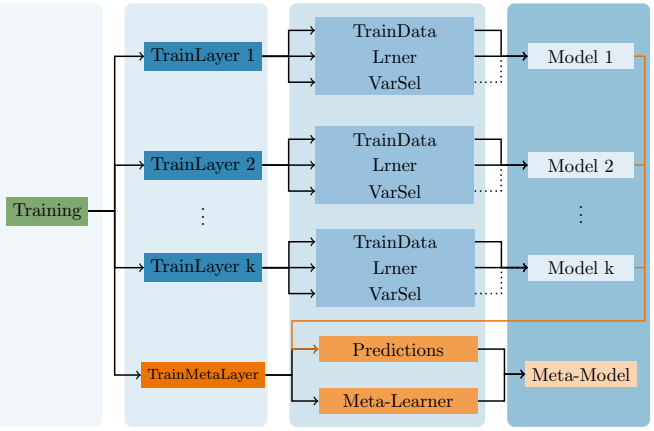
# fuseMLR: : CHEAT SHEET

## Introduction

The package facilitates integrative modeling by automating the fusion of models trained on different datasets for a common set of individuals. The implementation is built on a set of `R6` classes structured as follows:




## Class description

Main classes, their utilities, and key tasks are presented.

| Class | Utility | Available task |
|---|---|---|
| `Training` | Training layer container | Variable selection, training, predicting and upset plot |
| `Trainlayer` | Container of training data, learner and variable selection tool | Variable selection, training and predicting |
| `TrainMetalayer` | Meta data container | training and predicting |
| `TrainData` | Training datasets storage | – |
| `Learner` | Machine learning method storage | training and predicting |
| `Varsel` | Storage of variable selection method | variable selection |
| `Testing` | Useful for testing; test layer container | upset plot |
| `Testlayer` | Test data container | – |
| `TestData` | Test dataset | – |

## How to set up a training flow?

Except for the `Training` object, all objects are stored within a container object. Layer objects are stored in a training object, while all other objects (`TrainData`, `Lrner`, `VarSel`, and `Model`) are stored in a layer object. Models are automatically created after the learning process and cannot be set up by the user. Similarly, only a meta learner can be assigned by the user to the meta layer. Here is an usage illustration. See our GitHub for a complete example.

**Illustrative example**

```
# Instantiate Training
training <- Training$new(
  id = "tr",
  target = data.frame(), ...)
 # Instantiate TrainLayer
tl <- TrainLayer$new(
  id = "tl",
  training = training)
# Instantiate TrainMetaLayer
mtl <- TrainMetaLayer$new(
  id = "mtl",
  training = tr,
  ...)
# Add TrainData to the layer
td <- TrainMetaLayer$new(
  id = "td",
  train_layer = tl, ...)
# Add leaner to the layer
# Paramters
lnr_prm <- ParamLrner$new(
id = "lnr_prm",
param_list = list(...),
...)
lnr <- Lrner$new(
  id = "lnr",
  train_layer = tl,
  param = lnr_prm, ...)
  # Add variable selection method
# Parameters
  varsel_prm <- ParamLrner$new(
  id = "varsel_prm",
  param_list = list(...), ...)
varsel <- Varsel$new(
  id = "versel",
  train_layer = tl,
  param = varsel_prm, ...)
```

## Vizualisation

How individuals overlap across layers?

```
training$upset(order.by = "freq")
```

## Variable selection and training

Resampling method is required to create meta layer predictions.

```
# Variable selection
var_sel <- training$varSelection()
# Training
trained <- training$train(
resampling_method = ...,
resampling_arg = list(...), ...)
```

## Prediction

Set up a `Testing` flow (e.g. `testing`) similarly to `Training` and predict:

```
# Variable selection
predictions <- training$predict(
   testing = testing)
```

## Other useful functions

Additional classical functions like `print`, `summary` can be performed on `fuseMLR` objects. Getter and setter functions are available via the $ symbol as well. For example: `training$getTrainMetaLayer()`.

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