

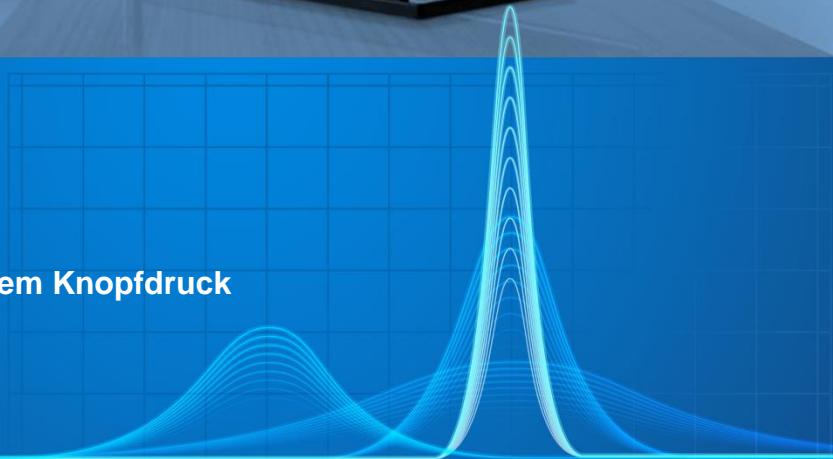
# SAS® Factory Miner

More models, smarter decisions, better outcomes. Automatically.



**PLATTFORM  
NETZWERK  
TREFFEN**

**SAS® FACTORY MINER –**  
**Tausende Data Mining Modelle mit nur einem Knopfdruck**  
Anette Almer



## AGENDA

- Motivation
- Demo
- Zusammenfassung

Unpersonalisiert  
Unübersichtlich  
Unfokussiert

Sehr geehrte Damen und Herren,

mit diesem Schreiben möchten wir Sie auf unser breit gefächertes Sortiment an Stempeln, Schildern, Gravuren und Orientierungssystemen mit den entsprechenden Rabattaktionen aufmerksam machen.

Erweitern Sie Ihr Schreibtischinventar mit neuen Stempeln für ggf. neue Mitarbeiter, Auszubildende oder mit neuer Anschrift nach einem Umzug.

Sorgen Sie für mehr Präsenz und Orientierung. Markieren Sie Ihre Räumlichkeiten mit Türbeschilderungen in Praxen oder Bürogebäuden, in Aufzügen oder an Stockwerksbezeichnungen als Schaufensterbeklebung oder den Firmenwagen.

Nutzen Sie unsere hochwertigen Geschenkartikel mit individueller und persönlicher Gravur zu besonderen Anlässen wie Betriebsfeier oder Jubiläum.

Unsere Rabattaktion beginnt am 02.04 – 13.04.2012 mit **10 %** auf alles!

Haben wir Ihr Interesse geweckt, dann lassen Sie sich fachgerecht vor Ort beraten oder besuchen Sie uns im Internet unter [www.sas.de](http://www.sas.de).

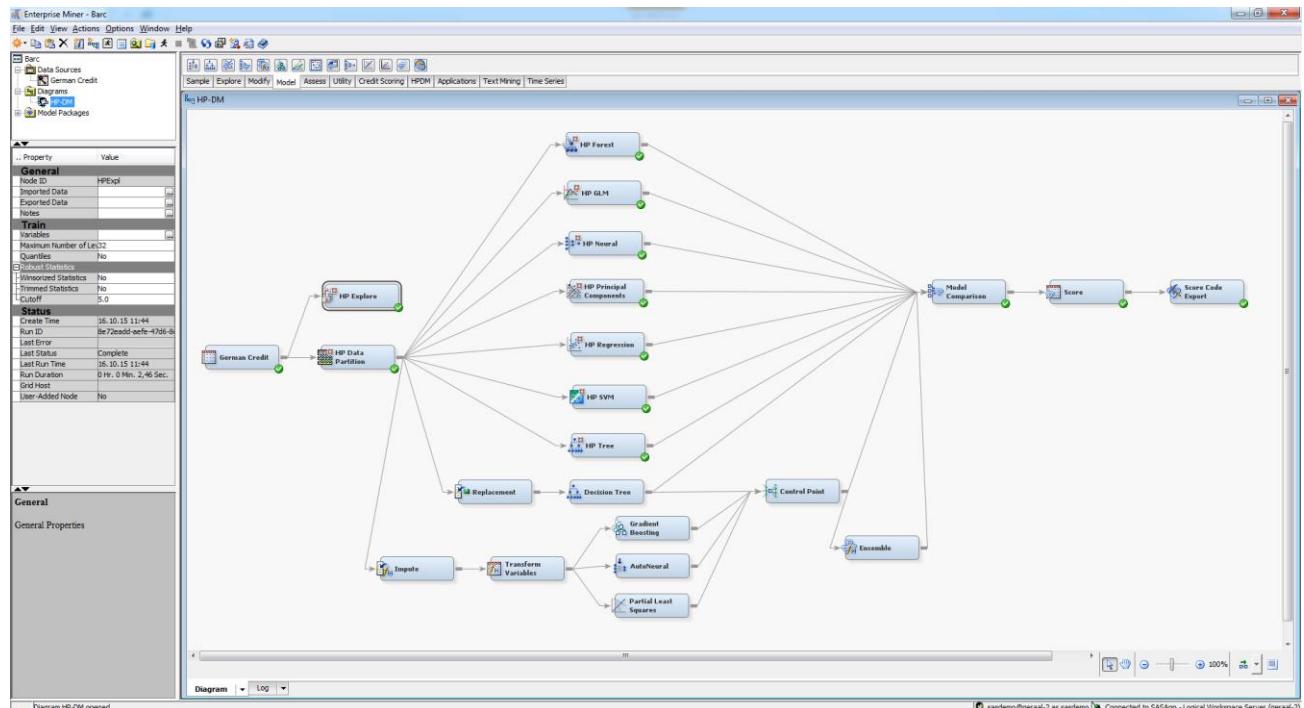
Wir freuen uns auf Ihre Aufträge.

Mit freundlichen Grüßen

# ANALYTICS

1 Modell für alle Kunden  
1 Deployment-Prozess  
Regelmäßige Anwendung

## „GESTERN“



# Personalisiert Segment-spezifisch Kanalübergreifend

## MARKETING

## ... UND HEUTE

Abhängig vom Kundensegment und von der Position im Lebenszyklus werden individuelle Angebote erstellt und Produktinformationen versendet



Regain Status



Keep Status



Reactivate



Activate

A380



Relatives & Friends



Dr. Wilfried Tietz  
Kundenanalyse B2C  
Deutsche Lufthansa AG

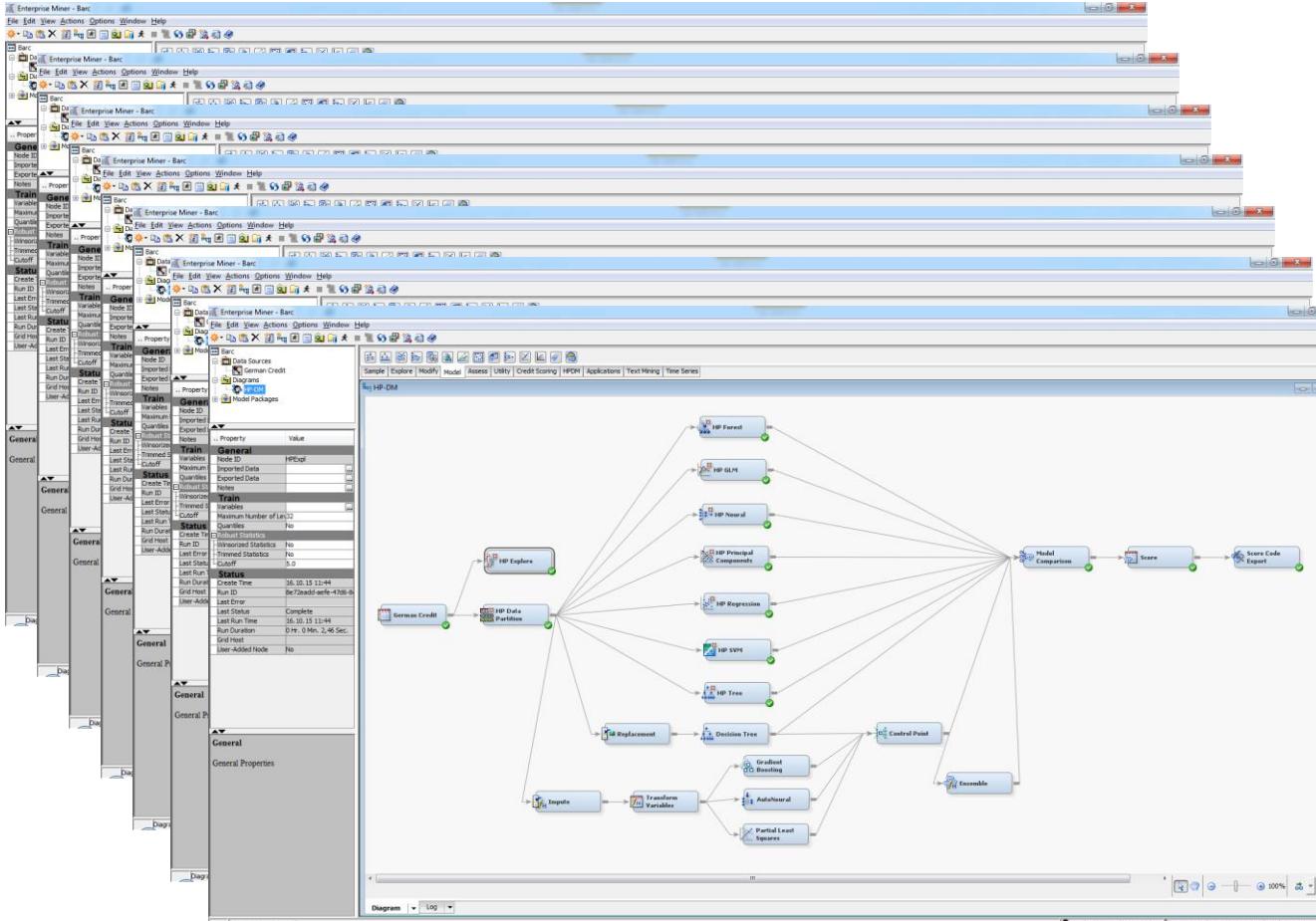
A STAR ALLIANCE MEMBER



# ANALYTICS

Individuelle Modelle  
je Kanal  
je Segment  
Viele Deployment-Prozesse  
Regelmäßige Anwendung

„HEUTE“ ?



# SAS® FACTORY MINER

## MODELLE MIT HÖHERER GRANULARITÄT

5  
Kundensegmente



10  
Regionen

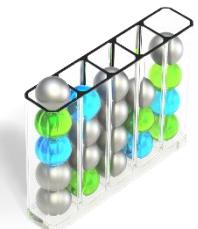


4  
Kanäle



200  
Segmente

Analytische Cluster



Regionen



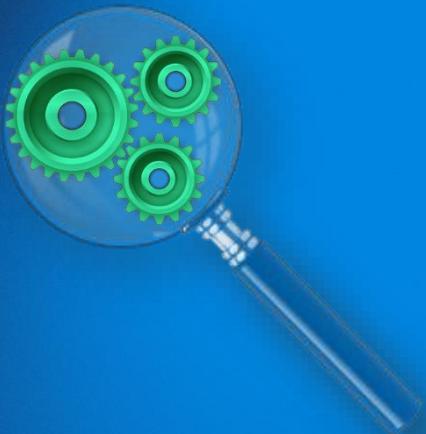
Kanäle



200  
Segmente

Testen multipler Algorithmen für jedes Segment.  
Anschließende Auswahl des “besten” Modells für jedes Segment.

# ANALYTICS



„HEUTE“ !

The screenshot shows the SAS Visual Analytics Hub home page. At the top, there's a navigation bar with links for File, Edit, View, Favorites, Tools, Help, and a search bar. Below the navigation is a banner with the text "Welcome, SAS Demo User!" and "Here are a few quick tips:" followed by a bulleted list and a link to the SAS communities website. To the right of the banner are sections for Recent, Favorites, and Links. The Recent section lists recent projects like "Airline\_1", "Airlines", "Test Purchases", "FCM Screenies", "Project2", and "Test\_JNH". The Favorites section is currently empty. The Links section is also currently empty. On the far right, there's a sidebar with a "SAS Demo User" profile icon and other user-related links. A red circle highlights the "SAS Factory Miner" application icon in the top row of the application grid.

Welcome, SAS Demo User!

Here are a few quick tips:

- Add application shortcuts to your Home page. You can customize the color and the name.
- Click the icon beside "Home" in the banner to access your applications using a side panel.
- Sign out of your application by selecting your name and clicking "Sign Out".
- Join a SAS community for great discussions on tips and best practices:  
<https://communities.sas.com/welcome>

Recent

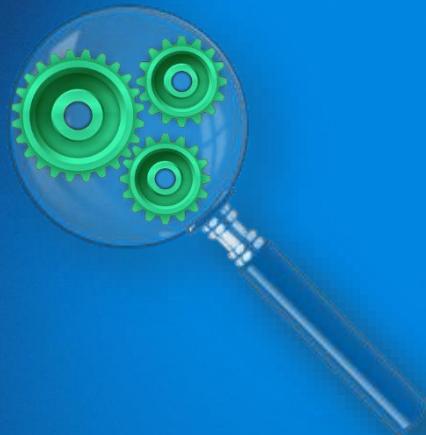
- Airline\_1  
Jul 28, 2015, 2:26:29 PM
- Airlines  
Jul 27, 2015, 5:13:11 PM
- Test Purchases  
Jul 28, 2015, 12:18:31 PM
- FCM Screenies  
Jul 27, 2015, 12:11:57 PM
- Project2  
Jul 24, 2015, 2:43:21 PM
- Test\_JNH  
Jul 24, 2015, 2:20:11 PM

Favorites

Content that you mark as a favorite will be displayed here. [Add favorites](#) now or later.

Links

Links will be displayed here. [Add links](#) now or later.



## WAS IST DER FACTORY MINER?

- Moderner **HTML5-Client**
- **Effiziente** Möglichkeit **hunderte von Modellen** in kürzester Zeit zu entwickeln
- **Add-On** zum Enterprise Miner
- Nutzung der **SAS In-Memory-Technologie\***
- **with Hadoop** oder anderen Appliances
- Verwendung moderner **Machine Learning Algorithmen**
- Nahtlose Integration mit dem **Model Manager** für ein **effizientes Deployment** der Modelle
- Sinnvolle Ergänzung durch **Visual Analytics** und **Visual Statistics**
- Setzt auf fertigen **ABTs** auf

\*: sowohl SMP als auch MPP



**DEMO**



# FUNCTIONS & FEATURES

## STARTSEITE

SAS Decision Management

Decision Builder

Model Manager

Regel-Manager

SAS Factory Miner

Projects

Model Templates

Data Sources

Factory Metadata

## NEUE DATA SOURCES ANLEGEN

Open

Search

SAS Folders > Shared Data

My Folder >

Products >

sascontent >

Shared Data > 

MMDATA >

Model Manager >

SAS Visual Analytics >

test >

ALRINE

DMAGESCR

GULFOIL

MWELECT

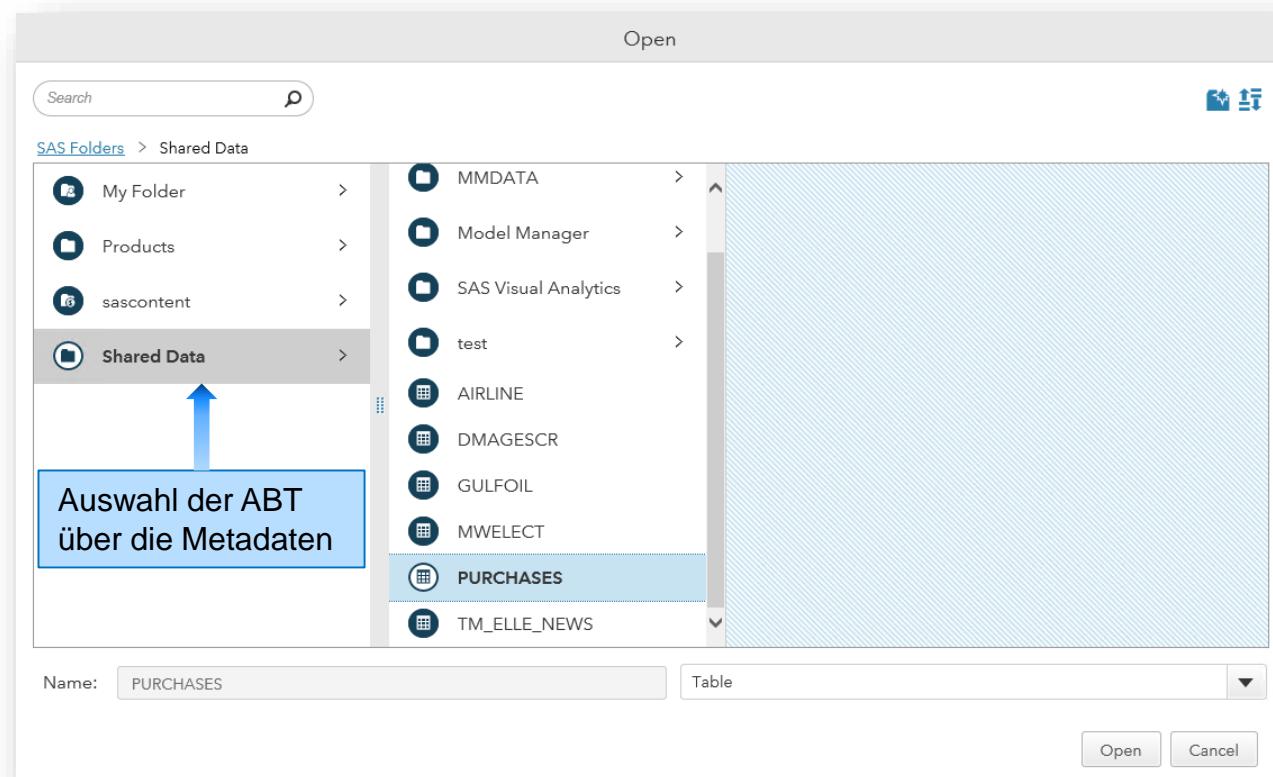
PURCHASES 

TM\_ELLE\_NEWS

Auswahl der ABT über die Metadaten

Name: PURCHASES Table

Open Cancel



# FUNCTIONS & FEATURES

STARTSEITE

SAS Decision Management

Decision Builder

Model Manager

Regel-Manager

SAS Factory Miner

Projects

Model Templates

Data Sources

Factory Metadata

## FACTORY METADATEN ERSTELLEN

Zentrale Definition der Factory Metadata

Zentrale Definition der Variableneigenschaften

Variable Type Role

Variable	Type	Role
acctnum	Character	Input
AGE	Numeric	Input
APRTMNT	Character	Input
COUNTY	Numeric	Input
EDLEVEL	Numeric	Input
GENDER	Character	Input
HEAT	Numeric	Input
HOMEVAL	Numeric	Input
JOB	Numeric	Input
MARITAL	Numeric	Input
MOBILE	Numeric	Input
NTITLE	Character	Input
NUMCARS	Numeric	Input
NUMKIDS	Numeric	Input
purchase	Numeric	Target

Save Cancel

# FUNCTIONS & FEATURES

**HOME**

SAS Decision Management

Decision Builder

Model Manager

Rules Manager

SAS Factory Miner

Projects

Model Templates

Data Sources

Factory Metadata

## DIE OBERFLÄCHE

The screenshot shows the SAS Factory Miner interface with the 'Data' tab selected. The main area displays a table of variables with columns for Variable, Label, Type, Role, Level, Order, Percent Missing, Number of Levels, Min, Mean, Max, Transform, and Compute. A blue box labeled 'Projektschritte' points to the 'Build Profile' and 'Run' buttons in the top right corner. Another blue box on the right side lists project actions: Retrain, Download Scorecode, Project Profile, Build Profile, and Run.

Variable	Label	Type	Role	Level	Order	Percent Missing	Number of Levels	Min	Mean	Max	Transform	Compute
acctnum	Account...	Character	Rejected	Nominal		0.0000	21					
AGE	Age	Numeric	Input	Interval		0.0000		15.0000	31.0467	64.0000		
APRTMNT	Rents Ap...	Character	Input	Binary		0.0000	2					
COUNTY	County C...	Numeric	Input	Interval		0.0000		-999.0000				
EDLEVEL		Numeric	Input	Nominal		0.0000	4					
GENDER	Gender	Character	Input	Binary		0.0000	2					
HEAT		Numeric	Input	Nominal		0.0000	4					
HOMEVAL	Home Val...	Numeric	Input	Interval		0.0000		0.0000	79,			
JOB		Numeric	Input	Nominal		0.0000	15					
MARITAL	Married (...)	Numeric	Input	Binary		0.0000	2					
MOBILE	Occupie...	Numeric	Input	Binary		0.0000	2					
NTITLE	Name Pr...	Character	Input	Nominal		0.0000	4					
NUMCARS		Numeric	Input	Nominal		0.0000	4					
NUMKIDS		Numeric	Input	Nominal		0.0000	11					
<input checked="" type="checkbox"/> purchase	Purchase...	Numeric	Target	Binary		0.0000	2					
region		Character	Segment	Nominal		0.0000	5					
SNGLMOM	Single Mom	Numeric	Input	Binary		0.0000	2					
		Numeric	Input	Interval		0.0000		0.0000	19.5291	90.0000		

Projektschritte

Retrain  
Download Scorecode  
Project Profile  
Build Profile  
Run

# FUNCTIONS & FEATURES



## „DATA“ ANSICHT

The screenshot shows the SAS Factory Miner interface with the title bar "SAS® Factory Miner - Projects". The main area is titled "Purchases" and displays a table of variables. The columns are: Variable, Label, Type, Role, Level, and several numerical values. A blue callout box points to the "View" button in the toolbar at the top right. Another blue callout box points to the "Target Segment" column header in the table.

Variable	Label	Type	Role	Level	0.0000	21	15.0000	31.0467	64.0000		
acctnum	Account...	Character	Rejected	Nominal							
AGE	Age	Numeric	Input	Interval	0.0000						
APRTMNT	Rents Ap...	Character	Input	Binary	0.0000	2					
COUNTY	County C...	Numeric	Input	Interval	0.0000		-999.0000	65.0167	810.0000		
EDLEVEL		Numeric	Input	Nominal	0.0000	4					
GENDER	Gender	Character	Input	Binary	0.0000	2					
HEAT		Numeric	Input	Nominal	0.0000	4					
HOMEVAL	Home Val...	Numeric	Input	Interval	0.0000		0.0000	79,311.7...	600,000...		
JOB		Numeric	Input	Nominal	0.0000	15					
MARITAL	Married (...)	Numeric	Input	Binary	0.0000	2					
MOBILE	Occupie...	Numeric	Input	Binary	0.0000	2					
NTITLE	Name Pr...	Character	Input	Nominal	0.0000	4					
NUMCARS		Numeric	Input	Nominal							
NUMKIDS		Numeric	Input	Nominal							
<input checked="" type="checkbox"/> purchase	Purchase...	Numeric	Target Segment	Binary							
region		Character	Segment	Nominal							
SNGLMOM	Single Mom	Numeric	Input	Binary							
TRAVTIME		Numeric	Input	Interval							

**Variableneigenschaften für das Projekt ändern  
Verteilungsansicht**

**Mindestvoraussetzung:**

- eine „Target“-Variable
- eine „Segment“-Variable

# FUNCTIONS & FEATURES

## Model Templates

### „MODEL TEMPLATES“ ANSICHT

The screenshot shows the SAS Factory Miner interface with the title bar "SAS® Factory Miner - Projects". The main area displays a table of Model Templates under the heading "Purchases". The table has columns for Name, Type, Last Modified By, and Last Modified Date. A blue callout box highlights the toolbar at the top right, which includes icons for creating (+), deleting (-), and searching (magnifying glass). The callout box contains the following text:

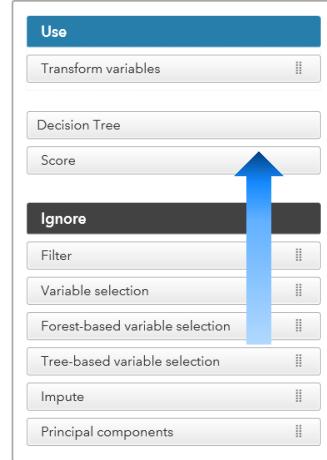
Neue Model Templates erstellen  
Aus globaler Liste Model Template hinzufügen  
Verändern der Template Eigenschaften  
Entfernen eines Model Templates

Name	Type	Last Modified By	Last Modified Date
Baseline template	Decision Tree	sasdemo@GERTEST073	1 hour ago
Decision Tree Gini	Neural Network	sasdemo@GERTEST073	1 hour ago
Decision Tree template	Random Forest	sasdemo@GERTEST073	1 hour ago
Neural Network template	Regression	sasdemo@GERTEST073	1 hour ago
Random Forest template			
Regression template			

# FUNCTIONS & FEATURES

## Model Templates

### EIGENE MODEL TEMPLATES ERSTELLEN – SEMMA-LIKE



Individuelle Anpassung von  
Modellierungsschritten  
durch Verschieben der  
Aktivitäten in den „Use“-  
Bereich

Decision Tree Gini

#### Decision Tree

Nominal target splitting criterion:

Gini

Interval target splitting criterion:

Variance

Maximum depth:



Maximum render depth:



Missing values:

Popularity

Surrogate rules:

0

Subtree method:

Cost complexity

Save Done



THE  
POWER  
TO KNOW.

# FUNCTIONS & FEATURES

Profile

## „PROFILE“ ANSICHT

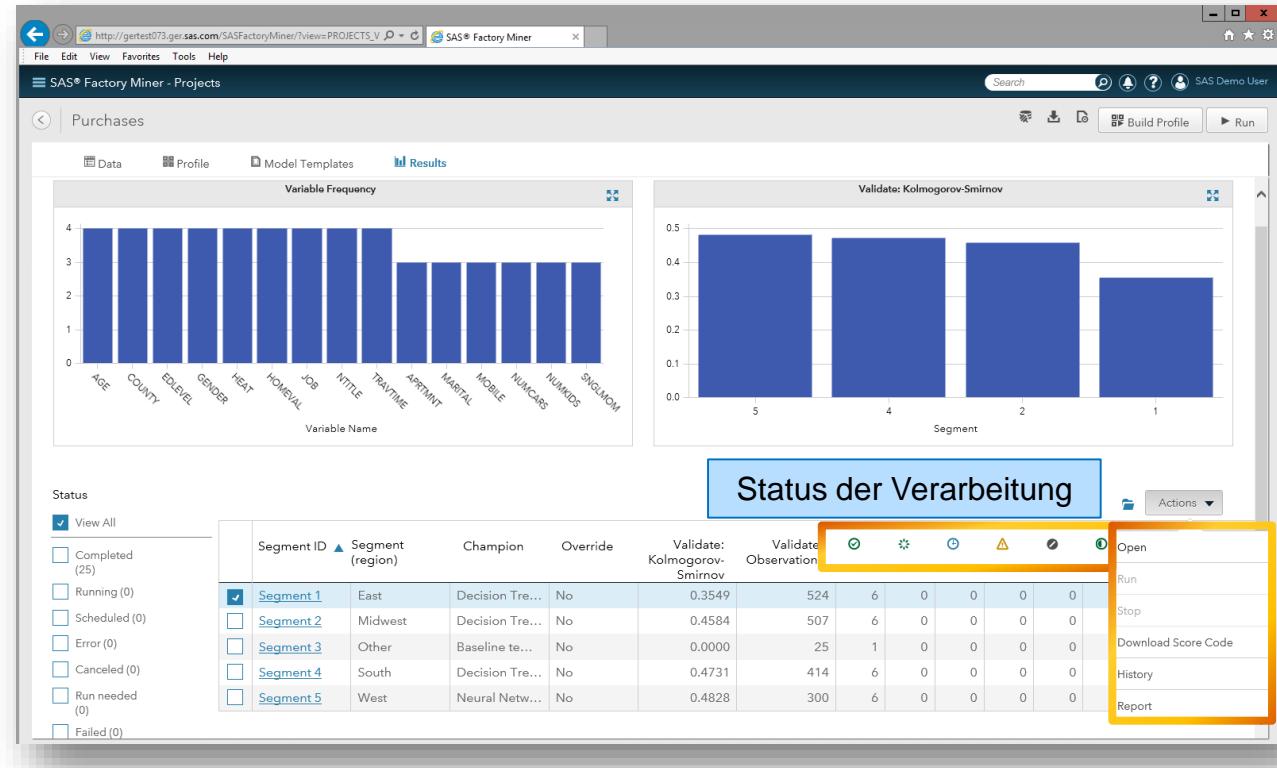
Auswählen und  
Ausschließen von Segmenten

Segment ID	Region	Count	Rate	Action
Segment 1	East	1219	0.5004	Include
Segment 2	Midwest	1182	0.5025	Include
Segment 3	Other	62	0.6290	Exclude
Segment 4	South	966	0.5279	Include
Segment 5	West	699	0.4935	Include

# FUNCTIONS & FEATURES

Results

## „RESULTS“ ANSICHT



# FUNCTIONS & FEATURES

Results

## „RESULTS“ ANSICHT – AUF EINZELSEGMENTEN

The screenshot shows the SAS Factory Miner interface with the following elements:

- Header:** Shows the URL [http://gettest073.ger.sas.com/SASFactoryMiner/?view=PROJECTS\\_V](http://gettest073.ger.sas.com/SASFactoryMiner/?view=PROJECTS_V), the title "SAS® Factory Miner", and a user "SAS Demo User".
- Breadcrumb:** Purchases > Segment 1
- Table:** A list of model templates with columns: Name, Algorithm, Validate: Kolmogorov-Smirnov (KS), and Status. The table includes rows for Decision Tree template, Baseline template, Decision Tree Gini, Neural Network template, Random Forest template, and Regression template. All models are marked as "Completed".
- Model Graphs:**
  - Lift and Cumulative Lift:** A line graph showing lift values over depth (0 to 100). Multiple lines represent different models, showing varying performance.
  - Tree Diagram:** A hierarchical tree diagram representing a decision tree structure.
- Actions Menu:** A context menu for the selected "Decision Tree template" row, listing options: Run, Stop, Compare, Delete, Duplicate, Mark as Champion, Unmark as Champion, Rename, Report, Log, and Download Score Code. The "Download Score Code" option is highlighted with an orange rectangle.

# SAS® FACTORY MINER



## „REGISTER“ MODELS

The screenshot shows the SAS Factory Miner - Projects interface. A large blue callout box highlights the 'Select' button in the top right corner of the header bar. The table below lists various projects with their details:

Name	Data Source	Registration	Owner	Date Modified	Modified By
Airline_1	AIRLINE	Not registered	sasdemo@gertest073	8 days ago	sasdemo@gertest073
Airlines	AIRLINE	Not registered	sasdemo@gertest073	8 days ago	sasdemo@gertest073
FCM_Screenies	AIRLINE	Not registered	sasdemo@GERTEST073	8 days ago	sasdemo@gertest073
Project2	PURCHASES	Not registered	sasdemo@GERTEST073	12 days ago	sasdemo@GERTEST073
Purchases	PURCHASES	Not registered	sasdemo@GERTEST073	less than a minute ago	sasdemo@GERTEST073
Test_JNH	PURCHASES	Not registered	sasdemo@gertest073	12 days ago	sasdemo@gertest073
Test_Purchases	PURCHASES	Not registered	sasdemo@GERTEST073	2 hours ago	sasdemo@GERTEST073

# SAS® FACTORY MINER



## REGISTER MODELS

The screenshot shows a web browser window for 'SAS® Factory Miner - Projects'. A blue callout box with the text 'Register project to SAS model repository' is overlaid on the interface. A yellow arrow points from the 'New Project' button in the toolbar to this callout box. The main table lists various projects with columns for Name, Data Source, Registration, Owner, Date Modified, and Modified By. The 'Purchases' project is selected, indicated by a checked checkbox.

Name	Data Source	Registration	Owner	Date Modified	Modified By	
Airline_1	AIRLINE	Not registered	sasdemo@gertest073	8 days ago	sasdemo@gertest073	
Airlines	AIRLINE	Not registered	sasdemo@gertest073	8 days ago	sasdemo@gertest073	
FCM_Screenies	AIRLINE	Not registered	sasdemo@GERTEST073	8 days ago	sasdemo@gertest073	
Project2	PURCHASES	Not registered	sasdemo@GERTEST073	12 days ago	sasdemo@GERTEST073	
<input checked="" type="checkbox"/> Purchases	PURCHASES	Not registered	sasdemo@GERTEST073	6 minutes ago	sasdemo@GERTEST073	
Test_JNH	PURCHASES	Not registered	sasdemo@gertest073	12 days ago	sasdemo@gertest073	
Test_Purchases	PURCHASES	Not registered	sasdemo@GERTEST073	2 hours ago	sasdemo@GERTEST073	



## REGISTER MODELS – ERGEBNIS UNTER „PORTFOLIOS“ IM MODEL MANAGER

The screenshot shows the SAS Model Manager interface. The left sidebar has a tree view with 'My Tasks', 'Data', 'Business Rules', 'Models' (selected), 'Inventory', 'Projects', 'Portfolios' (selected), and 'Workflows'. The main area displays a table titled 'Purchases\_FCMR\_sasdemo\_1438797783630' with the following data:

Name	Model Function	Location	Operation Status	Date Modified	Created By
Segment 1_East	Classification	FactoryMiner/Purchases_FCMR_sasd...	Under Development	Aug 5, 2015 10:28 PM	sasdemo
Segment 2_Midwest	Classification	FactoryMiner/Purchases_FCMR_sasd...	Under Development	Aug 5, 2015 10:27 PM	sasdemo
Segment 4_South	Classification	FactoryMiner/Purchases_FCMR_sasd...	Under Development	Aug 5, 2015 10:28 PM	sasdemo
Segment 5_West	Classification	FactoryMiner/Purchases_FCMR_sasd...	Under Development	Aug 5, 2015 10:27 PM	sasdemo

At the bottom, there are buttons for 'View' and 'Alerts: 0 Total, 0 New'. The status bar says 'User: SAS Demo User'.



## ZUSAMMENFASSUNG

- Effiziente Form der Modellentwicklung, wenn eine Vielzahl von segmentbasierten Modellen entwickelt werden muss
  - Marketing
  - Industrie 4.0
- Modernste Machine Learning Algorithmen
- Einfache Bereitstellung von Modellierungstemplates unterstützt die Standardisierung des Modellierungsprozesses
- Hoch performantes, skalierbares System
  - Multi-threaded Procedures
  - Grid
  - Hadoop & Datenbank Appliances
- Vereinfachtes Deployment aller Modelle über den Model Manager mit 3 Klicks



VIELEN DANK!



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THE  
POWER  
TO KNOW.

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