individual prognostic marker detection. The algorithm is designed for FPKM and RPKM normalized RNA-Seq transcriptome datasets.

RoxygenNote 7.3.2

biocViews GeneSetEnrichment, DifferentialExpression, GUI, Classification, RNASeq, Transcriptomics, Survival

NeedsCompilation no

License GPL-3

Encoding UTF-8

Roxygen list(markdown = TRUE)

Suggests BiocStyle, knitr, rmarkdown, testthat (>= 3.1.6)

VignetteBuilder knitr

Config/testthat/edition 3

BugReports https://github.com/robogeno/SVMDO/issues

git_url https://git.bioconductor.org/packages/SVMDO

git_branch devel

git_last_commit 5dea70d

git_last_commit_date 2024-10-29

Repository Bioconductor 3.21

Date/Publication 2025-04-03

Author Mustafa Erhan Ozer [aut, cre] (ORCID:
<https://orcid.org/0000-0002-1572-8008>),
Pemra Ozbek Sarica [aut],
Kazim Yalcin Arga [aut]

Maintainer Mustafa Erhan Ozer <erhanozer19@marun.edu.tr>

Contents

classification_server . . . 3
classification_ui . . . 3
clinic_data_input_server . . . 4
clinic_data_input_ui . . . 4
deg_server . . . 5
deg_ui . . . 5
disc_gene_download_ui . . . 6
disc_gene_dw_server . . . 6
do_based_gene_filtration_server . . . 7
do_based_gene_filtration_ui . . . 7
expression_dataset_input_server . . . 8
gene_directory_selection_server . . . 8
gene_directory_selection_ui . . . 9
gene_list_name_server . . . 9
gene_list_name_ui . . . 10
gene_list_table_visualization_ui . . . 10
globals . . . 11
gui_obj_removal_server . . . 11
gui_obj_removal_ui . . . 12
innerServer_exp_ui . . . 12
package_req_list . . . 13
plot_list_server . . . 13
plot_list_ui . . . 14
plot_push_server . . . 14
plot_push_ui . . . 15
plot_show_server . . . 15
plot_show_ui . . . 16
runGUI . . . 16
survival_analysis_server . . . 17
survival_analysis_ui . . . 17

surv_plot_dw_server 18
surv_plot_dw_ui 18
table_server 19
table_ui 19
test_data_selection_server 20
test_data_selection_ui 20
top_val_based_deg_filtration 21
top_val_based_deg_filtration_ui 21
top_val_server 22
top_val_ui 22

Index **23**

`classification_server` *SVMDO*

Description

SVMDO

Usage

```
innerServer_7(input, output, session)
```

Arguments

`input`	server input
`output`	server output
`session`	server session

Value

Server section of wilks lambda filtration and SVM classification of disease filtered differentially expressed gene set

---

`classification_ui` *SVMDO*

Description

SVMDO

Usage

```
innerUI_classification(id)
```

Arguments

id	connection input

Value

UI section of wilks lambda filtration and SVM classification of disease filtered differentially expressed gene set

---

clinic_data_input_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_clinic(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of loading clinical data

---

clinic_data_input_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_clinic_data(id)
```

Arguments

id	connection input

Value

UI section of loading clinical data

deg_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_3(input, output, session, rawData, rval)
```

Arguments

input	server input
output	server output
session	server session
rawData	expression dataset provided from innerServer_exp_server
rval	Selected radio button information provided from innerServer_rad_server

Value

Server section of differential gene expression analysis

deg_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_deg_analysis(id)
```

Arguments

id	connection input

Value

UI section of differential gene expression analysis

disc_gene_download_ui *SVMDO*

Description

SVMDO

Usage

```
disc_gene_download_ui(id)
```

Arguments

id	connection input

Value

UI section of discriminative gene set download button

disc_gene_dw_server *SVMDO*

Description

SVMDO

Usage

```
disc_gene_dw_server(input, output, session, gene_list_val)
```

Arguments

input	server input
output	server output
session	server session
gene_list_val	discriminative gene set list variable

Value

Server section of discriminative gene set download button

do_based_gene_filtration_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_6(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of disease ontology based filtration of differentially expressed genes

do_based_gene_filtration_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_disease_ont_class(id)
```

Arguments

id	connection input

Value

UI section of disease ontology based filtration of differentially expressed genes

`expression_dataset_input_server` *SVMDO*

Description

SVMDO

Usage

```
innerServer_exp(input, output, session)
```

Arguments

`input`	server input
`output`	server output
`session`	server session

Value

Server section of providing expression dataset

`gene_directory_selection_server` *SVMDO*

Description

SVMDO

Usage

```
innerServer(input, output, session)
```

Arguments

`input`	server input
`output`	server output
`session`	server session

Value

Server section of entering output/working for gene list directory

gene_directory_selection_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_path(id)
```

Arguments

id	connection input

Value

UI section of entering output/working for gene list directory

gene_list_name_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_10(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of entering final gene list name

gene_list_name_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_gene_names(id)
```

Arguments

id	connection input

Value

UI section of entering top gene value

gene_list_table_visualization_ui *SVMDO*

Description

SVMDO

Usage

```
deg_data_table_ui(id)
```

Arguments

id	connection input

Value

Providing table form of discriminative gene sets in GUI

globals *SVMDO*

Description

SVMDO

Value

Including script files and global variables of GUI required to be initiated at the runApp file execution

gui_obj_removal_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_9(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of workspace clearance

gui_obj_removal_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_clear_env(id)
```

Arguments

id	connection input

Value

UI section of workspace clearance

innerServer_exp_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_exp_data(id)
```

Arguments

id	connection input

Value

UI section of providing expression dataset into GUI

package_req_list *SVMDO*

Description

SVMDO

Value

List of packages involved in SVMDO

plot_list_server *SVMDO*

Description

SVMDO

Usage

```
plot_list_server(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of preparing plot list to be visualized in GUI page

plot_list_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_collect_plot_data(id)
```

Arguments

id	connection output

Value

UI section of preparing plot list to be visualized in GUI page

plot_push_server *SVMDO*

Description

SVMDO

Usage

```
plot_push_server(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of providing information about total number of survival plots for visualization

plot_push_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_plot_inject(id)
```

Arguments

id	connection input

Value

UI section of providing information about total number of survival plots for visualization

plot_show_server *SVMDO*

Description

SVMDO

Usage

```
plot_show_server(input, output, session, max_data)
```

Arguments

input	server input
output	server output
session	server session
max_data	Information of total number of survival plots prepared with discriminative gene set

Value

Server section of providing information about total number of survival plots for visualization

plot_show_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_plot_show(id)
```

Arguments

id	connection input

Value

UI section of providing information about total number of survival plots for visualization

runGUI *SVMDO*

Description

SVMDO

Usage

```
linebreaks(n)
```

Arguments

n	linebreak function variable

Value

Returning GUI window screen

Examples

```
#SVMDO::runGUI() Calling GUI without activating library
#runGUI() Calling GUI after activating library
# Disease Ontology Enrichment of a differentially expresed gene (entrez id):
a_1<-DOSE::enrichDO(2981,ont="HDO")
```

survival_analysis_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_8(input, output, session, rawData_2, rval)
```

Arguments

input	server input
output	server output
session	server session
rawData_2	Clinical data provided from clinic_data_input_server
rval	Selected radio button information provided from innerServer_rad_server

Value

Server section of survival analysis of final discriminative gene set

survival_analysis_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_surv(id)
```

Arguments

id	connection input

Value

UI section of survival analysis of final discriminative gene set

surv_plot_dw_server *SVMDO*

Description

SVMDO

Usage

```
surv_plot_dw_server(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of downloading survival plots of discriminative gene set

surv_plot_dw_ui *SVMDO*

Description

SVMDO

Usage

```
surv_plots_download_ui(id)
```

Arguments

id	connection input

Value

UI section of downloading survival plots of discriminative gene set

table_server *SVMDO*

Description

SVMDO

Usage

```
table_server(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of providing discriminative gene set for preparing table

table_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_table_show(id)
```

Arguments

id	connection input

Value

UI section of providing discriminative gene set for preparing table

test_data_selection_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_rad(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of providing information about selected radio button

test_data_selection_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_test_data(id)
```

Arguments

id	connection input

Value

UI section of providing information about selected radio button

top_val_based_deg_filtration *SVMDO*

Description

SVMDO

Usage

```
innerServer_5(input, output, session, top_val)
```

Arguments

input	server input
output	server output
session	server session
top_val	top gene number value provided from top_val_server

Value

Server section of selecting differentially expressed genes based on top gene value

top_val_based_deg_filtration_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_top_gene_selection(id)
```

Arguments

id	connection input

Value

UI section of selecting differentially expressed genes based on top gene value

top_val_server *SVMDO*

Description

SVMDO

Usage

```
innerServer_4(input, output, session)
```

Arguments

input	server input
output	server output
session	server session

Value

Server section of entering top gene value

top_val_ui *SVMDO*

Description

SVMDO

Usage

```
innerUI_top_gene_val(id)
```

Arguments

id	connection input

Value

UI section of entering top gene value

Index

classification_server, 3
classification_ui, 3
clinic_data_input_server, 4
clinic_data_input_ui, 4

deg_data_table_ui
(gene_list_table_visualization_ui), 10
deg_server, 5
deg_ui, 5
disc_gene_download_ui, 6
disc_gene_dw_server, 6
do_based_gene_filtration_server, 7
do_based_gene_filtration_ui, 7

expression_dataset_input_server, 8

gene_directory_selection_server, 8
gene_directory_selection_ui, 9
gene_list_name_server, 9
gene_list_name_ui, 10
gene_list_table_visualization_ui, 10
globals, 11
gui_obj_removal_server, 11
gui_obj_removal_ui, 12

innerServer
(gene_directory_selection_server), 8
innerServer_10 (gene_list_name_server), 9
innerServer_3 (deg_server), 5
innerServer_4 (top_val_server), 22
innerServer_5
(top_val_based_deg_filtration), 21
innerServer_6
(do_based_gene_filtration_server), 7
innerServer_7 (classification_server), 3
innerServer_8
(survival_analysis_server), 17
innerServer_9 (gui_obj_removal_server), 11
innerServer_clinic
(clinic_data_input_server), 4
innerServer_exp
(expression_dataset_input_server), 8
innerServer_exp_ui, 12
innerServer_rad
(test_data_selection_server), 20
innerUI_classification
(classification_ui), 3
innerUI_clear_env (gui_obj_removal_ui), 12
innerUI_clinic_data
(clinic_data_input_ui), 4
innerUI_collect_plot_data
(plot_list_ui), 14
innerUI_deg_analysis (deg_ui), 5
innerUI_disease_ont_class
(do_based_gene_filtration_ui), 7
innerUI_exp_data (innerServer_exp_ui), 12
innerUI_gene_names (gene_list_name_ui), 10
innerUI_path
(gene_directory_selection_ui), 9
innerUI_plot_inject (plot_push_ui), 15
innerUI_plot_show (plot_show_ui), 16
innerUI_surv (survival_analysis_ui), 17
innerUI_table_show (table_ui), 19
innerUI_test_data
(test_data_selection_ui), 20
innerUI_top_gene_selection

(top_val_based_deg_filtration_ui), 21
innerUI_top_gene_val (top_val_ui), 22

linebreaks (runGUI), 16

package_req_list, 13
plot_list_server, 13
plot_list_ui, 14
plot_push_server, 14
plot_push_ui, 15
plot_show_server, 15
plot_show_ui, 16

runGUI, 16

surv_plot_dw_server, 18
surv_plot_dw_ui, 18
surv_plots_download_ui (surv_plot_dw_ui), 18
survival_analysis_server, 17
survival_analysis_ui, 17

table_server, 19
table_ui, 19
test_data_selection_server, 20
test_data_selection_ui, 20
top_val_based_deg_filtration, 21
top_val_based_deg_filtration_ui, 21
top_val_server, 22
top_val_ui, 22