

# Package ‘SVMDO’

March 11, 2025

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

**Version** 1.6.0

**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** RELEASE\_3\_20

**git\_last\_commit** 1f89469

**git\_last\_commit\_date** 2024-10-29

**Repository** Bioconductor 3.20

**Date/Publication** 2025-03-10

**Author** Mustafa Erhan Ozer [aut, cre] (<<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 . . . . .                          | 10 |
| gui_obj_removal_server . . . . .           | 11 |
| gui_obj_removal_ui . . . . .               | 11 |
| innerServer_exp_ui . . . . .               | 12 |
| package_req_list . . . . .                 | 12 |
| plot_list_server . . . . .                 | 12 |
| plot_list_ui . . . . .                     | 13 |
| plot_push_server . . . . .                 | 13 |
| plot_push_ui . . . . .                     | 14 |
| plot_show_server . . . . .                 | 14 |
| plot_show_ui . . . . .                     | 15 |
| runGUI . . . . .                           | 15 |
| survival_analysis_server . . . . .         | 16 |
| survival_analysis_ui . . . . .             | 16 |
| surv_plot_dw_server . . . . .              | 17 |
| surv_plot_dw_ui . . . . .                  | 17 |
| table_server . . . . .                     | 18 |
| table_ui . . . . .                         | 18 |
| test_data_selection_server . . . . .       | 19 |
| test_data_selection_ui . . . . .           | 19 |
| top_val_based_deg_filtration . . . . .     | 20 |
| top_val_based_deg_filtration_ui . . . . .  | 20 |
| top_val_server . . . . .                   | 21 |

|                              |           |
|------------------------------|-----------|
| <i>classification_server</i> | 3         |
| <i>top_val_ui</i> . . . . .  | 21        |
| <b>Index</b>                 | <b>22</b> |

---

*classification\_server SVMDO*

---

**Description**

SVMDO

**Usage**

`innerServer_7(input, output, session)`

**Arguments**

|                      |                |
|----------------------|----------------|
| <code>input</code>   | server input   |
| <code>output</code>  | server output  |
| <code>session</code> | 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**

|                 |                  |
|-----------------|------------------|
| <code>id</code> | 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 | <i>SVMDO</i> |
|------------|--------------|

---

**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 | <i>SVMDO</i> |
|--------|--------------|

---

**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 | <i>SVMDO</i> |
|--------------|--------------|

---

**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 | <i>SVMDO</i> |
|------------------|--------------|

---

**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 | <i>SVMDO</i> |
|--------------|--------------|

---

**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 | <i>SVMDO</i> |
|------------------|--------------|

---

**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 expressed gene (entrez id):
a_1<-DOSE::enrichD0(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 | <i>SVMDO</i> |
|--------------|--------------|

---

**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 | <i>SVMDO</i> |
|----------|--------------|

---

**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 | <i>SVMDO</i> |
|----------------|--------------|

---

**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 | <i>SVMDO</i> |
|------------|--------------|

---

**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, 10  
gui\_obj\_removal\_server, 11  
gui\_obj\_removal\_ui, 11  
  
innerServer  
    (gene\_directory\_selection\_server),  
    8  
innerServer\_10 (gene\_list\_name\_server),  
    9  
innerServer\_3 (deg\_server), 5  
innerServer\_4 (top\_val\_server), 21  
innerServer\_5  
    (top\_val\_based\_deg\_filtration),  
    20  
innerServer\_6  
    (do\_based\_gene\_filtration\_server),  
    7  
innerServer\_7 (classification\_server), 3  
innerServer\_8  
    (survival\_analysis\_server), 16  
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),  
    19  
innerUI\_classification  
    (classification\_ui), 3  
innerUI\_clear\_env (gui\_obj\_removal\_ui),  
    11  
innerUI\_clinic\_data  
    (clinic\_data\_input\_ui), 4  
innerUI\_collect\_plot\_data  
    (plot\_list\_ui), 13  
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), 14  
innerUI\_plot\_show (plot\_show\_ui), 15  
innerUI\_surv (survival\_analysis\_ui), 16  
innerUI\_table\_show (table\_ui), 18  
innerUI\_test\_data  
    (test\_data\_selection\_ui), 19  
innerUI\_top\_gene\_selection  
    (top\_val\_based\_deg\_filtration\_ui),  
    20  
innerUI\_top\_gene\_val (top\_val\_ui), 21  
  
linebreaks (runGUI), 15  
  
package\_req\_list, 12  
plot\_list\_server, 12  
plot\_list\_ui, 13

plot\_push\_server, 13  
plot\_push\_ui, 14  
plot\_show\_server, 14  
plot\_show\_ui, 15

runGUI, 15

surv\_plot\_dw\_server, 17  
surv\_plot\_dw\_ui, 17  
surv\_plots\_download\_ui  
    (surv\_plot\_dw\_ui), 17  
survival\_analysis\_server, 16  
survival\_analysis\_ui, 16

table\_server, 18  
table\_ui, 18  
test\_data\_selection\_server, 19  
test\_data\_selection\_ui, 19  
top\_val\_based\_deg\_filtration, 20  
top\_val\_based\_deg\_filtration\_ui, 20  
top\_val\_server, 21  
top\_val\_ui, 21