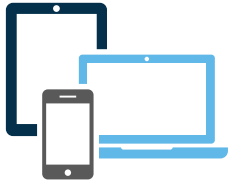
Analyse der NBA 1997 Daten durch 4 verschiedene Benutzer-Rollen

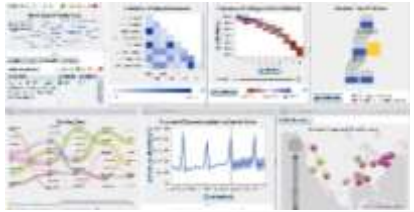
Offenheit der SAS Analytic Plattform für unterschiedliche Zugriffsarten

Offenheit der SAS Analytic Plattform für unterschiedliche Zugriffsarten

Erfüllung der individuellen Anforderungen

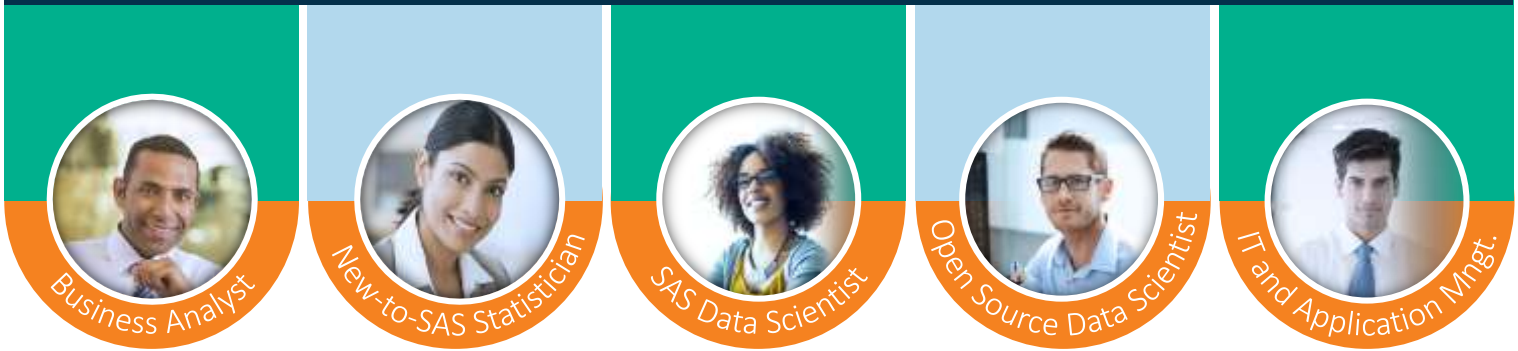


Mobile

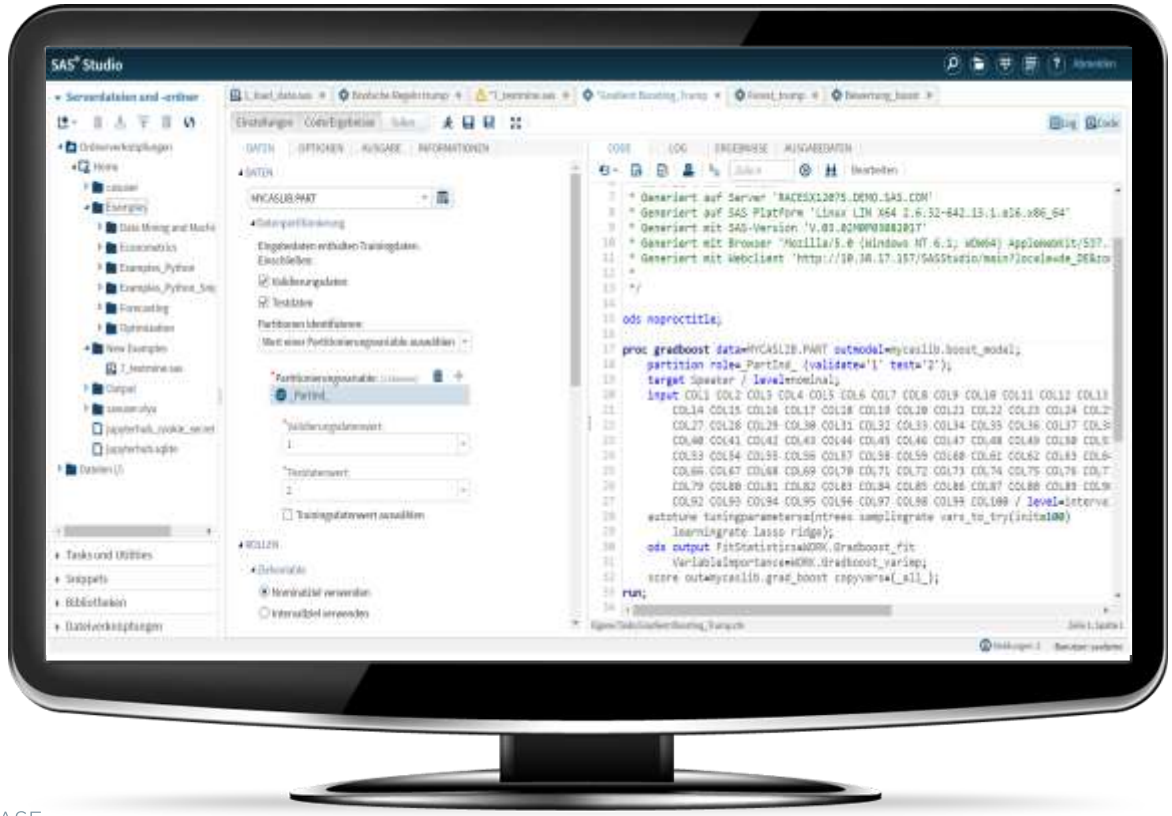


Office Integration

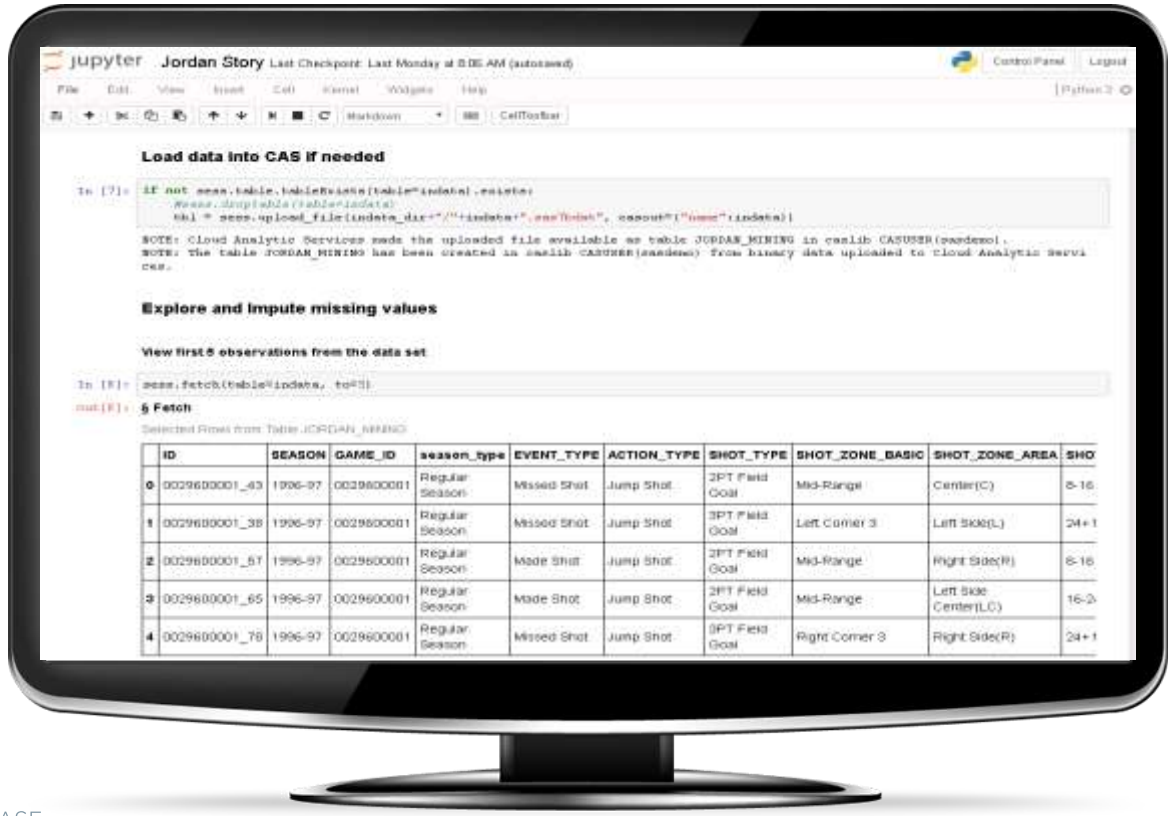
One Integrated Solution for Different User Types



Code Generators

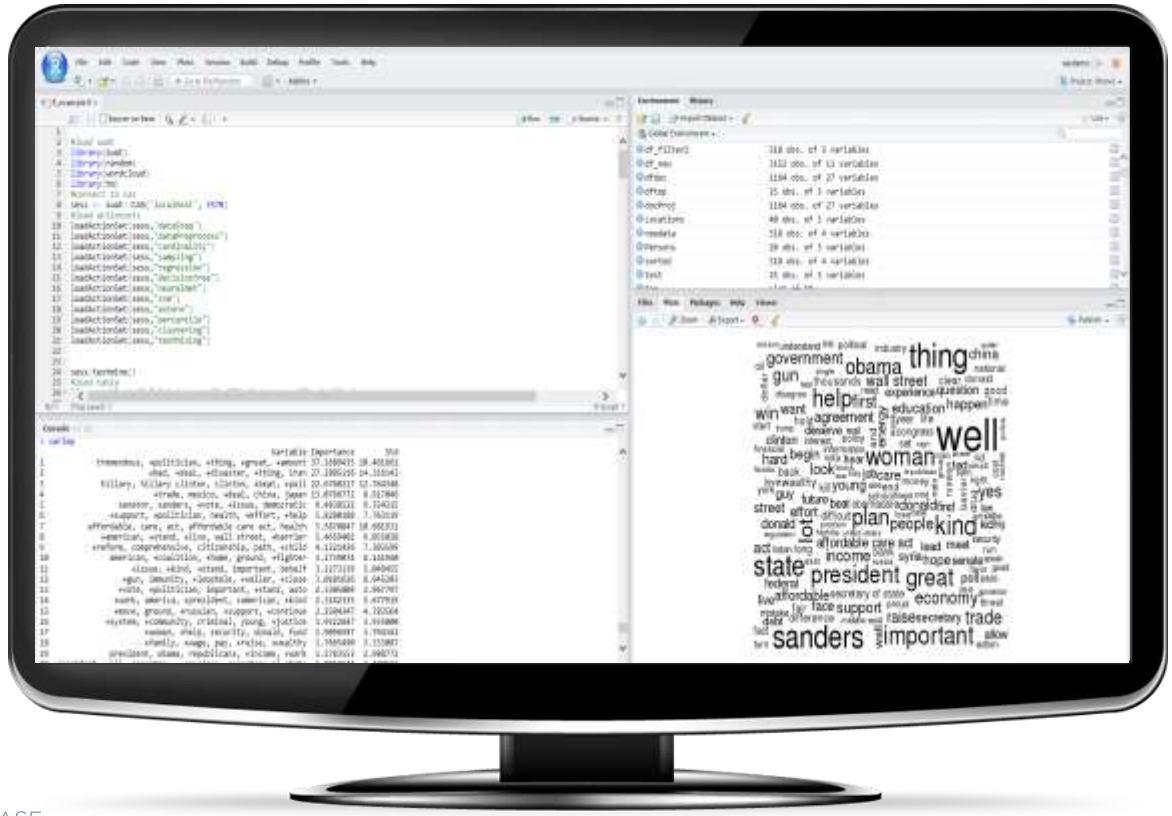


Python API



	ID	SEASON	GAME_ID	season_type	EVENT_TYPE	ACTION_TYPE	SHOT_TYPE	SHOT_ZONE_BASIC	SHOT_ZONE_AREA	SHO
0	0029600001_43	1996-97	0029600001	Regular Season	Missed Shot	Jump Shot	2PT Field Goal	Mid-Range	Center(C)	8-16
1	0029600001_38	1996-97	0029600001	Regular Season	Missed Shot	Jump Shot	3PT Field Goal	Left Corner 3	Left Side(L)	24+
2	0029600001_67	1996-97	0029600001	Regular Season	Made Shot	Jump Shot	2PT Field Goal	Mid-Range	Right Side(R)	8-16
3	0029600001_65	1996-97	0029600001	Regular Season	Made Shot	Jump Shot	2PT Field Goal	Mid-Range	Left Side Center(LC)	16-2
4	0029600001_78	1996-97	0029600001	Regular Season	Missed Shot	Jump Shot	3PT Field Goal	Right Corner 3	Right Side(R)	24+

R



Opening the SAS Analytic Platform via Different Interfaces

Start the SAS Cloud Analytic Server

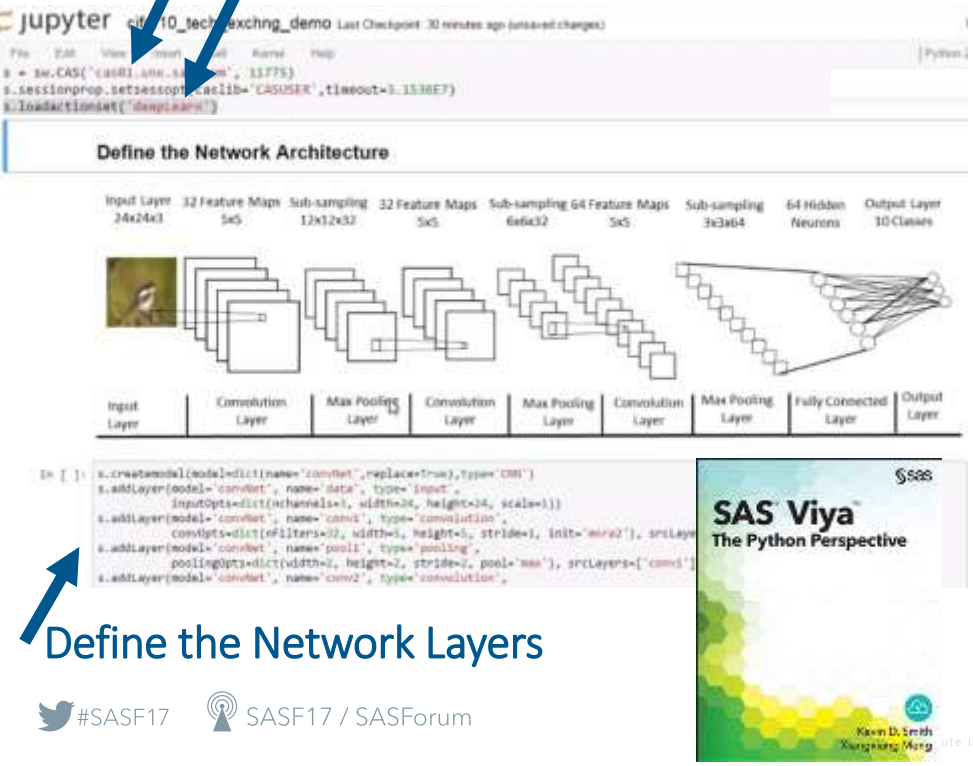
Load the DeepLearning Action Set

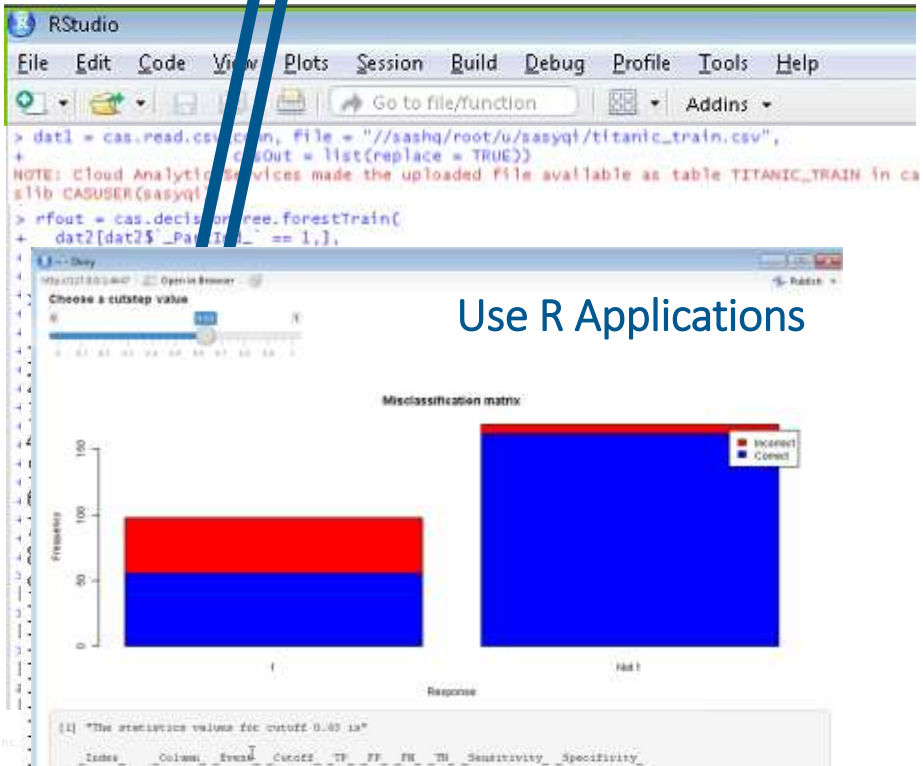
Define the Network Layers

Use the CAS Random Forest

Display the Results in R-Studio

Use R Applications





Michael Jordan under pressure

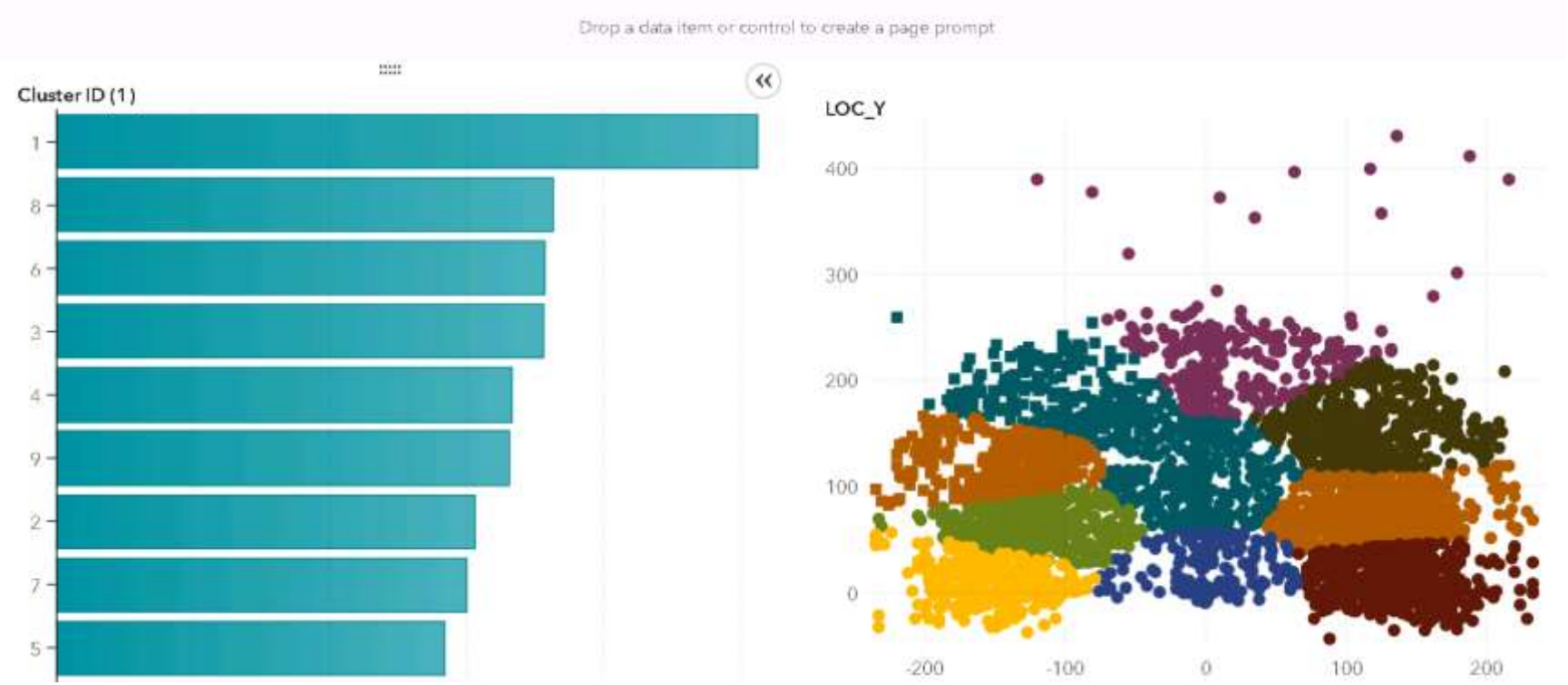
http://stats.nba.com

Analyse der NBA 1997 Daten durch 4 verschiedene Benutzer-Rollen

SAS Visual Analytics und SAS Visual Statistics für den Business Analyst

SAS Visual Statistics für den Business Analyst

Point&Click Zugriff auf Machine Learning Methoden



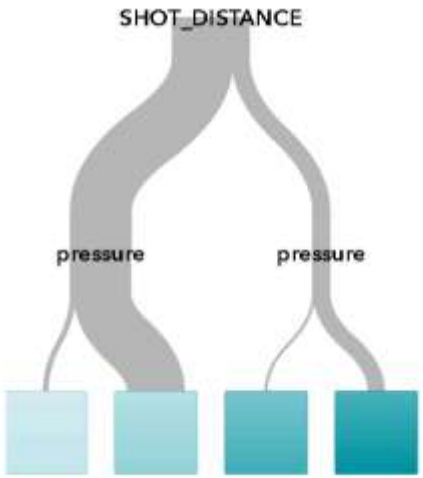
SAS Visual Statistics für den Business Analyst

Point&Click Zugriff auf Machine Learning Methoden

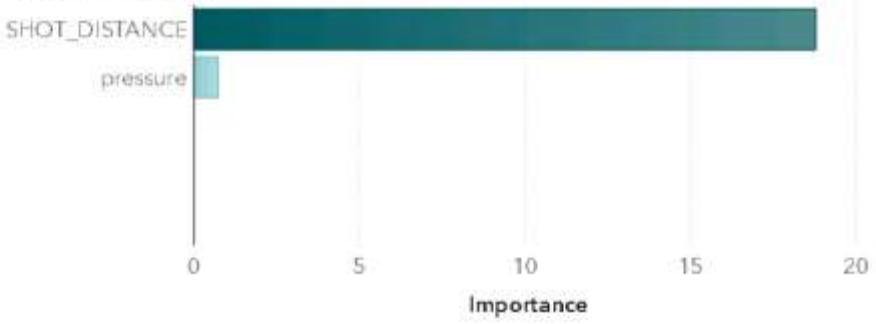
Drop a data item or control to create a page prompt

Decision Tree **SHOT_MADE_FLAG** ASE **0.245162** Observations Used **4,809**

Tree



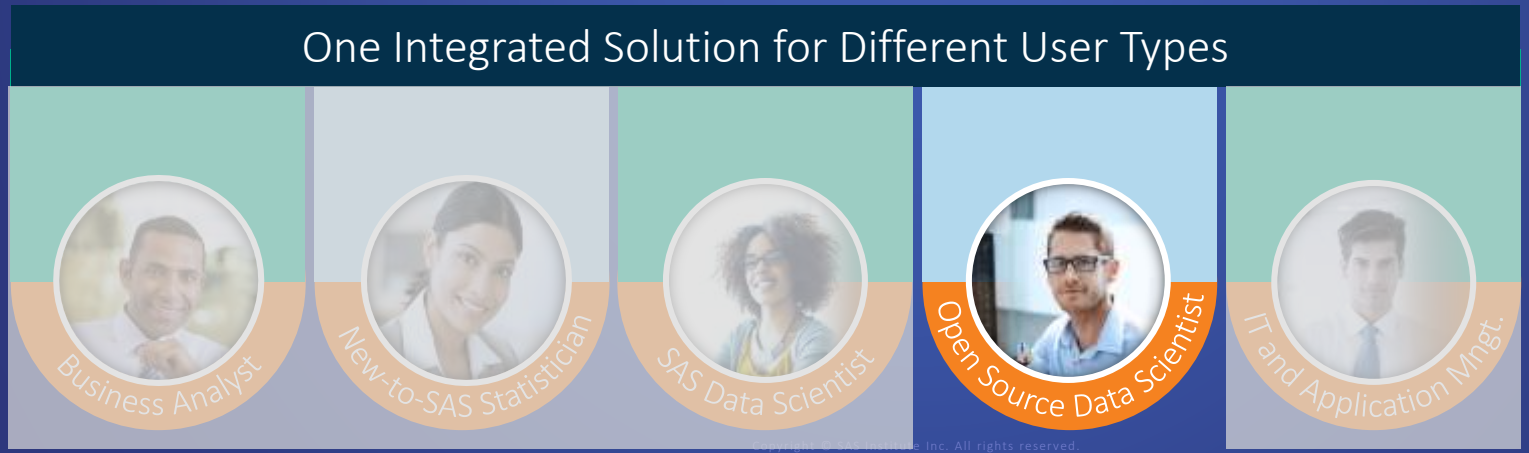
Variable Importance



Assessment

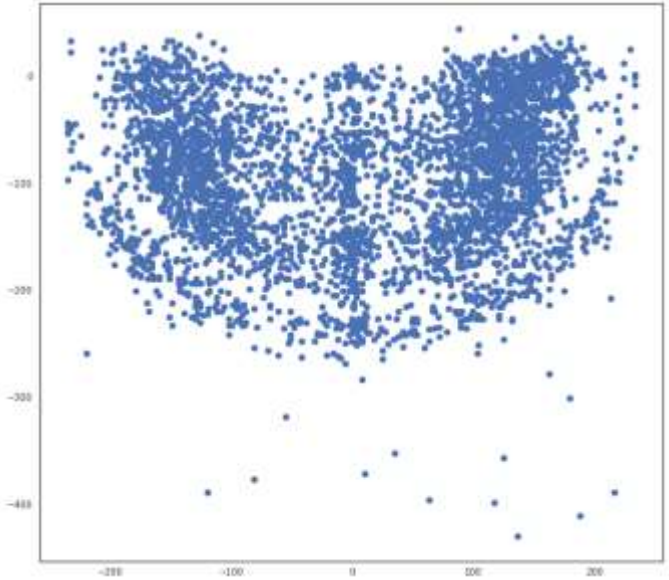
Analyse der NBA 1997 Daten durch 4 verschiedene Benutzer-Rollen

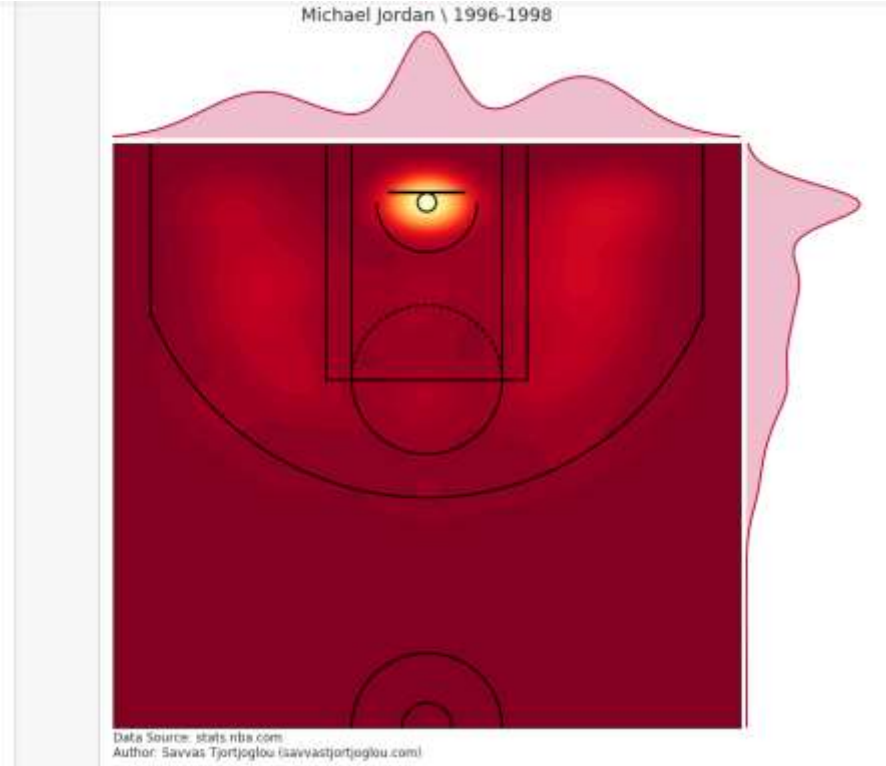
SAS-Python Integration für den Open Source Data Scientist



How good was Jordan under pressure?

Some Graphs benefiting from the open source community





http://savvastjortjoglou.com/nba-shot-sharts.html

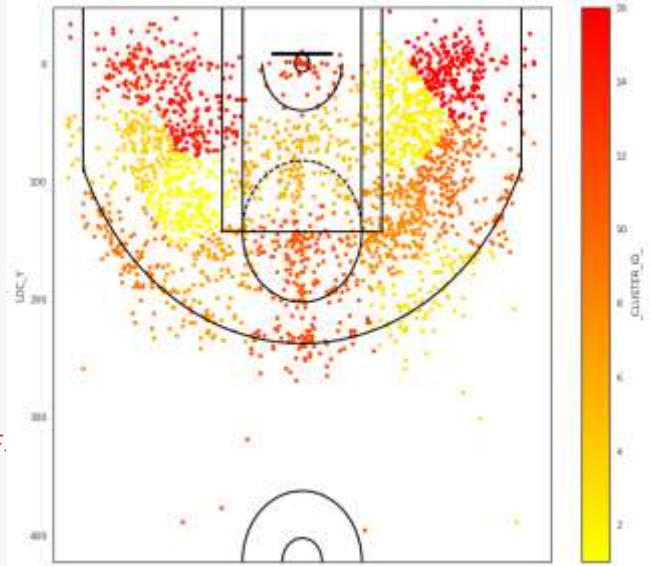
How good was Jordan under pressure?

Clustering the Court into Shot Zones using CAS action set

```
clust=sess.clustering.kClus(
      table={
          "name":"jordan_mining"
      },
      inputs={"LOC_X","LOC_Y_MINUS"},
      nClusters=30,
      maxIters=10,
      distanceNom="RELATIVEFREQ",
      estimateNClusters={
          "method":"ABC",
          "B":10,
          "minClusters":15,
          "criterion":"ALL",
          "align":"PCA"
      },
      kPrototypeParams={
          "method":"USERGAMMA",
          "value":10
      },

      output={"CasOut":{"name":"kClusOutputScore", "replace":True},
              "copyVars":{"LOC_X","LOC_Y","LOC_Y_MINUS","Made","Lead_Player
       ,
      display={"names":{"Modelinfo", "ClusterSumIntNom"}}

)
```



How good was Jordan under pressure?

Using CAS Regression to investigate performance under pressure

Logistic

In [69]:
```
lr = sess.regression.logistic(
  table={"name":"kClusOutputScore"},
  classVars=[{"vars":{"_CLUSTER_ID_","Lead_Player_Before", "Homegame", "ACTION_TYPE",  "end_of_game","Overtime","close_game","
  model={
    "depVars":[{"name":"Made", "options":{"event":"1"}}],
    "effects":[{"vars":{"SHOT_DISTANCE","_CLUSTER_ID_", "ACTION
  },

  outputTables={"names":"parameterestimates"}
)
sess.dataStep.runCode(
  code="""data round; set parameterestimates(keep=Parameter DF
do i = 1 to dim(_nums);
  _nums{i} = round(_nums{i},.001);
end;
drop i;
run;"""
)
sess.fetch(table="round")
```

Out[69]: § Fetch

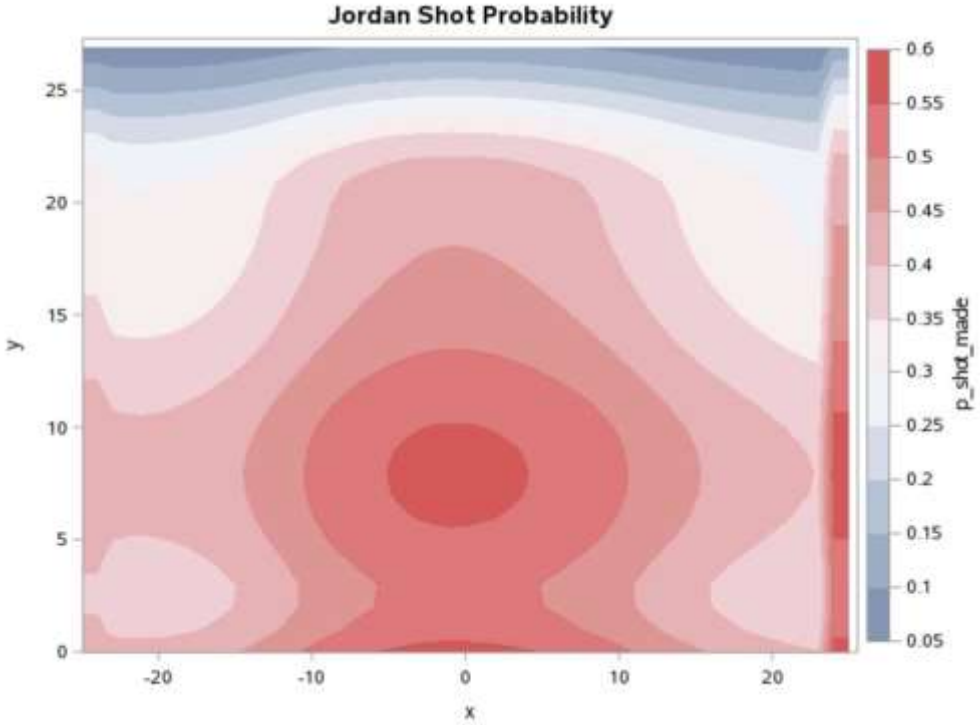
Selected Rows from Table ROUND

	Parameter	DF	Estimate	StdErr	ChiSq	ProbChiSq
0	Intercept	1.0	14.322	94.876	0.023	0.880
1	pressure 1	1.0	-0.365	0.188	4.193	0.041
2	pressure 0	0.0	0.000	NaN	NaN	NaN
3	Overtime Regular	1.0	0.382	0.370	1.069	0.301
4	Overtime Overtime	0.0	0.000	NaN	NaN	NaN
5	SHOT_DISTANCE	1.0	-0.035	0.014	6.500	0.011
6	ACTION_TYPE Tip Shot	1.0	-13.135	94.875	0.019	0.890
7	ACTION_TYPE Slam Dunk Shot	1.0	0.027	126.564	0.000	1.000
8	ACTION_TYPE Running Jump Shot	1.0	-12.634	94.876	0.018	0.894
9	ACTION_TYPE Layup Shot	1.0	-13.064	94.875	0.019	0.890
10	ACTION_TYPE Jump Shot	1.0	-14.106	94.875	0.022	0.882
11	ACTION_TYPE Hook Shot	1.0	-12.552	94.882	0.017	0.895
12	ACTION_TYPE Dunk Shot	1.0	-10.540	94.875	0.012	0.912
13	ACTION_TYPE Driving Layup Shot	1.0	-11.510	94.875	0.015	0.903
14	ACTION_TYPE Driving Dunk Shot	0.0	0.000	NaN	NaN	NaN

Analyse der NBA 1997 Daten durch 4 verschiedene Benutzer-Rollen

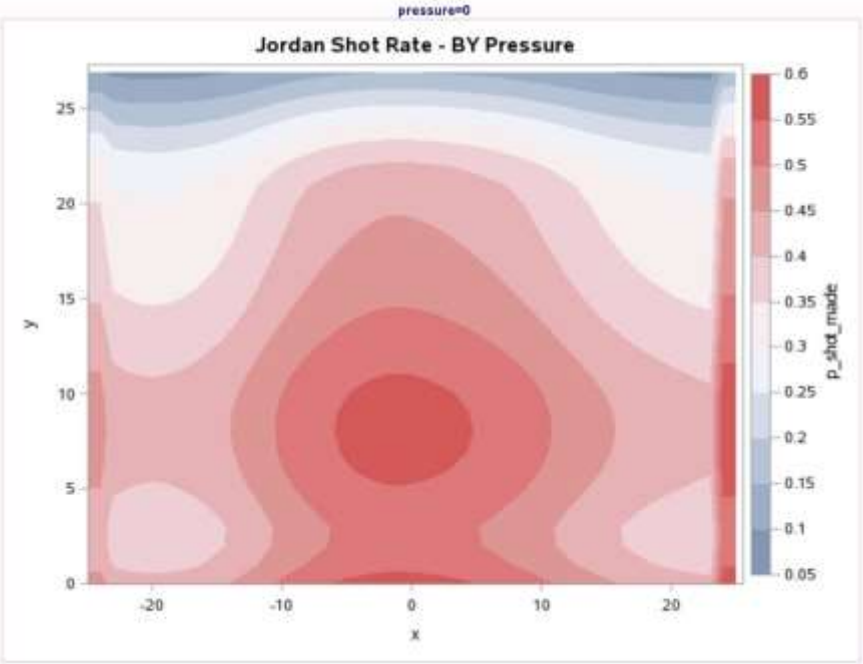
SAS Procedures für den SAS Data Scientist

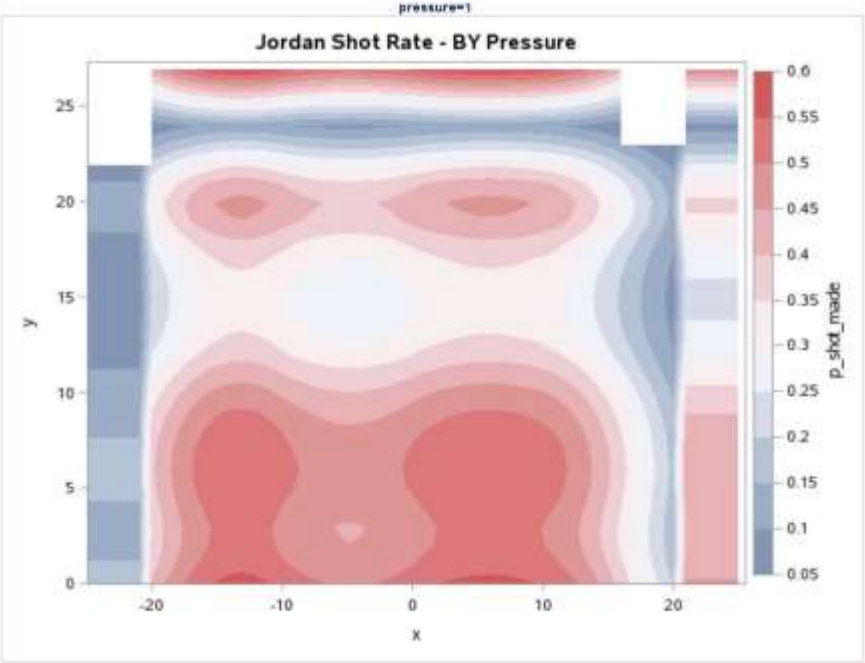
Vorhersage der Treffer-Wahrscheinlichkeit von Jordan im [-25,25]x[0,27] Grid




```
proc logselect data=sfdcas.Jordan;
where Shot_Distance <= 30;
effect spl = spline(X Y / degree=2);
model Shot_Made(event='1') = spl ;
output out=sfdcas.Jordan_pred
pred=p copyvars=(x y shot_distance
shot_made);
Code file='/opt/sasinside/
DemoData/SFD/JordanPred_0.sas';
run;
```

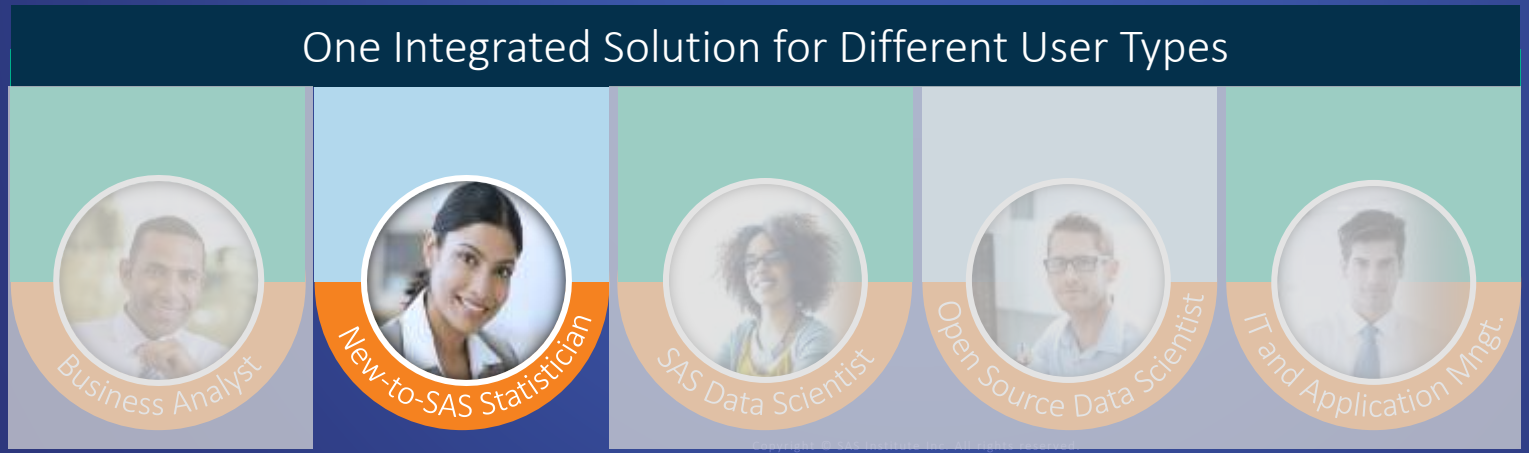
Vorhersage der Treffer-Wahrscheinlichkeit von Jordan getrennt nach Pressure ja/nein





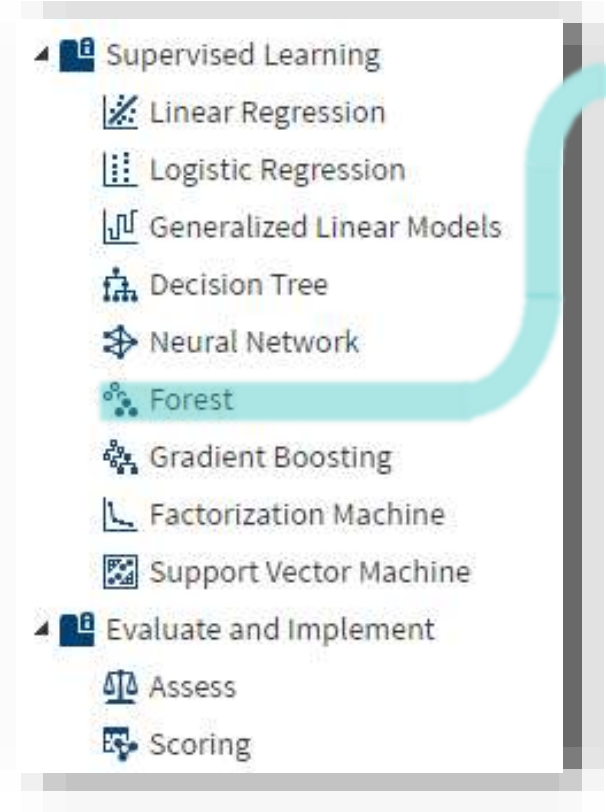
Analyse der NBA 1997 Daten durch 4 verschiedene Benutzer-Rollen

Data Mining/Machine Learnings Tasks im SAS Studio für den „New-to-SAS“ Statistician



Data Mining und Machine Learnings Tasks im SAS Studio

Beispiel: Random Forests



FOREST

Forest or PROC FOREST used for classification models.

Generates many trees from different samples of training data.

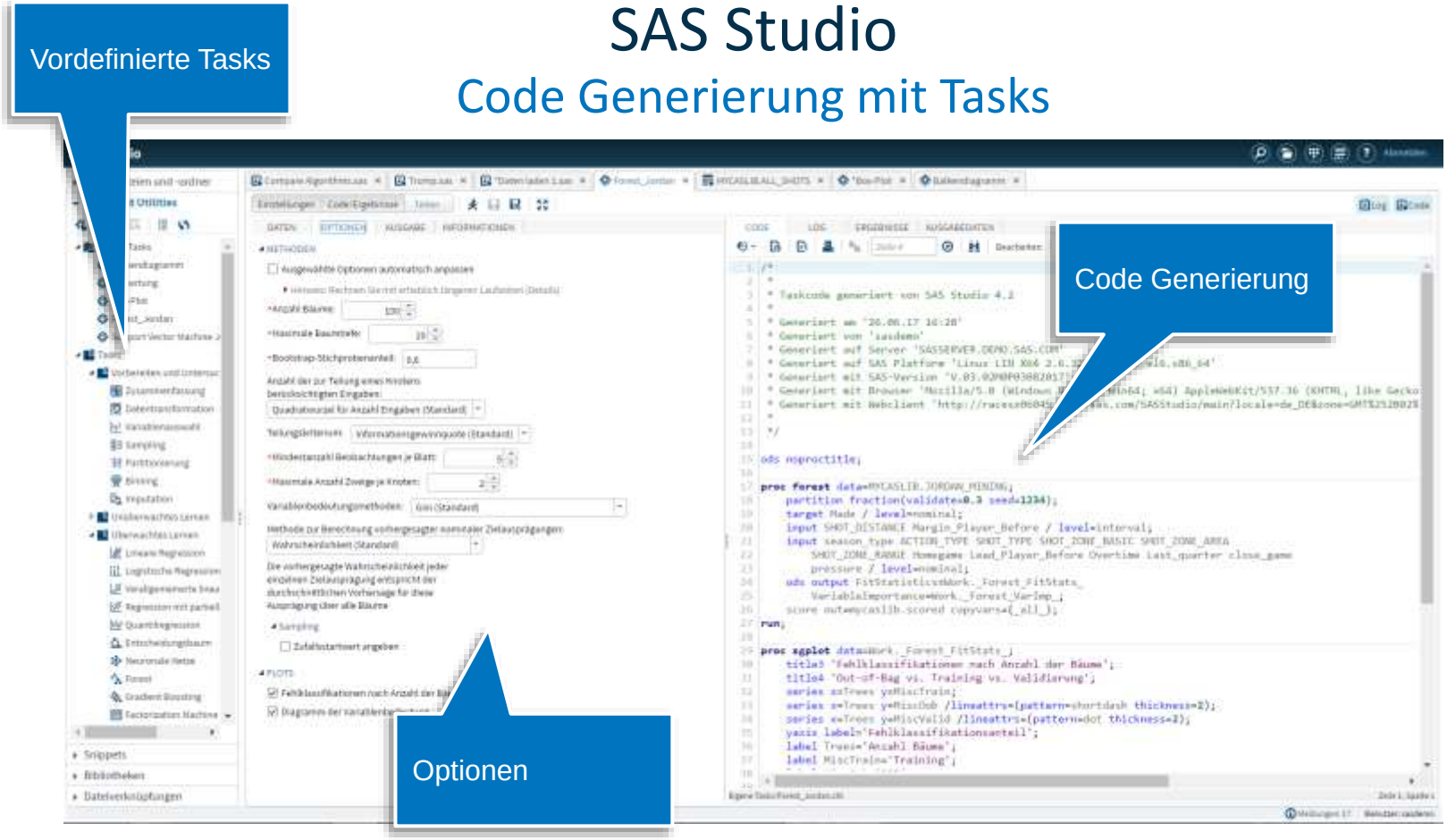
Mode of all predictions is final prediction

Forest Competitive Differentiators

- Distributed and massively parallel
- Faster, more memory-efficient, and more scalable algorithm
- Deployable – Generated rules

SAS Studio

Code Generierung mit Tasks



SAS Studio

Code Generierung mit Tasks

Vordefinierte Tasks

Ergebnisse

Optionen

SAS Studio

Code Generierung mit Tasks

Vordefinierte Tasks

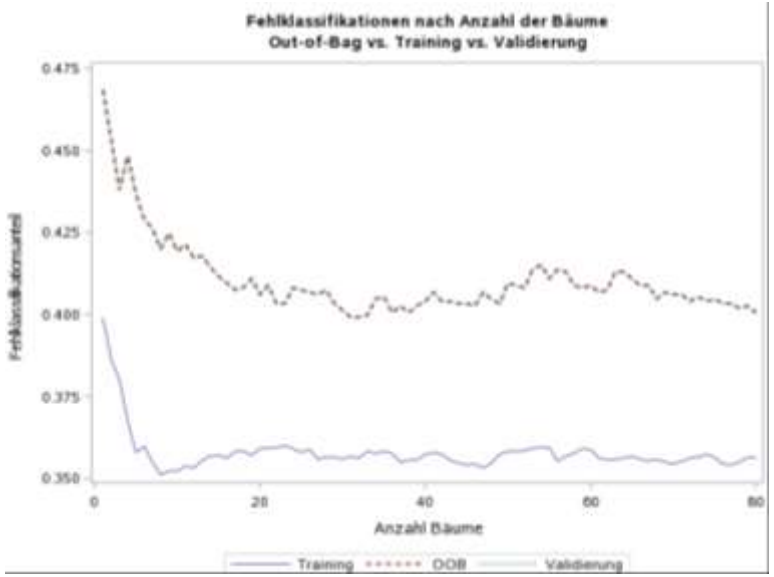
Aktivierung der Autotuning Funktionalität

Ergebnisse

SAS Studio

Code Generierung mit Tasks

Tuner Results Default and Best Configurations					
Evaluation	Maximum Tree Levels	Number of Trees	Number of Variables to Try	Bootstrap	Misclassification Error Percentage
0	21	100	14	0.600000	41.30
12	14	80	5	0.795267	40.06
45	14	80	5	0.791425	40.26
39	12	72	7	0.725718	40.54
30	12	70	7	0.705657	40.61
3	2	20	14	0.277778	40.68
17	5	34	12	0.403667	40.68
22	4	22	13	0.335616	40.68
24	5	34	12	0.394741	40.68
32	2	20	14	0.218658	40.68
33	6	33	12	0.415225	40.68



SAS Studio

Code Generierung mit Tasks