

Why SAS Viya for Learners?

Highlighting Academic Programs + where SAS Viya for
Learners shines

SAS Institute, Inc.



Who am I?



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Our Mission: U.S. Academic Programs

Empowering Analytics for Academics

Support the next generation by providing free software and resources for academia.

Our “customers” are students, educators, independent learners, and academic researchers.



Global Academic Program Goals



Increase SAS Consideration
and Adoption Among Faculty



Build SAS Skill and Usage
Among Students



Develop Academic-
Commercial Connections

Resources for Teaching and Learning



Software

SAS® OnDemand for
Academics

SAS® Viya® for Learners



Training

Onsite & Online
Training Offerings

E-learning & How To
Videos



Education Resources

Curriculum Consulting

SAS Educator Portal

SAS Skill Builder for
Students

Software for Learners



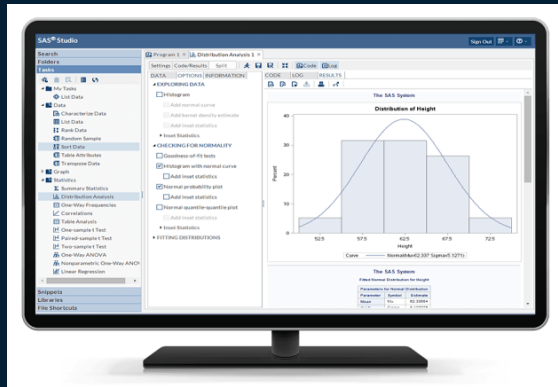
OnDemand for Academics

- SAS Studio
- Enterprise Guide
- Enterprise and Text Miner
- Forecast Server



Viya for Learners

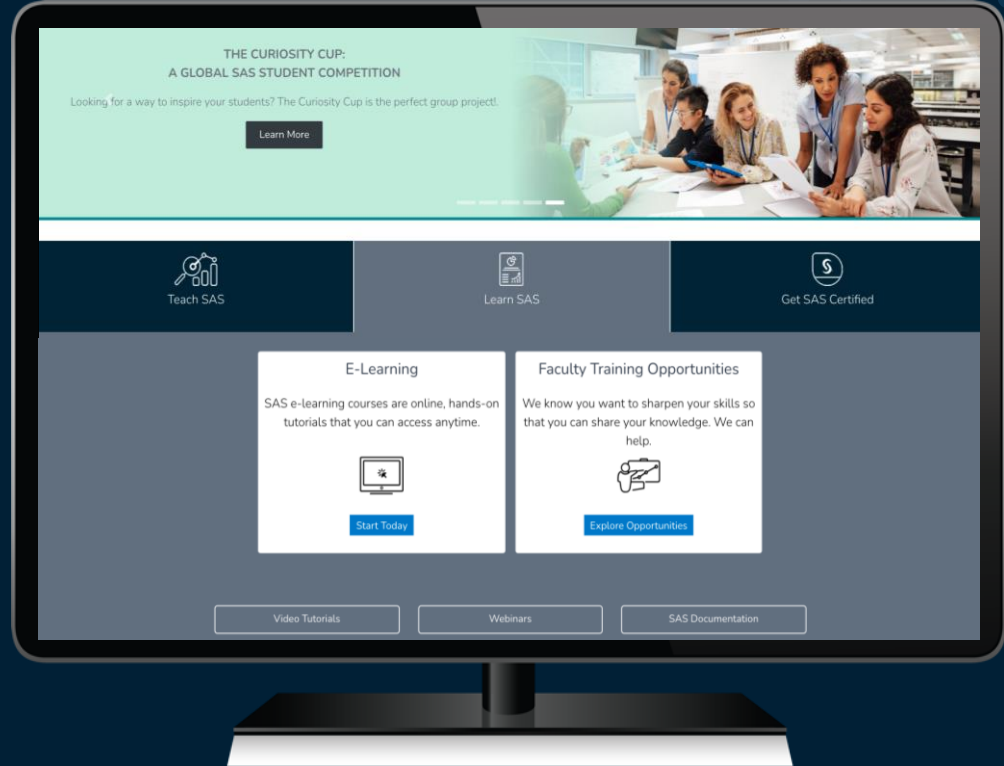
- Visual Analytics and Statistics
- Visual Text Analytics
- Visual Data Mining and Machine Learning
- Model Studio



All-In-One Resource Center

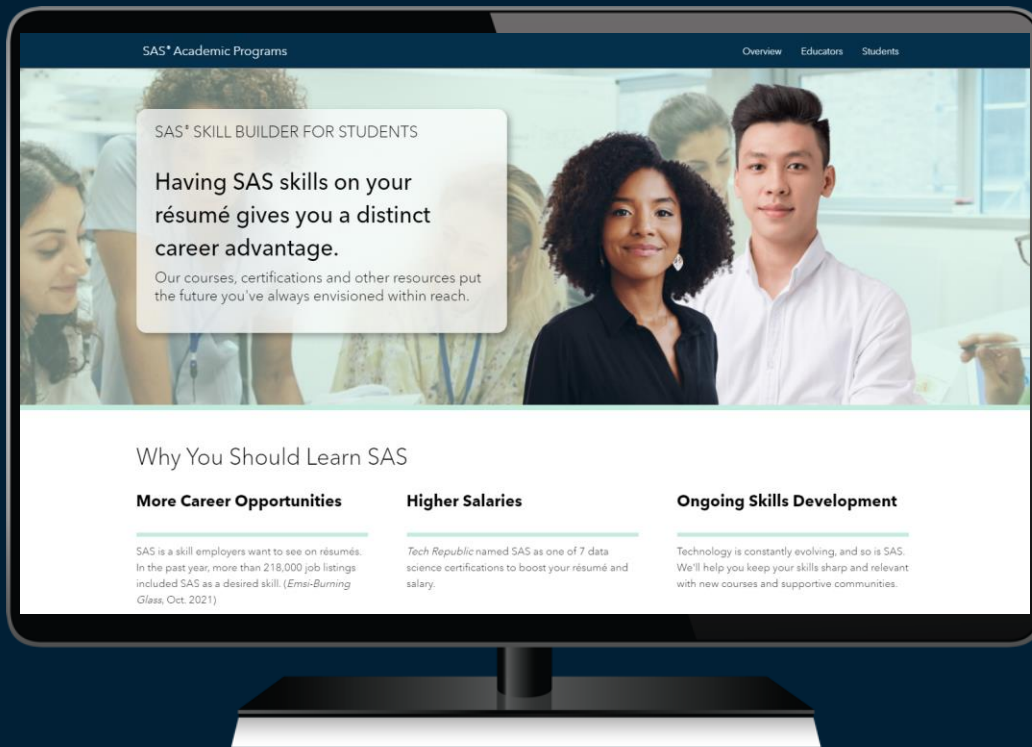
SAS Educator Portal

- E-learning & Certification Paths
- Instructional Materials
 - Teaching kits
 - Industry-specific classroom activities
- Educator Workshops & Training
- Discounts & Promotions



http://www.sas.com/en_us/learn/academic-programs/educators.geo.html

SAS Skill Builder for Students



www.sas.com/skillbuilderforstudents

SAS Skill Builder for Students

Your future starts here

“ 94% of decision makers worldwide said certified team members added value above and beyond the cost of certification.

- Global Knowledge 2020
'IT Skills and Salary Report'



- ✓ Learn on your time
- ✓ Free software
- ✓ Stay motivated with career resources
- ✓ Cross-industry access

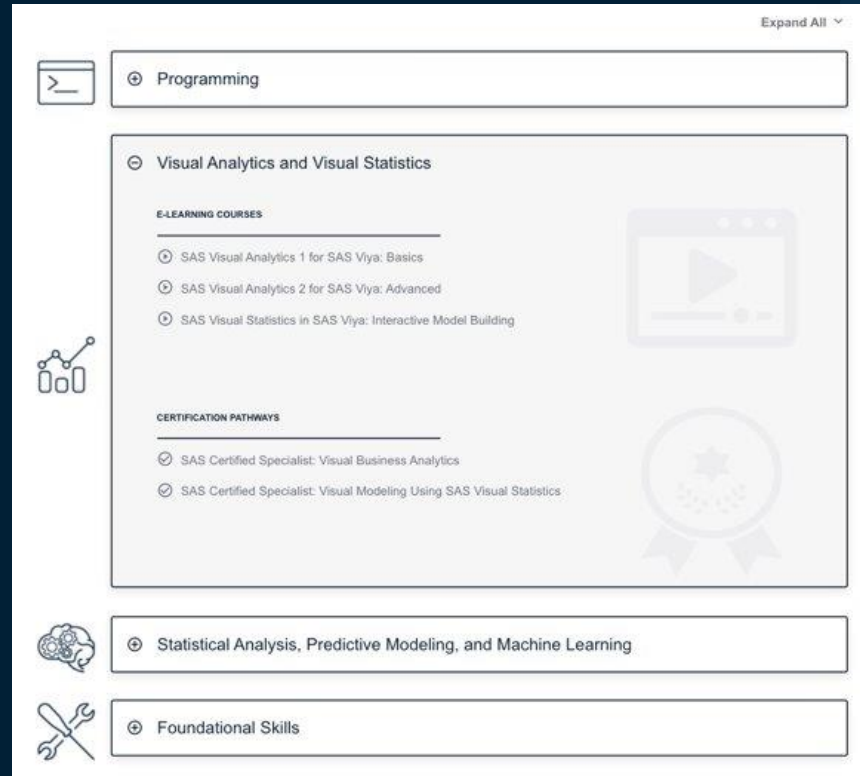


SAS Skill Builder for Students

Free Software & e-Learning

Learn SAS

- Point-and-Click Analytics
- Programming
- Visual Analytics and Statistics
- Statistical Analysis
- Predictive Modeling
- Machine Learning
- Data Literacy



SAS Skill Builder for Students

Learn SAS: Prep for Certification

Some of the Analytics Credentials

- SAS Certified Specialist: Base Programming using SAS
- SAS Certified Associate: Programming Fundamentals using SAS
- SAS Certified Professional: Advanced Programming
- SAS Certified Statistical Business Analyst: Regression and Modeling

SAS® Certified Specialist: Visual Business Analytics 7.5/8.3

[Back to Certification Pathways](#)

About this Path

The content on this page is designed to prepare you for the SAS® Certified Specialist: Visual Business Analytics 7.5/8.3 exam.

As you prepare for this certification exam, you will learn how to and manipulate data, perform basic and advanced analyses (geographic analysis, forecasting, network analysis, path analysis, text analytics), create interactive reports and share them using SAS Visual Analytics.

This page features e-learning (self-paced learning modules), exam prep materials, and information about our special student certification discount to prepare you to take these exams.

Software

Access to free software you can use to complete your training will be found within each e-learning course in this certification path.

Certification Exam

SAS® Certified Specialist: Visual Business Analytics 7.5/8.3

Digital Badges

As you complete eligible courses and certifications, you will earn digital badges that validate your learning. Share your SAS badges on email signatures, digital résumés and social media to show employers everything you've accomplished.



E-learning

COURSE
SAS Visual Analytics 1 for SAS Viya: Basics

COURSE
SAS Visual Analytics 2 for SAS Viya: Advanced

Extra Practice

Exam Content | SAS Certified Specialist: Visual Business Analytics
Practice Questions | SAS Certified Specialist: Visual Business Analytics

Take the Exam

[Request Academic Exam Discount](#)

[Register for Exam](#)

SAS Skill Builder for Students

Get SAS Certified

Certification Exam Discount

Standard Exam Price for SAS Skill Builder Participants:

\$50 USD per exam*

Watch for special exam promotions throughout the year!

**This discount is not available in China or India. Please email the country office to inquire about other discounts or promotions that may apply. Students in Japan should also contact their local office.*

The screenshot displays the SAS Skill Builder for Students web application. A modal window titled "Request your certification exam discount" is open in the center. The modal contains the following text: "As an academic user, you are eligible to receive a discounted price on certification exams. Please select your intended certification exam below to reveal your discount voucher code." Below this, it states: "You should be prepared to take your exam within 90 days of receiving the discount voucher. Requests for a discount voucher must be made prior to registering for the exam. Vouchers are valid for one exam attempt and are non-transferable. Vouchers must be used by the individual who submits the discount request. Only one voucher is issued per request. If you wish to take additional exams after utilizing a voucher, you must submit another discount request." A footnote reads: "*This discount is not available in China or India. Please email the country office in China or India to inquire about other discounts or promotions that may apply." The form includes a "Certification Name" dropdown menu with "Select One" as the current selection, and a "Promo Code" text input field. At the bottom of the modal are "Submit" and "Cancel" buttons. The background shows the main dashboard with a "Request an exam discount" card featuring a tag icon and a "Schedule your exam" card featuring a calendar icon. Both cards have corresponding action buttons: "Get Discount" and "Schedule Now". At the very bottom of the page, there are links for "Video Tutorials" and "Certification Webinars".

Earn Badges



SAS Skill Builder for Students

Shine a light on your accomplishments!

Don't forget to claim and post the digital badges you earn from e-learning and certification. Sharing badges on social media sites demonstrates your credentials.

These digital images contain verified metadata that describes your qualifications and the process required to earn them.

SAS Skill Builder for Students

Career Resources


Fabulous finds for you

- Blogs and industry overviews
- Student success stories
- Global competitions for real-world experience
- Guidance on demonstrating skill to employers


Resources

[Back](#)


[Expand All](#)




[+ Discover why data analytics is a rewarding career path](#)




[+ Learn about what it means to be a data analytics professional](#)



[+ Set yourself apart as a data analytics professional](#)




[+ Connect with employers](#)



PREPARE FOR A CAREER IN HEALTHCARE AND LIFE SCIENCES

Interested in fields like epidemiology, health care operations, or biostatistics? Discover how your analytics skills are used across roles and subsectors.

[Learn More](#)



PREPARE FOR A CAREER IN GOVERNMENT

Interested in working in defence, national security, or transportation? Discover how your analytics skills are used across roles and subsectors.

[Learn More](#)

A series of horizontal bars of varying lengths and colors (teal, blue, and purple) are arranged on the left side of the slide, creating a modern, abstract background element.

SAS Viya for Learners

The Main Event

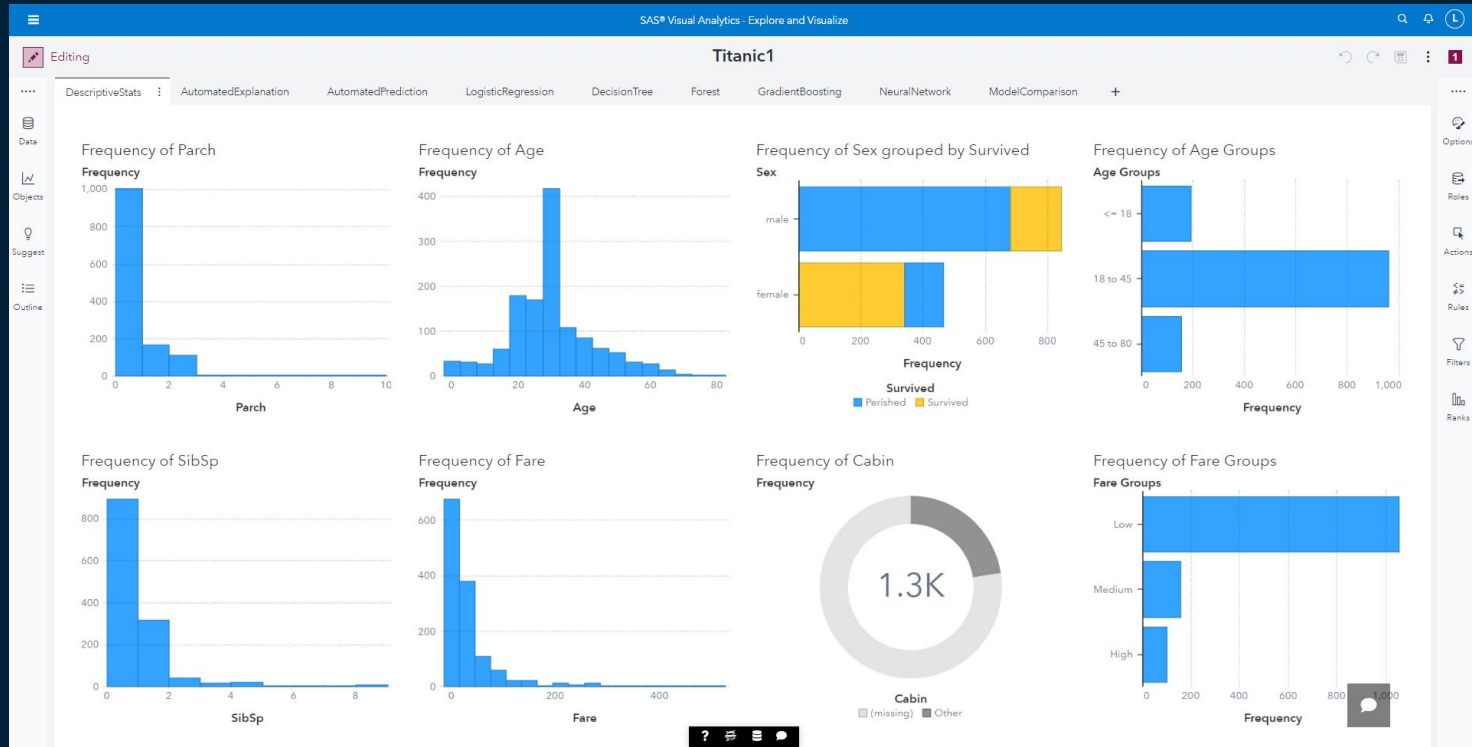


Part I: SAS Visual Analytics

Dashboarding approach to analytics = analytics for all

SAS Visual Analytics

Utilize dynamic dashboards to help with storytelling



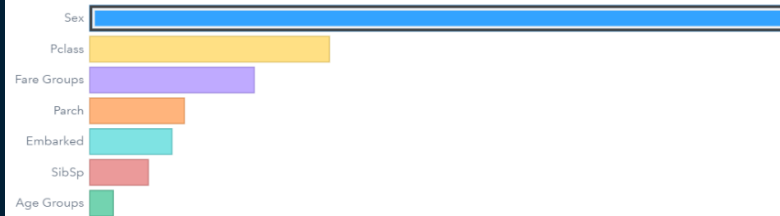
SAS Visual Analytics

Access AI Insights | Automated Explanation

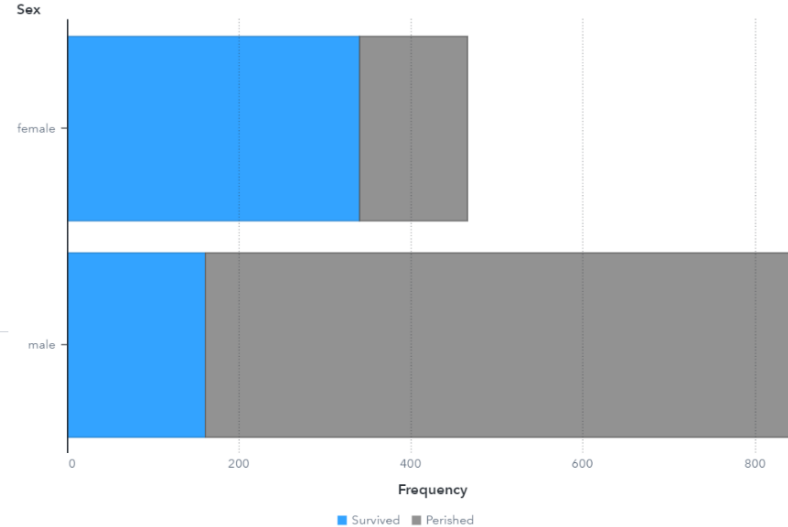
What are the characteristics of Survived?

Survived has a 38.27% chance (501 of 1.3K) of being Survived. It's the least common Survived value.

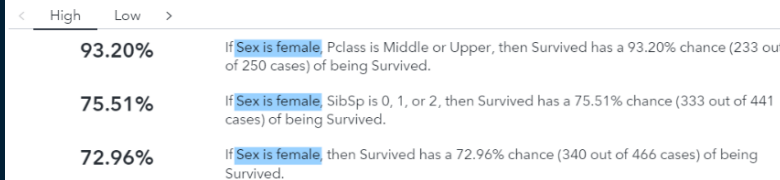
What factors are most related to Survived?



What is the relationship between Survived and Sex?



What are the groups based on Sex by the chance of Survived being Survived?

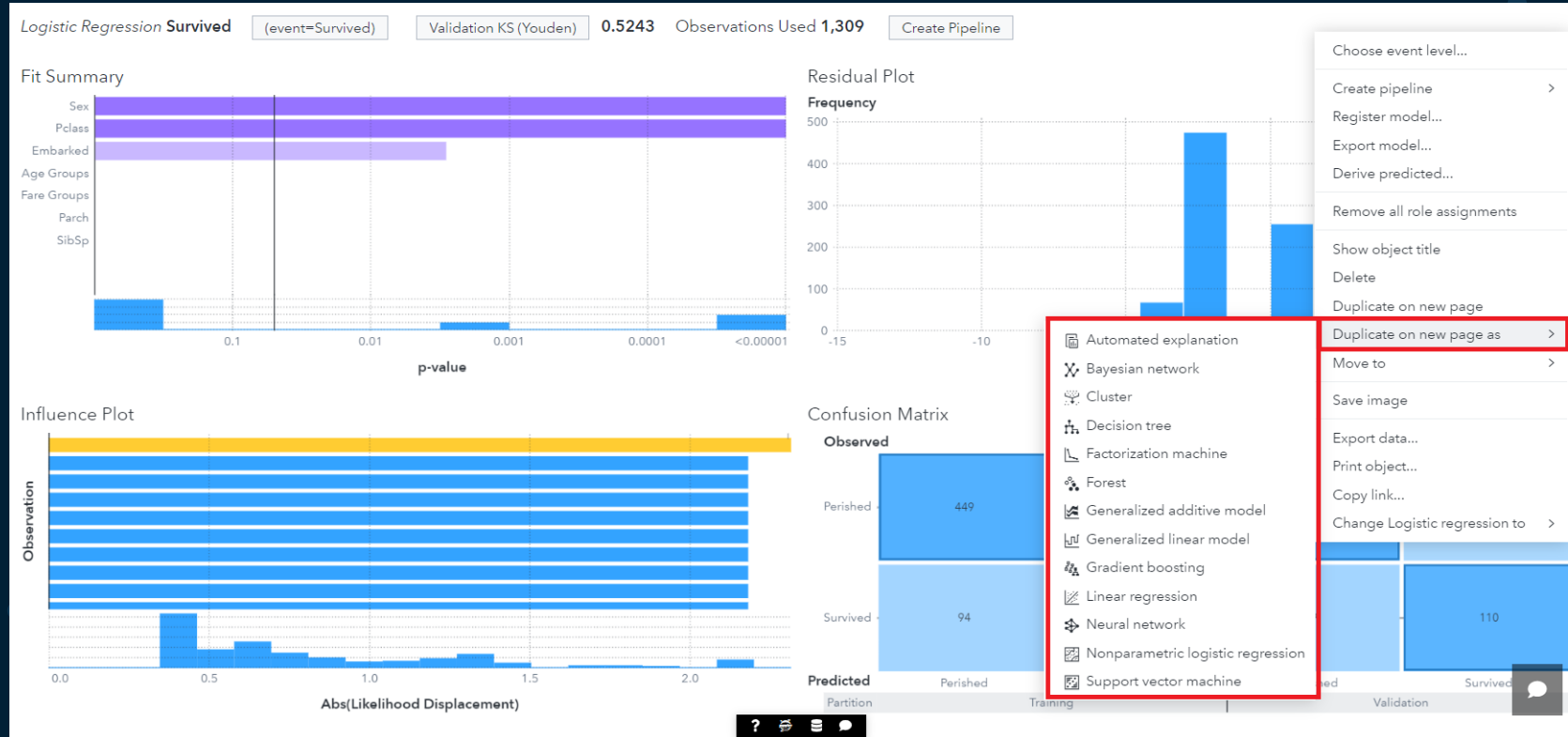


When Sex is female, the total count of Survived is 340. When Sex is male, the total count of Survived is 161. The most common Sex value is male.



SAS Visual Analytics

Run new models with the click of a button | Duplicate on new page as...

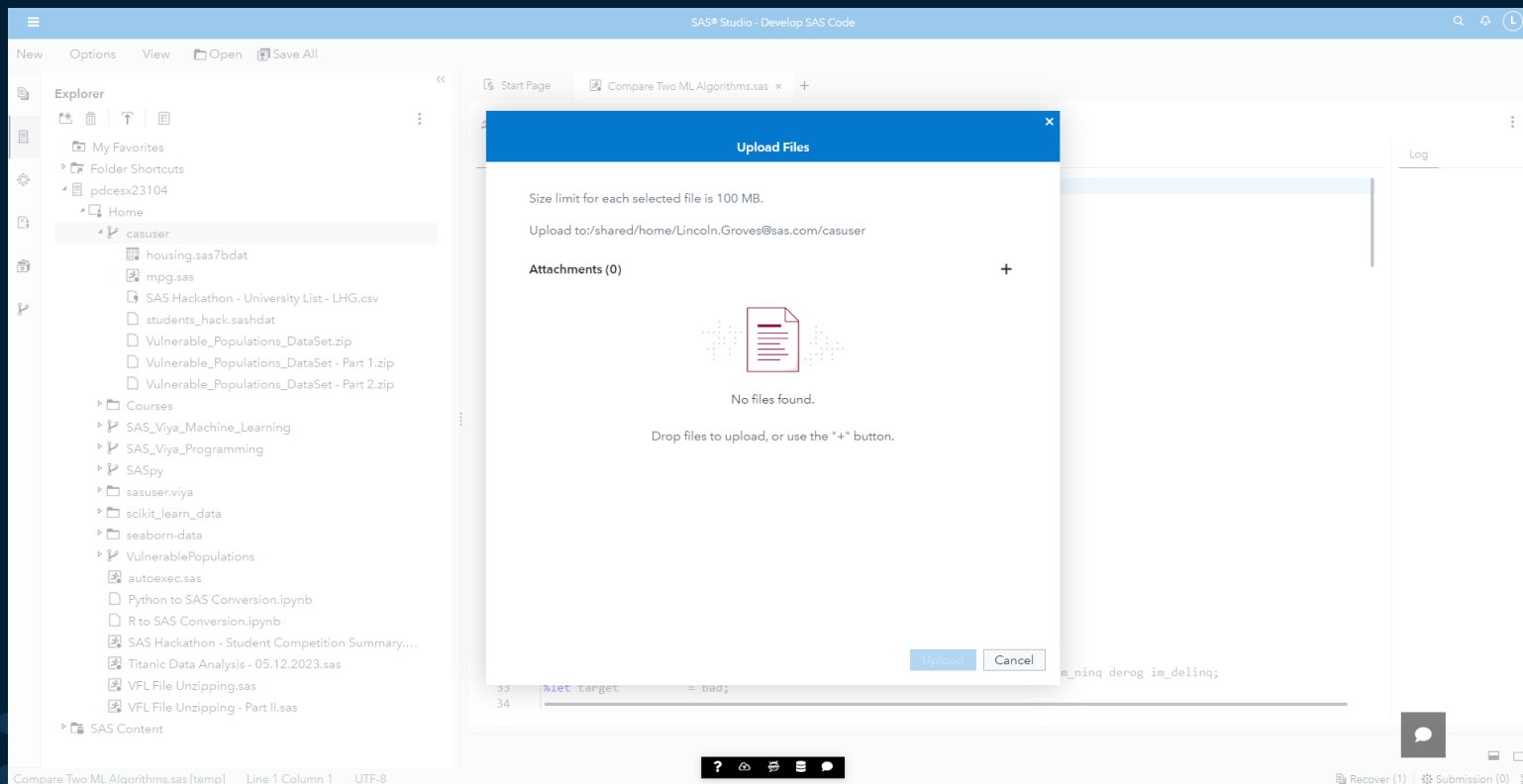


Part II: SAS Studio

Programmers guide to analytics

SAS Studio

Upload your data into SAS Viya for Learners



SAS Studio

Learn to code, Part 1: Tasks

The screenshot displays the SAS Studio interface with the following components:

- Tasks Pane (Left):** A list of tasks under the 'Tasks' tab. The 'Characterize Data' task is selected.
- Data and Options Pane (Middle):** Shows the selected data source as 'TITANIC.TITANIC' and the filter as '(none)'. Under 'AUTOMATIC CHARACTERIZATION', the variables 'PassengerId', 'Survived', 'Pclass', 'Name', and 'Sex' are listed.
- Code Editor (Right):** Contains SAS code for analyzing the Titanic data. The code includes comments about the generation date and platform, and uses PROC FREQ, PROC MEANS, and PROC UNIVARIATE to analyze the data.

```
1 /*  
2 *  
3 * Task code generated by SAS® Studio 5.2  
4 *  
5 * Generated on '5/17/23, 12:41 PM'  
6 * Generated by 'Lincoln.Groves@sas.com'  
7 * Generated on server 'pdcesx23104'  
8 * Generated on SAS platform 'Linux X64 3.10.0-862.9.1.el7.x86_64'  
9 * Generated on SAS version 'V.03.05M0P111119'  
10 * Generated on browser 'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (  
11 * Generated on web client 'https://v4e055.vfe.sas.com/SASStudioV/main?locale=en_US&lau  
12 */  
13  
14 ods noprint;  
15  
16 /*** Analyze categorical variables ***/  
17 title "Frequencies for Categorical Variables";  
18  
19 proc freq data=TITANIC.TITANIC;  
20     tables Survived Pclass Name Sex Ticket Cabin Embarked / plots=(freqplot);  
21 run;  
22  
23 /*** Analyze numeric variables ***/  
24 title "Descriptive Statistics for Numeric Variables";  
25  
26 proc means data=TITANIC.TITANIC n nmiss min mean median max std;  
27     var PassengerId Age SibSp Parch Fare;  
28 run;  
29  
30 title;  
31  
32 proc univariate data=TITANIC.TITANIC noprint;  
33     histogram PassengerId Age SibSp Parch Fare;  
34
```

SAS Studio

Learn to code, Part 2: Snippets

The screenshot shows the SAS Studio interface. On the left is the 'Snippets' panel with a tree view. The 'Compare Two ML Algorithms' snippet is selected. The main editor shows the following SAS code:

```
1 /* This example illustrates fitting and comparing two Machine */
2 /* Learning algorithms for predicting the binary target in the */
3 /* HMEQ data set. The steps include: */
4 /* */
5 /* (1) PREPARE AND EXPLORE */
6 /* a) Check data is loaded into CAS */
7 /* */
8 /* (2) PERFORM SUPERVISED LEARNING */
9 /* a) Fit model using Logistic Regression */
10 /* b) Fit a model using a Decision Tree */
11 /* */
12 /* (3) EVALUATE AND IMPLEMENT */
13 /* a) Score the data */
14 /* b) Assess model performance */
15 /* c) Generate ROC and Lift charts */
16 /* */
17 /* Setup and initialize for later use in the program */
18 /* */
19 /* Define a CAS engine libref for CAS in-memory data tables */
20 libname mycaslib cas caslib=casuser;
21
22 /* Specify the data set names */
23 %let casdata = mycaslib.hmeq_prepped;
24 %let partitioned_data = mycaslib.hmeq_part;
25
26 /* Specify the data set inputs and target */
27 %let class_inputs = reason job;
28 %let interval_inputs = im_clage clno im_debtinc loan mortdue value im_voj im_ninq derog im_delinq;
29 %let target = bad;
```

The status bar at the bottom indicates 'Compare Two ML Algorithms.sas [temp] Line 1 Column 1 UTF-8'.

SAS Studio

Incorporate your course materials | GitHub Integration

The screenshot displays the SAS Studio interface with the following components:

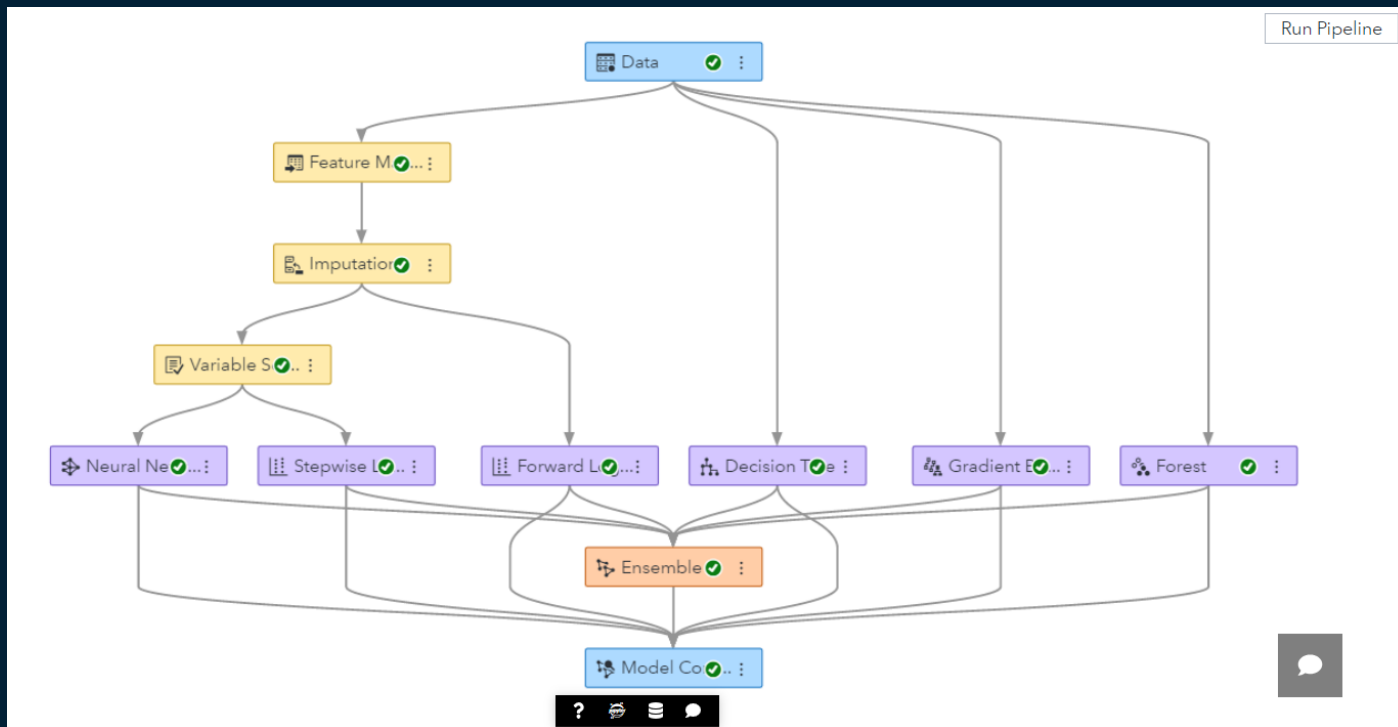
- Top Bar:** "SAS® Studio - Develop SAS Code" with search, refresh, and help icons.
- Left Panel (Git Repositories):**
 - Buttons: Clone, Add
 - Current Repository: VulnerablePopulations (main (1))
 - Other Repositories: SAS_Viya_Programming, SAS_Viya_Machine_Learning, casuser, SASpy
- Central Panel:**
 - Buttons: Start Page, Compare Two MLAlgorithms.sas, VulnerablePopulations (x), +
 - Repository: VulnerablePopulations (Current repository)
 - Branch: main (Current branch)
 - Buttons: Pull main (Last pulled: Feb 27, 2023, 10:2...), Push main (Last pushed: Feb 27, 2023, 10:26:43 ...)
 - Commit History: Unstaged Changes (0) - No items; Staged Changes (0) - No items
 - Commit Input: "Enter a commit comment" field and a "Commit" button.
- Right Panel (WORKING WITH GIT):**
 - Edit:** Edit files in your working directory. As you work, the files you change and save are added to the Unstaged Changes area of the Commit tab.
 - Stage:** Move the changed files that you want to keep together to the Staged Changes area. It is good practice to group related changes together in the same commit.
 - Commit:** Enter a short description of your changes and commit the files to your local repository. Each commit represents a snapshot of the changes since your last commit.
 - Push:** Share your committed changes with others by pushing them to the remote repository.
- Bottom Bar:** VulnerablePopulations (0), (0), (0), and buttons for Recover (1) and Submission (0).

Part III: SAS Model Studio

Where machine learning experts hang out

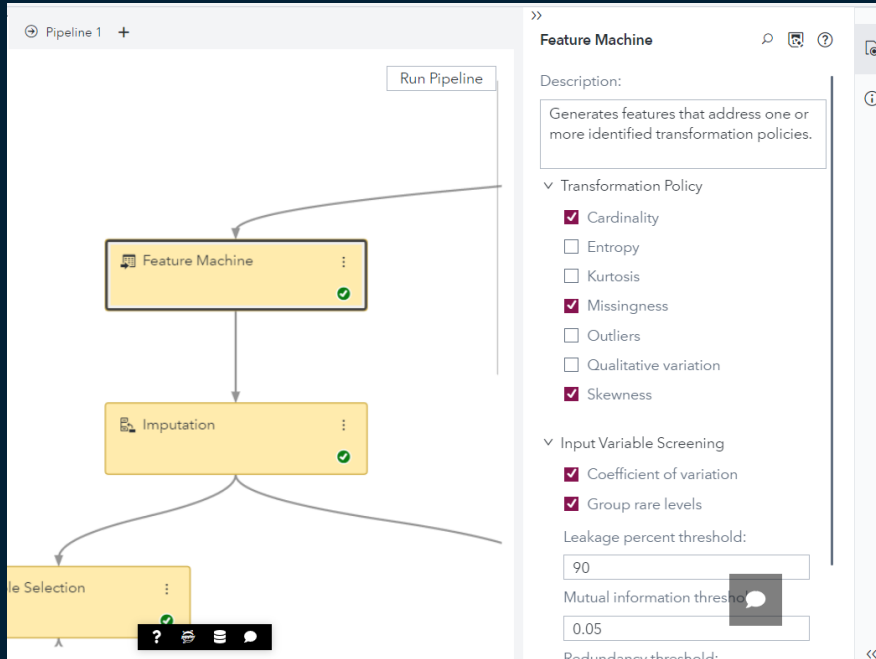
SAS Model Studio

Get to the good stuff faster | Automated Pipelines



SAS Model Studio

Use an AI friend for data prep | Feature Machine



The Feature Machine node generates new features by performing variable transformations to improve data quality and model accuracy. For more information, see [Overview of Feature Machine](#) in the Model Studio reference documentation.

SAS Model Studio

Automatically tune those hyperparameters, Part 1 | single node

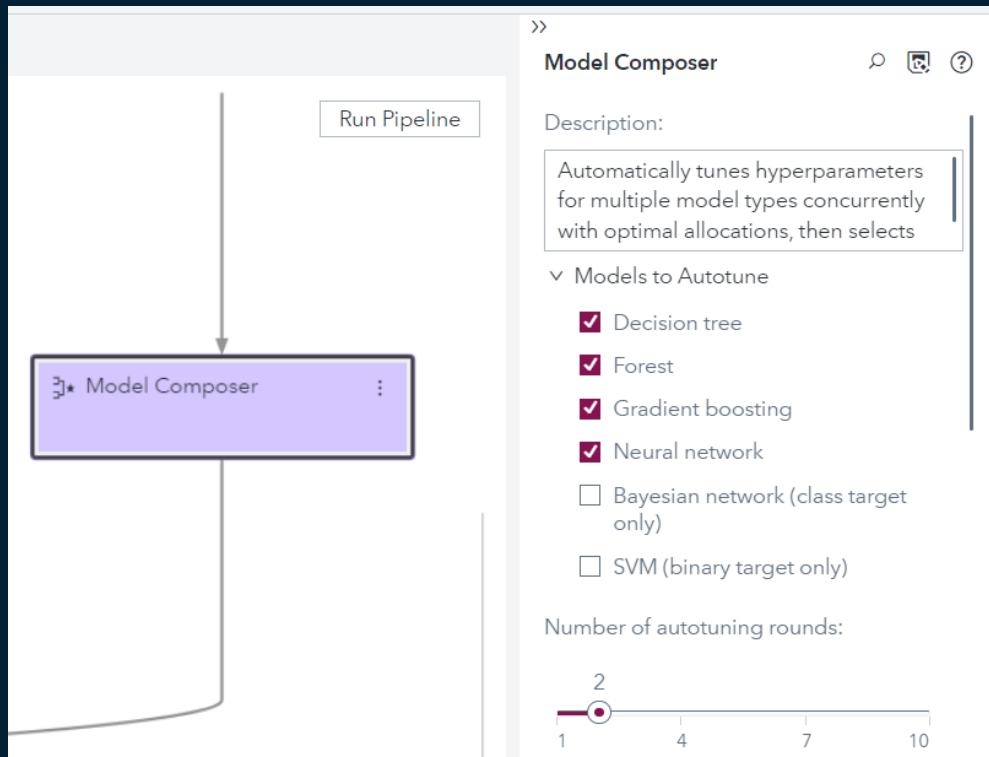
Gradient Boosting 🔍 🖨️ ?

- ▼ Perform Autotuning ☒
- > L1 Regularization ☒
- > L2 Regularization ☒
- > Learning Rate ☒
- > Maximum Depth ☒
- > Minimum Leaf Size ☒
- > Number of Interval Bins ☒
- > Number of Inputs per Split ☒
- > Number of Trees ☒
- > Subsample Rate ☒
- > Search Options
- > General Options

Model Comparison			
Cham... ↓	Name	Algorithm Name	KS (Youden)
★	Gradient Boosting (Autotuning)	Gradient Boosting	0.5866
	Decision Tree (Autotuning)	Decision Tree	0.5385
	Ensemble	Ensemble	0.5775
	Forest (Autotuning)	Forest	0.5665
	Forward Logistic Regression (Autotuning)	Logistic Regression	0.5450
	Stepwise Logistic Regression (Autotuning)	Logistic Regression	0.5434

SAS Model Studio

Automatically tune those hyperparameters, Part 2 | Model Composer node



The screenshot displays the SAS Model Studio interface. On the left, a workflow diagram shows a 'Model Composer' node (highlighted in purple) receiving input from a 'Run Pipeline' button. On the right, the 'Model Composer' configuration panel is open, showing the following settings:

- Description:** Automatically tunes hyperparameters for multiple model types concurrently with optimal allocations, then selects
- Models to Autotune:**
 - ☒ Decision tree
 - ☒ Forest
 - ☒ Gradient boosting
 - ☒ Neural network
 - ☐ Bayesian network (class target only)
 - ☐ SVM (binary target only)
- Number of autotuning rounds:** A slider set to 2, with a range from 1 to 10.

SAS Model Studio

Incorporate SAS 9 Code | SAS Code node

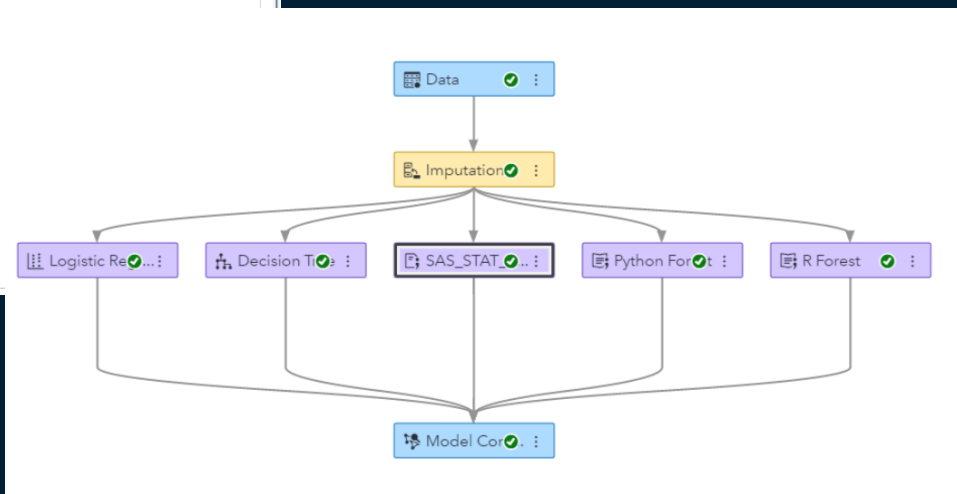
Macro

Filter

DATA-VARIABLES

- dm_text
- dm_interval_input
- dm_offset
- dm_into_var
- dm_unary_input
- dm_predicted_var
- dm_id
- dm_binary_input
- dm_key
- dm_nominal_input

```
1 /* SAS code */
2 proc LOGISTIC data=&dm_data;
3 class %dm_nominal_input %dm_binary_input %dm_dec_target;
4 model %dm_dec_target(event="&dm_dec_event")= %dm_interval_input
5 %dm_binary_input
6 %dm_nominal_input /
7 selection=stepwise
8 slentry=0.3
9 slstay=0.35
10 details
11 lackfit ;
12 where &dm_partitionvar=&dm_partition_train_val;
13 ods output fitstatistics=&dm_data_outfit;
14 code file="&dm_file_scorecode";
15 run;
16
```



SAS Model Studio

Incorporate R + Python code | Open-Source Code node

_Demo1 > Python Forest

Python Variables

Filter

- dm_class_input
- dm_classtarget_intovar
- dm_classtarget_level
- dm_dec_target
- dm_input
- dm_inputdf
- dm_interval_input
- dm_model
- dm_nodedir
- dm_partition_train_val
- dm_partitionvar
- dm_predictionvar
- dm_scoreddf
- dm_traindf

```
16 # The actual code that was executed. START ENTERING YOUR CODE ON THE NEXT LINE
17
18 from sklearn import ensemble
19
20 # Get full data with inputs + partition indicator
21 dm_input.insert(0, dm_partitionvar)
22 fullX = dm_inputdf.loc[:, dm_input]
23
24 # Dummy encode class variables
25 fullX_enc = pd.get_dummies(fullX, columns=dm_class_input+dm_dec_target)
26
27 # Create X (features/inputs); drop partition indicator
28 X_enc = fullX_enc[fullX_enc[dm_partitionvar] == dm_partitionvar]
29 X_enc = X_enc.drop(dm_partitionvar, 1)
30
31 # Create y (labels)
32 y = dm_traindf[dm_dec_target]
33
34 # Fit RandomForest model w/ training data
35 params = {'n_estimators': 100, 'max_depth': 20, 'min_samples': 5}
36 dm_model = ensemble.RandomForestClassifier(**params)
37 dm_model.fit(X_enc, y)
38 print(dm_model)
```

_Demo1 > R Forest

R Variables

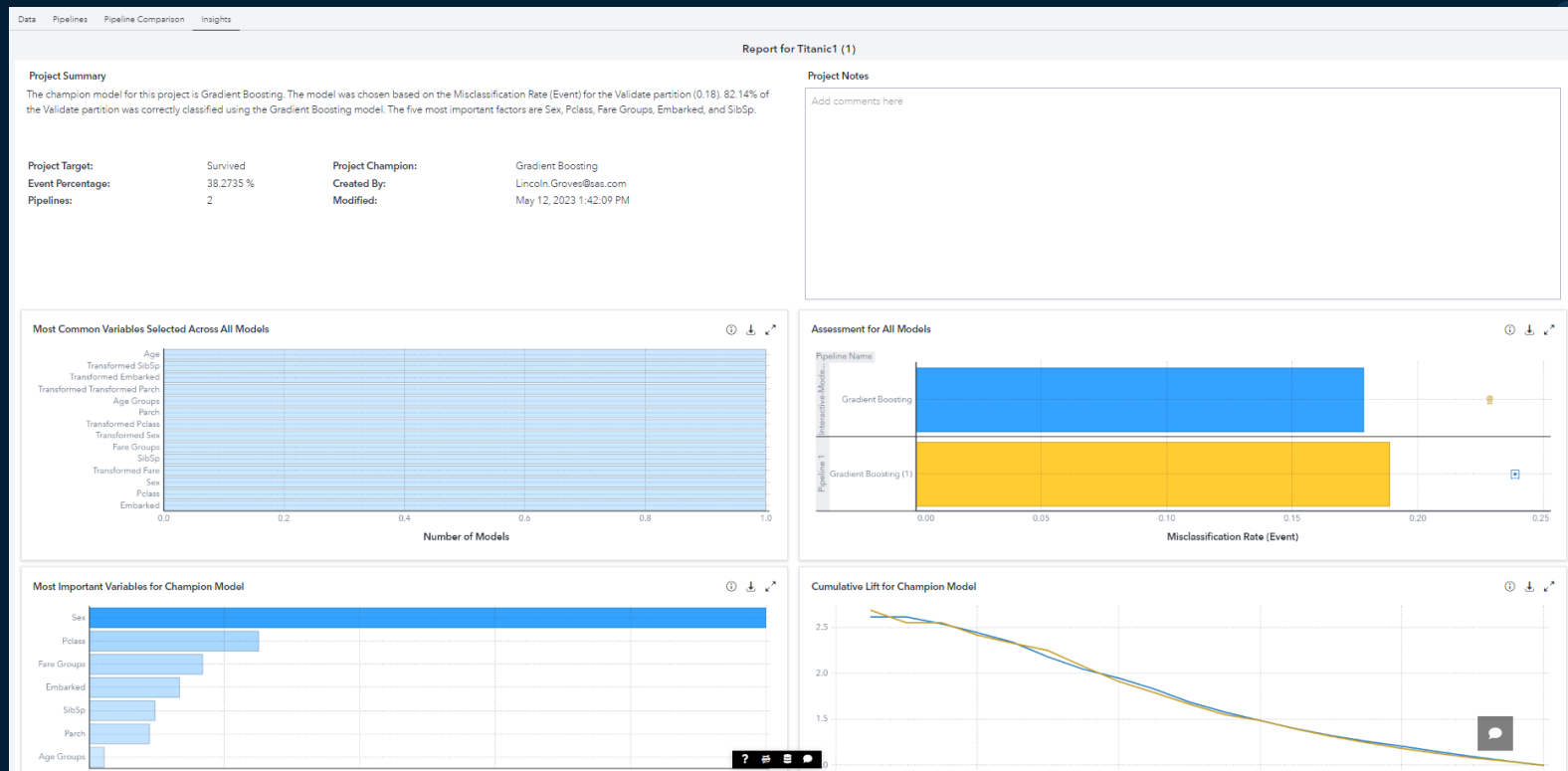
Filter

- dm_class_input
- dm_classtarget_intovar
- dm_classtarget_level
- dm_dec_target
- dm_input
- dm_inputdf
- dm_interval_input
- dm_model
- dm_model_formula
- dm_nodedir
- dm_partition_train_val
- dm_partitionvar
- dm_predictionvar
- dm_scoreddf
- node_data.csv
- node_scored.csv

```
3 # Note that a few lines of Python or R code are added before your code; for example:
4 # Python:
5 dm_class_input = ["class_var_1", "class_var_2"]
6 dm_interval_input = ["numeric_var_1", "numeric_var_2"]
7 # R:
8 dm_class_input <- c("class_var_1", "class_var_2")
9 dm_interval_input <- c("numeric_var_1", "numeric_var_2")
10
11 # For Python, use the Node Configuration section of the Project Settings to prepend
12 # any configuration code, which is executed before the above code. During execution,
13 # this code is automatically prepended to every node that runs Python code.
14
15 # After running the node, the Python or R code window in the node results displays
16 # the actual code that was executed. START ENTERING YOUR CODE ON THE NEXT LINE.
17
18 library(randomForest)
19
20 # RandomForest
21 dm_model <- randomForest(dm_model_formula, ntree=100, mtry=5, data=dm_traindf, importance=
22
23 # Score
24 pred <- predict(dm_model, dm_inputdf, type="prob")
25 dm_scoreddf <- data.frame(pred)
26 colnames(dm_scoreddf) <- c("P_CHURN0", "P_CHURN1")
27
28 # Print/plot model output
29 png("rpt_forestMsePlot.png")
30 plot(dm_model, main='randomForest MSE Plot')
31 dev.off()
32
33 write.csv(in ? @ @ @ del, file="rpt_forestIMP.csv", row.names=TRUE)
```

SAS Model Studio

Need help with storytelling? | Use AI generated Insights

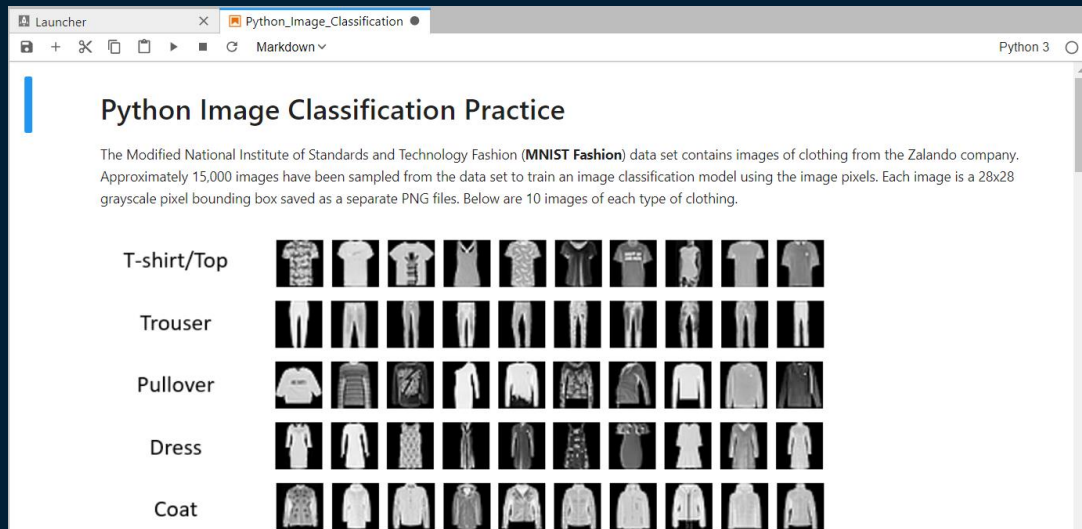
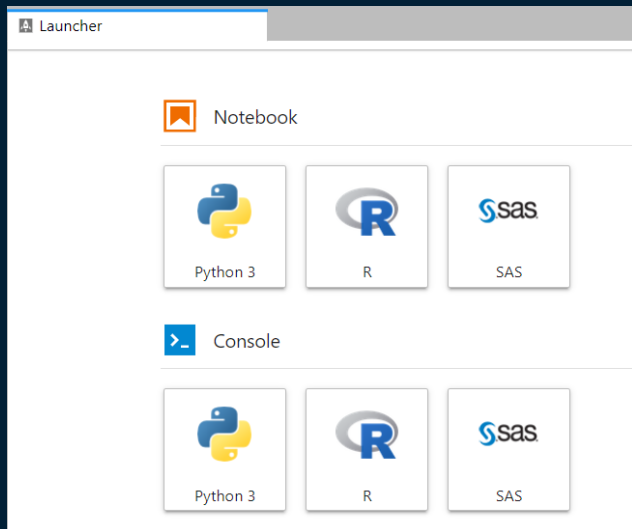


Part IV: Jupyter

Where to get your open-source fix

Jupyter

Better together | Run R, Python, and SAS Notebooks



Jupyter

Prefer to wrangle data in open source? | Convert open-source data to SAS

FileEditViewRunKernel

SettingsHelp

+⌵↺

Filter files by name

NameLast Modified

casuser42 minutes ago

Courses4 years ago

SAS_Viya_Machine_Learning3 months ago

SAS_Viya_Programming3 months ago

SASpy2 months ago

sasuser.viya2 months ago

scikit_learn_data2 months ago

seaborn-data2 months ago

VulnerablePopulations3 months ago

autoexec.sas3 years ago

Python to SAS Conversion.ipynb2 months ago

Python_to_SAS.ipynbseconds ago

R to SAS Conversion.ipynb2 months ago

SAS Hackathon - Student Competition S...3 days ago

Titanic Data Analysis - 05.12.2023.sas6 days ago

Untitled.ipynban hour ago

VFL File Unzipping - Part IILas2 months ago

VFL File Unzipping.sas2 months ago

Python_to_SAS.ipynb

+⌵↺CodePython 3

display(df.head())
display(df.tail())

[6]: # from seaborn.datasets load MPG
mpg_df = sns.load_dataset('mpg')

[7]: glimpse(mpg_df)

398 rows and 9 columns

	mpg	cylinders	displacement	horsepower	weight	acceleration	model_year	origin	name
0	18.0	8	307.0	130.0	3504	12.0	70	usa	chevrolet chevelle malibu
1	15.0	8	350.0	165.0	3693	11.5	70	usa	buick skylark 320
2	18.0	8	318.0	150.0	3436	11.0	70	usa	plymouth satellite
3	16.0	8	304.0	150.0	3433	12.0	70	usa	amc rebel sst
4	17.0	8	302.0	140.0	3449	10.5	70	usa	ford torino

	mpg	cylinders	displacement	horsepower	weight	acceleration	model_year	origin	name
393	27.0	4	140.0	86.0	2790	15.6	82	usa	ford mustang gl
394	44.0	4	97.0	52.0	2130	24.6	82	europe	vw pickup
395	32.0	4	135.0	84.0	2295	11.6	82	usa	dodge rampage
396	28.0	4	120.0	79.0	2625	18.6	82	usa	ford ranger
397	31.0	4	119.0	82.0	2720	19.4	82	usa	chevy s-10

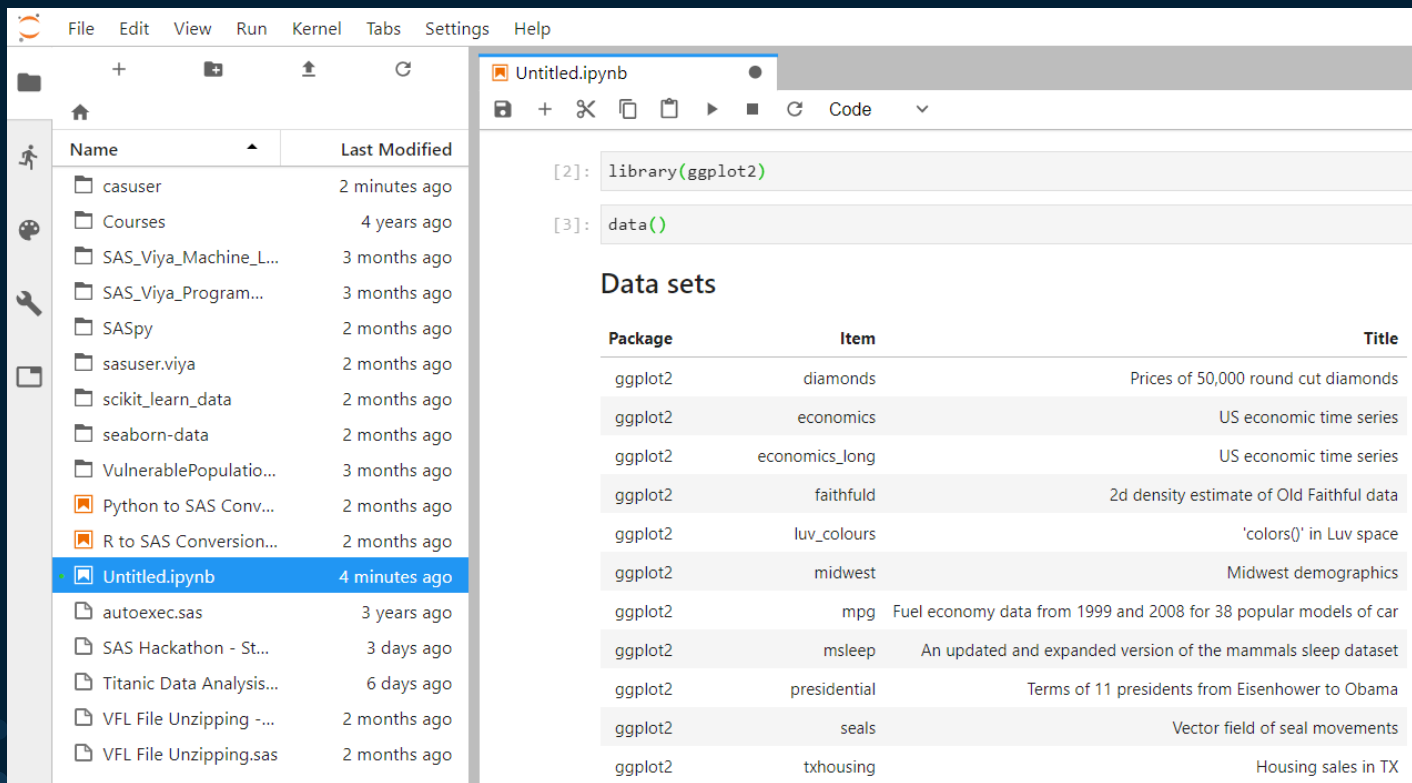
[8]: import saspy

[]: sas = saspy.SASsession(cfgname='iomlinux')

[]: sas.dataframe2sasdata(df=mpg_df,table='mpg_python',libref='PY_CONV')

Jupyter

Want access to more data for teaching and learning? | Import open-source data



The screenshot displays the JupyterLab interface. On the left is a file browser pane showing a list of files and folders. The 'Untitled.ipynb' file is selected. On the right is a code editor pane titled 'Untitled.ipynb' showing two code cells:

```
[2]: library(ggplot2)
[3]: data()
```

Below the code editor, a 'Data sets' section displays a table of available datasets:

Package	Item	Title
ggplot2	diamonds	Prices of 50,000 round cut diamonds
ggplot2	economics	US economic time series
ggplot2	economics_long	US economic time series
ggplot2	faithful	2d density estimate of Old Faithful data
ggplot2	luv_colours	'colors()' in Luv space
ggplot2	midwest	Midwest demographics
ggplot2	mpg	Fuel economy data from 1999 and 2008 for 38 popular models of car
ggplot2	msleep	An updated and expanded version of the mammals sleep dataset
ggplot2	presidential	Terms of 11 presidents from Eisenhower to Obama
ggplot2	seals	Vector field of seal movements
ggplot2	txhousing	Housing sales in TX