Package 'PairQDA'

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Type Package

Title What the Package Does (Title Case)

Version 0.1.0

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Description More about what it does (maybe more than one line)
Use four spaces when indenting paragraphs within the Description.

License GPL (>= 3)

Encoding UTF-8

LazyData true

Depends R (>= 2.10)

Imports stats, dplyr, mvtnorm, MASS, utils

RoxygenNote 7.2.1

NeedsCompilation no

R topics documented:

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asym_cond_qda_fit   *Asymmetric Conditional QDA (fitting the model)*

Description

Asymmetric Conditional QDA (fitting the model)

Usage

```
asym_cond_qda_fit(
  train_data,
  id = "SID",
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  Y = "Label",
  number_features = 7
)
```

Arguments

train_data	A data.frame for the training dataset
id	A character for the column name which stores id.
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
Y	A character denotes the first several letters of label.
number_features	
	Number of features (covariates) to fit the model for each ear.

Value

A list to store model parameters.

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- asym_cond_qda_fit(HearingLoss_simu,
                 id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
asym_cond_qda_predict(fit, test_data_X)
```

asym_cond_qda_predict   *Asymmetric Conditional QDA (predicting new phenotypes)*

Description

Asymmetric Conditional QDA (predicting new phenotypes)

Usage

```
asym_cond_qda_predict(
  qda_model = NA,
  test_data_X = NA,
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  number_features = 7,
  iter = 1000
)
```

Arguments

qda_model	A list output from asym_cond_qda_fit
test_data_X	A vector of predictors from the test data
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
number_features	
	Number of features (covariates) to fit the model for each ear.
iter	Number of interations set by users. The default is 1000 times

Value

Predicted individual level phenotype

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- asym_cond_qda_fit(HearingLoss_simu,
                 id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
asym_cond_qda_predict(fit, test_data_X)
```

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asym_marg_qda_fit   *Asymmetric Marginal QDA (fitting model)*

Description

Asymmetric Marginal QDA (fitting model)

Usage

```
asym_marg_qda_fit(
  train_data,
  id = "SID",
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  Y = "Label",
  number_features = 7
)
```

Arguments

train_data	A data.frame for the training dataset
id	A character for the column name which stores id.
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
Y	A character denotes the first several letters of label.
number_features	
	Number of features (covariates) to fit the model for each ear.

Value

A list to store model parameters.

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- asym_marg_qda_fit(HearingLoss_simu,
                 id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
asym_marg_qda_predict(fit, test_data_X)
```

asym_marg_qda_predict *Asymmetric Marginal QDA (predicting new phenotypes)*

Description

Asymmetric Marginal QDA (predicting new phenotypes)

Usage

```
asym_marg_qda_predict(
  qda_model = NA,
  test_data_X = NA,
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  number_features = 7
)
```

Arguments

qda_model	A list output from asym_marg_qda_fit
test_data_X	A vector of predictors from the test data
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
number_features	Number of features (covariates) to fit the model for each ear.

Value

Predicted individual level phenotype

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- asym_marg_qda_fit(HearingLoss_simu,
                  id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
asym_marg_qda_predict(fit, test_data_X)
```

conv_qda_fit *Conventional QDA (fitting model)*

Description

Conventional QDA (fitting model)

Usage

```
conv_qda_fit(
  train_data,
  id = "SID",
  Y1 = "Label_1",
  Y2 = "Label_2",
  X1 = c("T500_1", "T1K_1", "T2K_1", "T3K_1", "T4K_1", "T6K_1", "T8K_1"),
  X2 = c("T500_2", "T1K_2", "T2K_2", "T3K_2", "T4K_2", "T6K_2", "T8K_2")
)
```

Arguments

train_data	A data.frame for the training dataset
id	A character for the column name which stores id.
Y1	A character shows the column name of label 1.
Y2	A character shows the column name of label 2.
X1	A string of characters for the column names of predictor set 1.
X2	A string of characters for the column names of predictor set 2.

Value

A list to store model parameters.

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- conv_qda_fit(HearingLoss_simu,
                    id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
conv_qda_predict(fit, test_data_X)
```

---

conv_qda_predict *Conventional QDA (predicting new phenotypes)*

Description

Conventional QDA (predicting new phenotypes)

Usage

```
conv_qda_predict(
  qda_model = NA,
  test_data_X = NA,
  X1 = c("T500_1", "T1K_1", "T2K_1", "T3K_1", "T4K_1", "T6K_1", "T8K_1"),
  X2 = c("T500_2", "T1K_2", "T2K_2", "T3K_2", "T4K_2", "T6K_2", "T8K_2")
)
```

Arguments

`qda_model`	A list output from conv_qda_predict
`test_data_X`	A vector of predictors from the test data
`X1`	A string of characters for the column names of predictor set 1.
`X2`	A string of characters for the column names of predictor set 2.

Value

Predicted individual level phenotype

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- conv_qda_fit(HearingLoss_simu,
                 id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
conv_qda_predict(fit, test_data_X)
```

HearingLoss_simu *Simulated data for hearing loss*

Description

A simulated data for the use of examples

Usage

```
HearingLoss_simu
```

Format

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 596 rows and 17 columns.

Details

A data frame with 596 rows and 17 columns:

id ID

Ear1_label, Ear2_label Ear 1 & 2 hearing loss types ...

QDA_function   *Mannual QDA*

Description

Mannual QDA

Usage

```
QDA_function(x, prior = prior, mu_list = mu_list, var_list = var_list)
```

Arguments

x	A vector of predictors
prior	prior weights of subtypes
mu_list	A list of mean parameters
var_list	A list of variance-covariance matrices

QDA_function_2   *QDA-2 function for conditional on two phenotypes*

Description

QDA-2 function for conditional on two phenotypes

Usage

```
QDA_function_2(
  x,
  prior = prior,
  mu_list_1 = mu_list_1,
  mu_list_2 = mu_list_2,
  var_list_1 = var_list_1,
  var_list_2 = var_list_2
)
```

Arguments

x	A vector of predictors
prior	prior weights of subtypes
mu_list_1	A list of mean parameters for phenotype 1
mu_list_2	A list of mean parameters for phenotype 2
var_list_1	A list of variance-covariance matrices for phenotype 1
var_list_2	A list of variance-covariance matrices for phenotype 2

---

sym_bayes_qda_fit   *Symmetric Bayesian QDA (fitting model)*

Description

Symmetric Bayesian QDA (fitting model)

Usage

```
sym_bayes_qda_fit(
  train_data,
  id = "SID",
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  Y = "Label",
  number_features = 7
)
```

Arguments

train_data	A data.frame for the training dataset
id	A character for the column name which stores id.
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
Y	A character denotes the first several letters of label.
number_features	
	Number of features (covariates) to fit the model for each ear.

Value

A list to store model parameters.

Examples

```
library(dplyr)
library(mvtnorm)
library(MASS)
data(HearingLoss_simu)
fit <- sym_bayes_qda_fit(HearingLoss_simu,
                   id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
sym_bayes_qda_predict(fit, test_data_X)
```

---

sym_bayes_qda_predict   *Symmetric Bayesian QDA (predicting new phenotypes)*

Description

Symmetric Bayesian QDA (predicting new phenotypes)

Usage

```
sym_bayes_qda_predict(
  qda_model = NA,
  test_data_X = NA,
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  number_features = 7,
  iter = 1000
)
```

Arguments

qda_model	A list output from sym_bayes_qda_fit
test_data_X	A vector of predictors from the test data
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
number_features	
	Number of features (covariates) to fit the model for each ear.
iter	Number of interations set by users. The default is 1000 times

Value

Predicted individual level phenotype

Examples

```
library(dplyr)
library(mvtnorm)
library(MASS)
data(HearingLoss_simu)
fit <- sym_bayes_qda_fit(HearingLoss_simu,
                 id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
sym_bayes_qda_predict(fit, test_data_X)
```

---

sym_joint_qda_fit *Symmetric Joint QDA (fitting model)*

Description

Symmetric Joint QDA (fitting model)

Usage

```
sym_joint_qda_fit(
  train_data,
  id = "SID",
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  Y = "Label",
  number_features = 7
)
```

Arguments

train_data	A data.frame for the training dataset
id	A character for the column name which stores id.
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
Y	A character denotes the first several letters of label.
number_features	
	Number of features (covariates) to fit the model for each ear.

Value

A list to store model parameters.

Examples

```
library(dplyr)
data(HearingLoss_simu)
fit <- sym_joint_qda_fit(HearingLoss_simu,
                 id = "id")
```

---

sym_joint_qda_predict *Symmetric Joint QDA (predicting new phenotypes)*

Description

Symmetric Joint QDA (predicting new phenotypes)

Usage

```
sym_joint_qda_predict(
  qda_model = NA,
  test_data_X = NA,
  Ear1_mark = "_1",
  Ear2_mark = "_2",
  number_features = 7
)
```

Arguments

qda_model	A list output from sym_joint_qda_fit
test_data_X	A vector of predictors from the test data
Ear1_mark	A character shows the last several letters to denote ear 1 label.
Ear2_mark	A character shows the last several letters to denote ear 2 label.
number_features	
	Number of features (covariates) to fit the model for each ear.

Value

Predicted individual level phenotype

Examples

```
library(dplyr)
library(mvtnorm)
data(HearingLoss_simu)
fit <- sym_joint_qda_fit(HearingLoss_simu,
                id = "id")
test_data_X <- HearingLoss_simu[1,] %>% dplyr::select(-"Label_1", -"Label_2",-"id")
sym_joint_qda_predict(fit, test_data_X)
```

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