

# Package ‘MSML’

November 24, 2023

**Title** Model selection based on Machine Learning (ML)  
**Version** 1.0.0.0  
**Description** The MSML package is designed to determine the optimal model(s) by leveraging all available features.  
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| data_test | <i>7 sets of PRSs for test dataset and target phenotype</i> |
|-----------|---|

---

## Description

A dataset containing 7 sets of PRSs for test dataset and target phenotype

## Usage

data\_test

**Format**

A data frame for test dataset:

**V1** PRS1, for bin1

**V2** PRS2, for bin1

**V3** PRS3, for bin1

**V4** PRS4, for bin1

**V5** PRS5, for bin1

**V6** PRS6, for bin1

**V7** PRS7, for bin1

**target** Target Phenotype, value

---

data\_train

*7 sets of PRSs for training data set and target phenotype*

---

**Description**

A dataset containing 7 sets of PRSs for training data set and target phenotype

**Usage**

data\_train

**Format**

A data frame for training dataset:

**V1** PRS1, for bin1

**V2** PRS2, for bin1

**V3** PRS3, for bin1

**V4** PRS4, for bin1

**V5** PRS5, for bin1

**V6** PRS6, for bin1

**V7** PRS7, for bin1

**target** Target Phenotype, value

---

data\_valid

7 sets of PRSs for validation dataset and target phenotype

---

### Description

A dataset containing 7 sets of PRSs for validation dataset and target phenotype

### Usage

```
data_valid
```

### Format

A data frame for validation dataset:

**V1** PRS1, for bin1

**V2** PRS2, for bin1

**V3** PRS3, for bin1

**V4** PRS4, for bin1

**V5** PRS5, for bin1

**V6** PRS6, for bin1

**V7** PRS7, for bin1

**target** Target Phenotype, value

---

model\_configuration

*model\_configuration function This function will generate PRS based on all possible combinations of model. The total number of models required to explore the combinations of these 'n' features can be calculated by summing the combinations for each possible number of features, ranging from 1 to 'n' ( $C(n,i)$ ). where  $C(n,k)$  represents the binomial coefficient or "n choose k," with n denoting the total number of features and k indicating the number of features to include in each model.*

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### Description

model\_configuration function This function will generate PRS based on all possible combinations of model. The total number of models required to explore the combinations of these 'n' features can be calculated by summing the combinations for each possible number of features, ranging from 1 to 'n' ( $C(n,i)$ ). where  $C(n,k)$  represents the binomial coefficient or "n choose k," with n denoting the total number of features and k indicating the number of features to include in each model.

### Usage

```
model_configuration(data_train, data_valid, mv)
```

**Arguments**

|            |  |
|------------|--|
| data_train | This is the matrix for training dataset              |
| data_valid | This is the matrix for validation dataset            |
| mv         | The total number of columns in data_train/data_valid |

**Value**

This function will generate all possible model outcomes for validation and test dataset

**Examples**

```
data_train <- data_train
data_valid <- data_valid
mv=8
out=model_configuration(data_train,data_valid)
```

---

model\_evaluation      *model\_evaluation function*

---

**Description**

This function will identify best model in validation and test dataset.

**Usage**

```
model_evaluation(dat, mv, tn, prev)
```

**Arguments**

|      |  |
|------|--|
| dat  | This is the matrix for all the combinations of model |
| mv   | The total number of columns in data_train/data_valid |
| tn   | The total no of best models to be identified         |
| prev | The prevalence of disease in the data                |

**Value**

This function will generate all possible model outcomes for validation and test dataset

**Examples**

```
dat <- predict_validation
mv=8
tn=15
prev=0.047
model_evaluation(dat,mv,tn,prev)
```

---

|              |  |
|--------------|--|
| predict_test | <i>target phenotype and 127 sets of model configurations based on the test dataset</i> |
|--------------|--|

---

**Description**

A dataset containing target phenotype and 127 sets of model configurations based on the test dataset

**Usage**

```
predict_test
```

**Format**

A data frame for models\_test:

- V1** target, phenotype
- V2** model1, based on configurations
- V3** model2, based on configurations
- V4** model3, based on configurations
- V5** model4, based on configurations
- V6** model5, based on configurations
- V7** model6, based on configurations
- V8** model7, based on configurations
- V9** model8, based on configurations
- V10** model9, based on configurations
- V11** model10, based on configurations
- V12** model11, based on configurations
- V13** model12, based on configurations
- V14** model13, based on configurations
- V15** model14, based on configurations
- V16** model15, based on configurations
- V17** model16, based on configurations
- V18** model17, based on configurations
- V19** model18, based on configurations
- V20** model19, based on configurations
- V21** model10, based on configurations
- V22** model21, based on configurations
- V23** model22, based on configurations
- V24** model23, based on configurations
- V25** model24, based on configurations
- V26** model25, based on configurations
- V27** model26, based on configurations

**V28** model27, based on configurations  
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**V66** model65, based on configurations  
**V67** model66, based on configurations

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**V125** model124, based on configurations  
**V126** model125, based on configurations  
**V127** model126, based on configurations  
**V128** model127, based on configurations

---

predict\_validation *target phenotype and 127 sets of model configurations based on validation dataset*

---

### Description

A dataset containing target phenotype and 127 sets of model configurations based on validation dataset

### Usage

```
predict_validation
```

### Format

A data frame for models\_test:

**V1** target, phenotype  
**V2** model1, based on configurations  
**V3** model2, based on configurations  
**V4** model3, based on configurations  
**V5** model4, based on configurations



**V6** model5, based on configurations  
**V7** model6, based on configurations  
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