Validation of models with auditor: : **CHEAT SHEET**

Intro

Package **auditor** is a tool for model-agnostic validation. Implemented techniques facilitate assessing and comparing the goodness of fit and performance of models. In addition, they may be used for the analysis of the similarity of residuals and for the identification of outliers and influential observations.

The auditor is based on the DrWhy grammar, the idea that you can wrap up a model into explainer. Such explainer can be used for furher analysis of model in a uniform way.

PREPARING EXPLAINER OF MODEL

The **DALEX::explain()** function creates model adapters: objects with standardised structure that are used by auditor functions for model validation and exploration.

```
DALEX::explain(model,
    data, y, label, predict_function, residual_function)
```

CALCULATION FUNCTIONS

Created explainer object can be passed to five calculation functions from the **auditor** package. Each function focuses on other validation aspect.

- Exploration of residuals (distribution, homoscedasticity, …)
  model_residual(explainer)
- Evaluation of classifiers (derivations from confusion matrix)
  model_evaluation(explainer)
- Measuring a performance of model (MSE, MAE, AUC, …)
  model_performance(explainer, score, new_score)
- Influence of observations (Cook's distances)
  model_cooksdistance(explainer)
- Verification of model fit (Half-Normal plots)
  model_halfnormal(explainer, quant, …)

GENARAL WORKFLOW

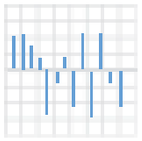
Explanations can be both plotted and printed.

```
explanation <- model %>%
        explain %>%
        <calculation function>
```

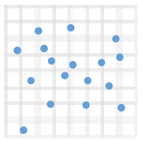
```
plot(explanation)
plotD3(explanation)
print(explanation)
```

Exploration of residuals

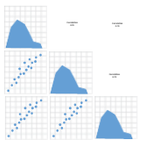
model_residual(explainer)



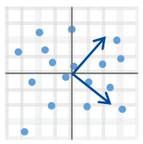
Autocorrelation Function of Residuals
plot(explanationa, …, type = "acf")
plot_acf(explanation, ..., variable, alpha**)**
plotD3_acf(explanation, …, variable, alpha, scale_plot**)**



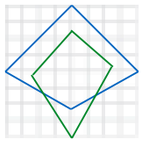
Autocorrelation of Residuals
plot(explanation, …, type = "autocorrelation"**)**
plot_autocorrelation(explanation, …, variable, smooth**)**
plotD3_autocorrelation(explantion, …, variable, points, smoth, point_count, single_plot, scale_plot, background**)**



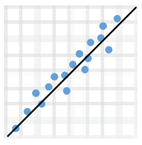
Correlation of residuals
plot(explanation, …, type = "correlation"**)**
plot_correlation(explanation, …, values**)**



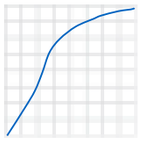
Principal Components of model's of residuals
plot(explanation, …, type = "pca"**)**
plot_pca(explanation, …, scale**)**



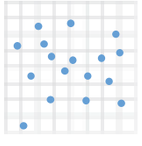
Model Ranking Radar Plot
plot(explanation, …, type = "radar"**)**
plot_radar(explanation, …, score, new_score**)**



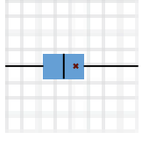
Predicted Response vs Actual or Variable Values
plot(explanation, …, type = "prediction"**)**
plot_prediction(explanation, …, variable, smooth, abline**)**
plotD3_prediction(explanation, …, variable, points, smooth, abline, point_count, single_plot, scale_plot, background**)**



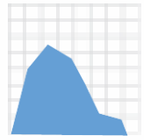
Regression Error Characteristic Curve (REC)
plot(explanation, …**)**
plot_rec(explanation, ...**)**
plotD3_rec(explanation, ..., scale_plot**)**



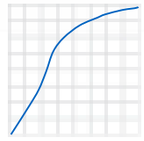
Plot Residuals vs Actual, Fitted or Variable Values
plot(explanation, …, type = "prediction"**)**
plot_residual(explanation, …, variable, smooth, std_residuals, nlabel**)**
plotD3_residual(explanation, …, points, std_residuals, nlabel, point_count, single_plot, scale_plot, background**)**



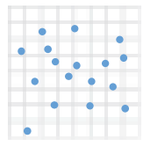
Residual Boxplot
plot(explanation, …, type = "residual_boxplot"**)**
plot_residua;_boxplot(explanation, …**)**



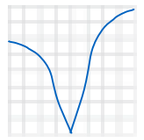
Residual Density
plot(explanation, …, type = "residual_density"**)**
plot_residual_density(explanation, …, split, variable**)**



Regression Receiver Operating Characteristic (RROC)
plot(explanation, …, type = "rroc"**)**
plot_rroc(explanation, …**)**



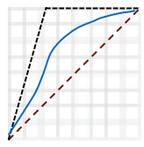
Scale-Location Plot
plot(explanation, …, type = "scalelocation"**)**
plot_scalelocation(explanation, …, variable, smooth, peaks**)**
plotD3_scalelocation(explanation, …, variable, smooth, peaks, point_count, single_plot, scale_plot, background**)**



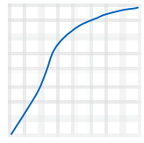
Two-sided Cumulative Distribution Function
plot(explanation, …, type = "tsecdf"**)**
plot_tsecdf(explanation, …scale_error, outliers, residuals, reverse_y**)**

Evaluation of classifiers

model_evaluation(explainer)



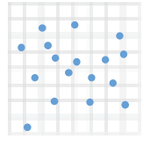
LIFT Curve
plot(explanation, …, type = "lift"**)**
plot_lift(explanation, ...**)**
plotD3_lift(explanation, …, scale_plot**)**



Receiver Operating Characteristic (ROC) Curve
plot(explanation, …, type = "roc"**)**
plot_roc(explanation, ..., nlabel**)**

Influence of observations

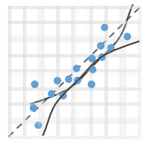
model_cooksdistance(explainer)



Cook's Distances of Observations
plot(explanation, …, type = "cooksdistance"**)**
plot_cooksdistance(explanation, ..., nlabel**)**
plotD3_cooksdistance(explanation, …, nlabel, single_plot, scale_plot, background**)**

Verification of model fit

model_halfnormal(explainer, quant, …)



Half-normal plots
plot(explanation, …, type = "halfnormal"**)**
plot_halfnormal(explanation, ..., quantiles, sim**)**
plotD3_halfnormal(explanation, …, nlabel, single_plot, scale_plot, background**)**