

Loading packages:

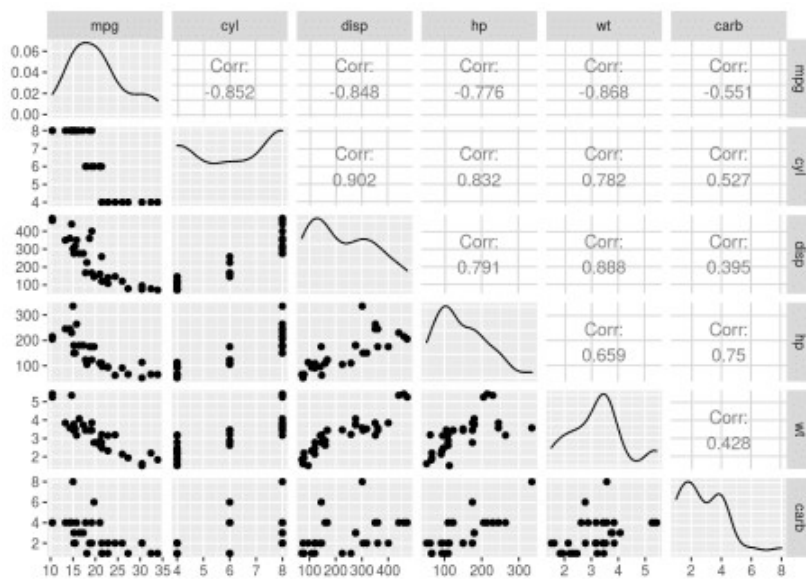
```
library(glmnet)
library(crossval)
```

Load mtcars dataset

```
data("mtcars")
df <- mtcars[, c(1, 2, 3, 4, 6, 11)]
summary(df)
```

Create response and explanatory variables from mtcars dataset

```
X <- as.matrix(df[, -1]) # explanatory variables
y <- df$mpg # response
```



Grid of hyperparameters for glmnet

```
tuning_grid <- expand.grid(alpha = c(0, 0.5, 1),
                           lambda = c(0.01, 0.1, 1))
n_params <- nrow(tuning_grid)
print(tuning_grid)
```

```
##   alpha lambda
## 1    0.0  0.01
## 2    0.5  0.01
## 3    1.0  0.01
## 4    0.0  0.10
## 5    0.5  0.10
## 6    1.0  0.10
## 7    0.0  1.00
## 8    0.5  1.00
## 9    1.0  1.00
```

Grid search cross-validation

- list of cross-validation results
- 5-fold cross-validation (`k`)
- repeated 3 times (`repeats`)

- cross-validation of 80% of the data (p)
- validation on the remaining 20%

```
cv_results <- lapply(1:n_params,
  function(i)
    crossval::crossval_ml(
      x = X,
      y = y,
      k = 5,
      repeats = 3,
      p = 0.8,
      fit_func = glmnet::glmnet,
      predict_func = predict.glmnet,
      packages = c("glmnet", "Matrix"),
      fit_params = list(alpha = tuning_grid[i, "alpha"],
        lambda = tuning_grid[i, "lambda"])
    ))
names(cv_results) <- paste0("params_set", 1:n_params)
```

Print grid search results

Remarks are welcome.

```
print(cv_results)

## $params_set1
## $params_set1$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1   2.7116571 3.4204585 2.970296
## fold_validation_1 1.1310676 2.1443185 2.038922
## fold_training_2   1.7335414 1.0317404 3.740119
## fold_validation_2 1.6528925 1.5592805 0.905873
## fold_training_3   2.9526843 4.4059576 3.063401
## fold_validation_3 2.4348686 0.9470344 1.227135
## fold_training_4   4.3206047 3.7097429 3.252773
## fold_validation_4 0.8305158 1.7408722 1.793542
## fold_training_5   1.3484699 1.9396528 1.322698
## fold_validation_5 1.4838844 1.8029411 1.288075
##
## $params_set1$mean_training
## [1] 2.79492
##
## $params_set1$mean_validation
## [1] 1.532082
##
## $params_set1$sd_training
## [1] 1.089414
##
## $params_set1$sd_validation
## [1] 0.4773198
##
## $params_set1$median_training
## [1] 2.970296
##
## $params_set1$median_validation
## [1] 1.559281
##
##
```

```

## $params_set2
## $params_set2$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1    2.6942232 3.4034435 2.9509207
## fold_validation_1  1.1283288 2.1212168 2.0922106
## fold_training_2    1.7071382 1.0236950 3.7337454
## fold_validation_2  1.6183054 1.5395739 0.9289049
## fold_training_3    2.9572493 4.3913568 3.0347475
## fold_validation_3  2.4458845 0.9670278 1.2149724
## fold_training_4    4.3683721 3.6924562 3.2383772
## fold_validation_4  0.8786582 1.7168194 1.7714379
## fold_training_5    1.3451998 1.9338217 1.3169037
## fold_validation_5  1.4832682 1.7971002 1.2850981
##
## $params_set2$mean_training
## [1] 2.78611
##
## $params_set2$mean_validation
## [1] 1.532587
##
## $params_set2$sd_training
## [1] 1.093607
##
## $params_set2$sd_validation
## [1] 0.470716
##
## $params_set2$median_training
## [1] 2.957249
##
## $params_set2$median_validation
## [1] 1.539574
##
##
## $params_set3
## $params_set3$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1    2.6762742 3.385479 2.9318273
## fold_validation_1  1.1267161 2.094206 2.1505220
## fold_training_2    1.6851155 1.017365 3.7272127
## fold_validation_2  1.5972579 1.519639 0.9543918
## fold_training_3    2.9614653 4.376096 3.0052024
## fold_validation_3  2.4567021 0.989157 1.2033089
## fold_training_4    4.4107761 3.674386 3.2273064
## fold_validation_4  0.9223574 1.691938 1.7506447
## fold_training_5    1.3421543 1.928040 1.3124042
## fold_validation_5  1.4833113 1.791768 1.2834694
##
## $params_set3$mean_training
## [1] 2.777407
##
## $params_set3$mean_validation
## [1] 1.534359
##
## $params_set3$sd_training
## [1] 1.096777
##
## $params_set3$sd_validation

```

```

## [1] 0.4656268
##
## $params_set3$median_training
## [1] 2.961465
##
## $params_set3$median_validation
## [1] 1.519639
##
##
## $params_set4
## $params_set4$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1  2.582406 3.2605565 2.864273
## fold_validation_1 1.168777 1.9268152 2.078255
## fold_training_2   1.650031 0.8984717 3.686839
## fold_validation_2 1.482450 1.4721014 1.017757
## fold_training_3   2.708588 4.2802020 2.939830
## fold_validation_3 2.235334 1.0667584 1.204211
## fold_training_4   4.466894 3.5879682 3.081803
## fold_validation_4 1.004771 1.5646289 1.570059
## fold_training_5   1.326640 1.9144285 1.380771
## fold_validation_5 1.509964 1.7885983 1.335888
##
## $params_set4$mean_training
## [1] 2.708647
##
## $params_set4$mean_validation
## [1] 1.495091
##
## $params_set4$sd_training
## [1] 1.086611
##
## $params_set4$sd_validation
## [1] 0.3817352
##
## $params_set4$median_training
## [1] 2.864273
##
## $params_set4$median_validation
## [1] 1.48245
##
##
## $params_set5
## $params_set5$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1  2.5706795 3.1103749 2.803793
## fold_validation_1 1.2068333 1.7463001 2.075065
## fold_training_2   1.5011386 0.8148667 3.688756
## fold_validation_2 1.3987359 1.3301017 1.001877
## fold_training_3   2.7010045 4.2517543 2.747419
## fold_validation_3 2.2688901 1.1557910 1.178889
## fold_training_4   4.4448265 3.4750530 3.016761
## fold_validation_4 0.9854596 1.4860992 1.437257
## fold_training_5   1.3487225 1.8742370 1.295727
## fold_validation_5 1.5372721 1.7800714 1.311683
##
## $params_set5$mean_training

```

```

## [1] 2.643008
##
## $params_set5$mean_validation
## [1] 1.460022
##
## $params_set5$sd_training
## [1] 1.093856
##
## $params_set5$sd_validation
## [1] 0.3720159
##
## $params_set5$median_training
## [1] 2.747419
##
## $params_set5$median_validation
## [1] 1.398736
##
##
## $params_set6
## $params_set6$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1   2.5990228 2.9781640 2.7493269
## fold_validation_1 1.2121089 1.5799814 2.0848477
## fold_training_2   1.4225076 0.7604152 3.6906583
## fold_validation_2 1.4216262 1.2543630 0.9884764
## fold_training_3   2.7409312 4.2492745 2.7175981
## fold_validation_3 2.3240529 1.1598608 1.1607340
## fold_training_4   4.4339739 3.4654770 3.0117350
## fold_validation_4 0.9800525 1.4991208 1.4168583
## fold_training_5   1.3765304 1.8415788 1.3257447
## fold_validation_5 1.5496021 1.8006454 1.3220442
##
## $params_set6$mean_training
## [1] 2.624196
##
## $params_set6$mean_validation
## [1] 1.450292
##
## $params_set6$sd_training
## [1] 1.097017
##
## $params_set6$sd_validation
## [1] 0.3811666
##
## $params_set6$median_training
## [1] 2.740931
##
## $params_set6$median_validation
## [1] 1.416858
##
##
## $params_set7
## $params_set7$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1   2.698210 2.885301 2.455576
## fold_validation_1 1.551401 1.704756 1.716643
## fold_training_2   1.783057 1.028166 3.528652

```

```

## fold_validation_2 1.688929 1.457255 1.192856
## fold_training_3 2.635762 3.951937 2.764754
## fold_validation_3 2.325906 1.361088 1.478338
## fold_training_4 4.383367 3.622788 2.966129
## fold_validation_4 1.262743 1.758041 1.628874
## fold_training_5 1.520805 1.968637 1.384429
## fold_validation_5 1.747330 2.061490 1.586987
##
## $params_set7$mean_training
## [1] 2.638505
##
## $params_set7$mean_validation
## [1] 1.634842
##
## $params_set7$sd_training
## [1] 0.9764259
##
## $params_set7$sd_validation
## [1] 0.2898281
##
## $params_set7$median_training
## [1] 2.69821
##
## $params_set7$median_validation
## [1] 1.628874
##
##
## $params_set8
## $params_set8$folds
##          repeat_1 repeat_2 repeat_3
## fold_training_1 2.966475 2.806465 1.737976
## fold_validation_1 1.692210 1.804410 1.498461
## fold_training_2 1.392634 1.104673 3.578175
## fold_validation_2 2.068470 1.499582 1.163872
## fold_training_3 2.684285 3.930335 2.611488
## fold_validation_3 2.543810 1.441189 1.498748
## fold_training_4 4.269152 3.760451 3.327202
## fold_validation_4 1.381628 2.067037 2.049550
## fold_training_5 1.771081 2.323059 1.777073
## fold_validation_5 1.946920 2.405880 1.787871
##
## $params_set8$mean_training
## [1] 2.669368
##
## $params_set8$mean_validation
## [1] 1.789976
##
## $params_set8$sd_training
## [1] 0.9775324
##
## $params_set8$sd_validation
## [1] 0.3908084
##
## $params_set8$median_training
## [1] 2.684285
##
## $params_set8$median_validation

```

```
## [1] 1.787871
##
##
## $params_set9
## $params_set9$folds
##           repeat_1 repeat_2 repeat_3
## fold_training_1   3.254495 2.789325 1.094701
## fold_validation_1 1.878893 1.938494 1.581836
## fold_training_2   1.546198 1.179068 3.647095
## fold_validation_2 2.495703 1.623228 1.219294
## fold_training_3   2.478050 3.922693 2.414970
## fold_validation_3 2.594489 1.592061 1.575155
## fold_training_4   4.171757 3.904126 3.695321
## fold_validation_4 1.754051 2.395155 2.455114
## fold_training_5   2.053809 2.660005 2.127650
## fold_validation_5 2.177259 2.741885 2.012704
##
## $params_set9$mean_training
## [1] 2.729284
##
## $params_set9$mean_validation
## [1] 2.002355
##
## $params_set9$sd_training
## [1] 1.014183
##
## $params_set9$sd_validation
## [1] 0.454853
##
## $params_set9$median_training
## [1] 2.660005
##
## $params_set9$median_validation
## [1] 1.938494...
```