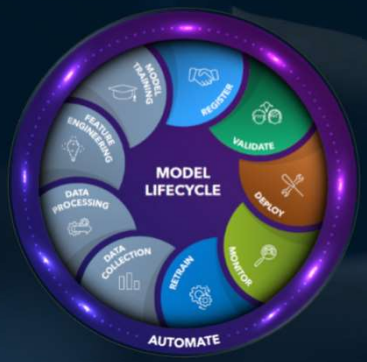
Integrating Open Source Modeling with SAS® Model Manager

A modeling melting pot for innovation and creativity



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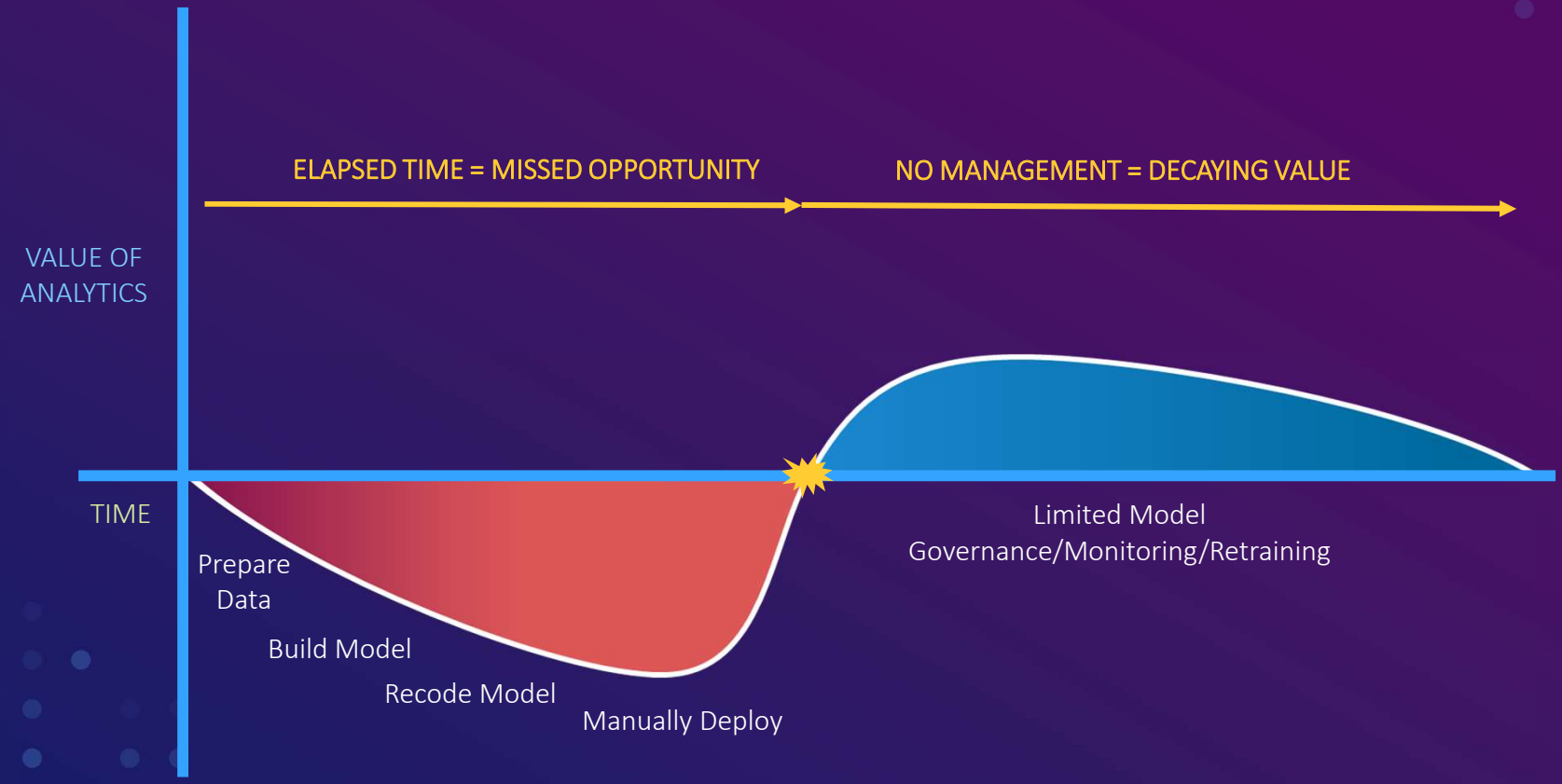
Typical Analytics Orchestration



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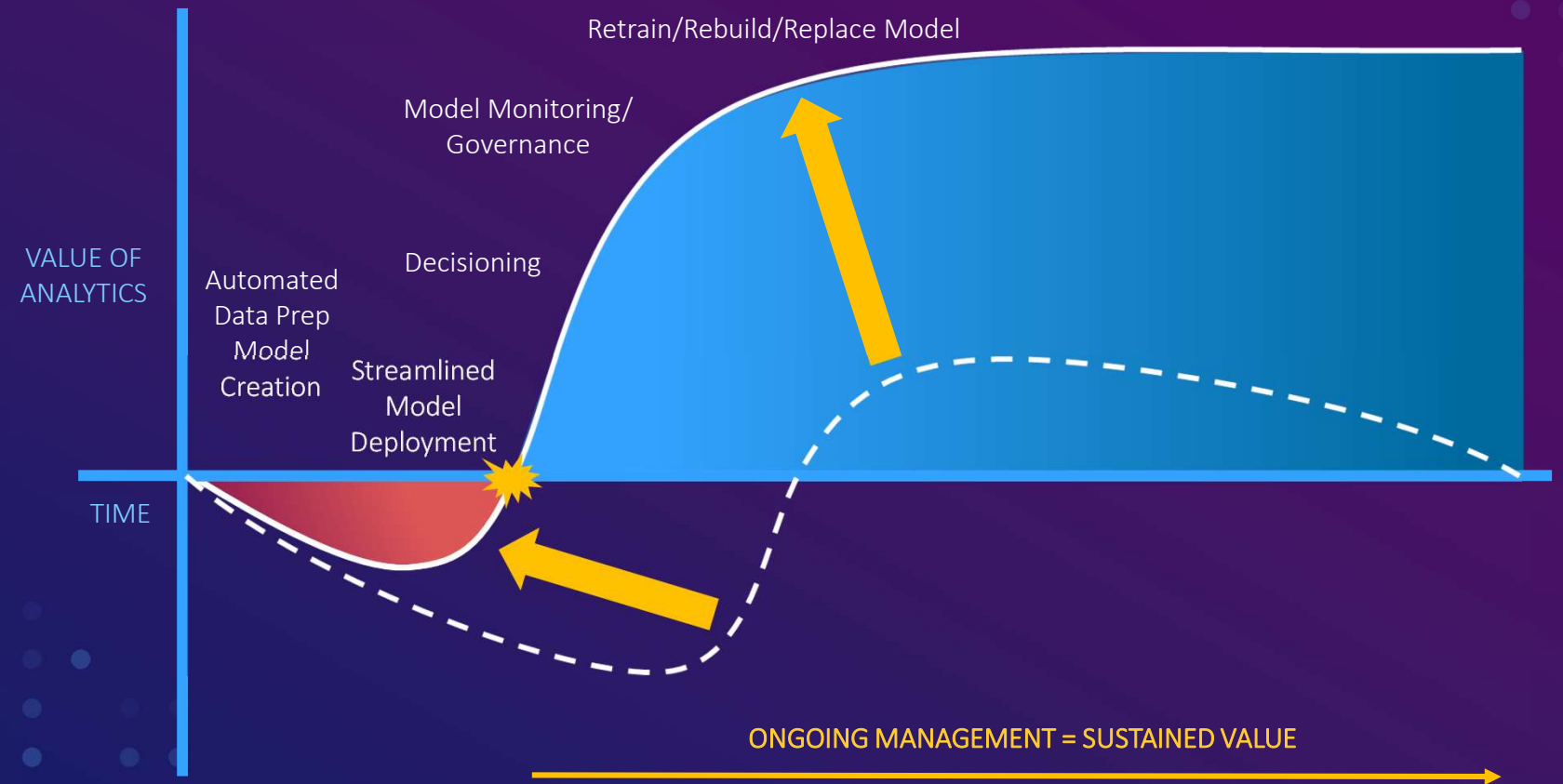
Analytics Orchestration with SAS Viya



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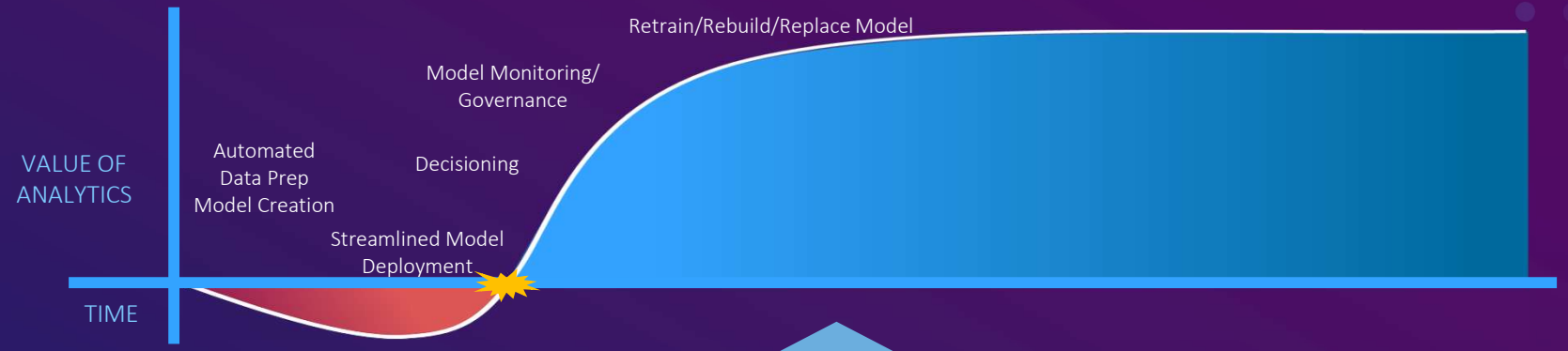
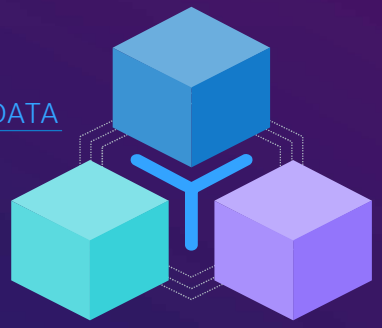
What is SAS Viya?



Data Access
Data Quality
Data Preparation

DATA



Visualization
Statistics, Machine Learning (Deep Learning)
Computer Vision
Natural Language Processing
Forecasting
Optimization

DISCOVERY

Model Management
Decision Management
Real-Time Analytics

DEPLOYMENT

SAS, Rest API, Python, R, Lua, Java

Azure

amazon web services

In-memory

In-Database

Batch

Streaming

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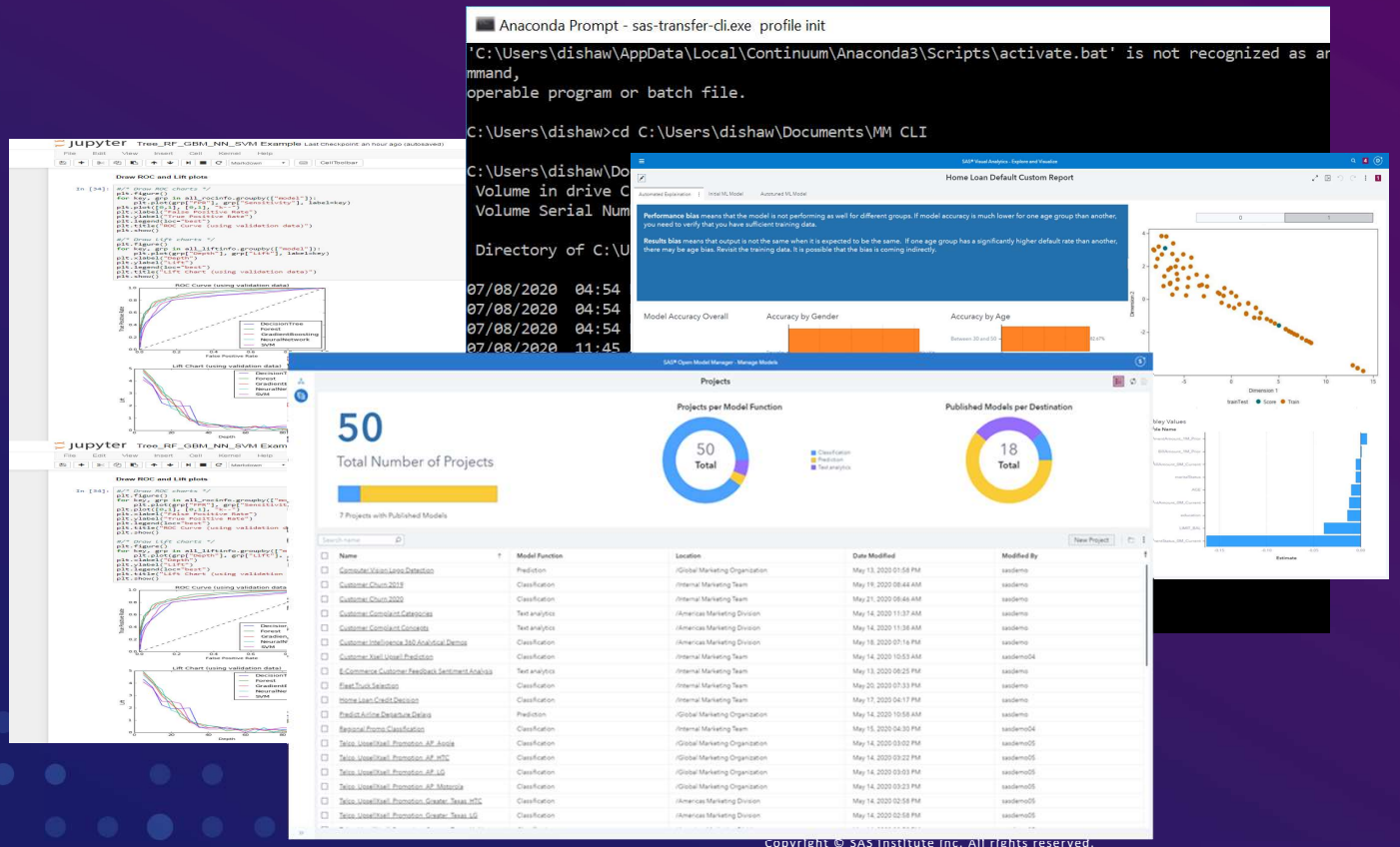
Open Access From Diverse Interfaces



- ✓ Interactive GUI with KPI performance monitoring, variable drift, stability, alerts
- ✓ REST APIs
- ✓ Command Line Interface
- ✓ Python package (PZMM and others)
- ✓ SAS code

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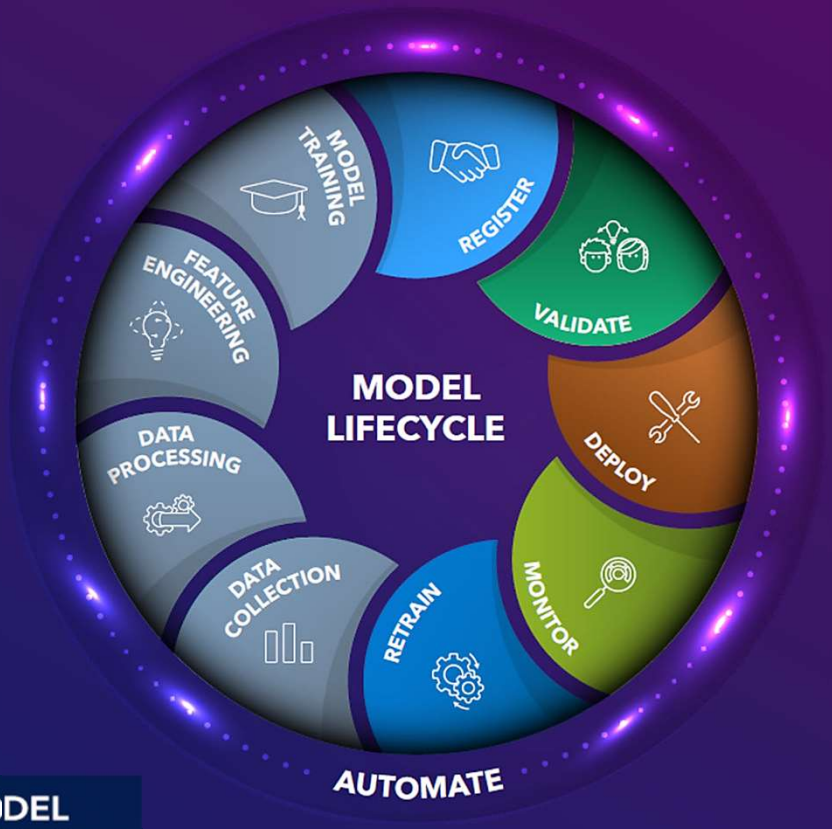
SAS® Model Manager



- Register
- Validate
- Deploy
- Monitor
- Retrain

SAS MODEL MANAGEMENT

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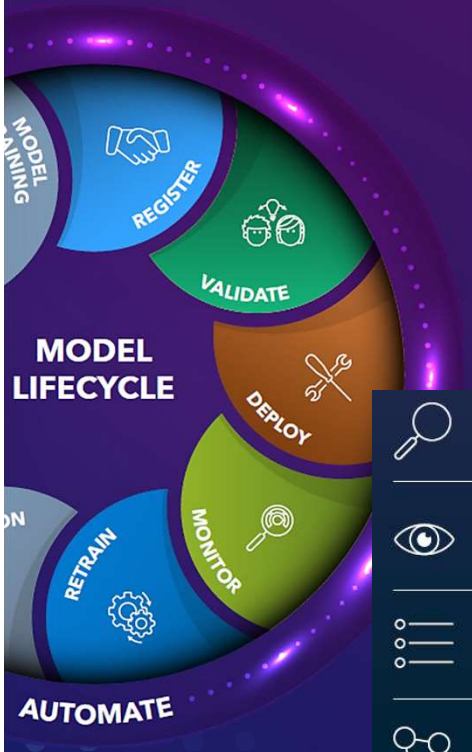
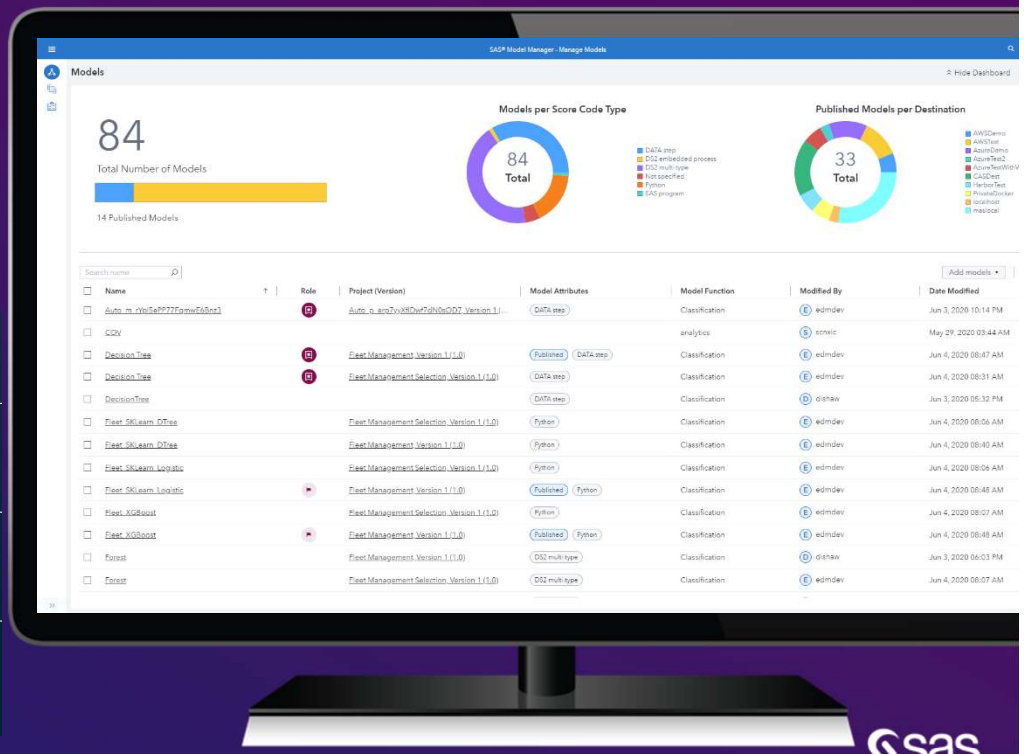
SAS MODEL MANAGEMENT

Register

ORGANIZE AND MANAGE ANALYTIC MODELS AND PIPELINES



- Create a central searchable repository for all models/pipelines
- Compare models side-by-side
- Maintain version control and track project history
- Access models and model-score artifacts using open REST APIs



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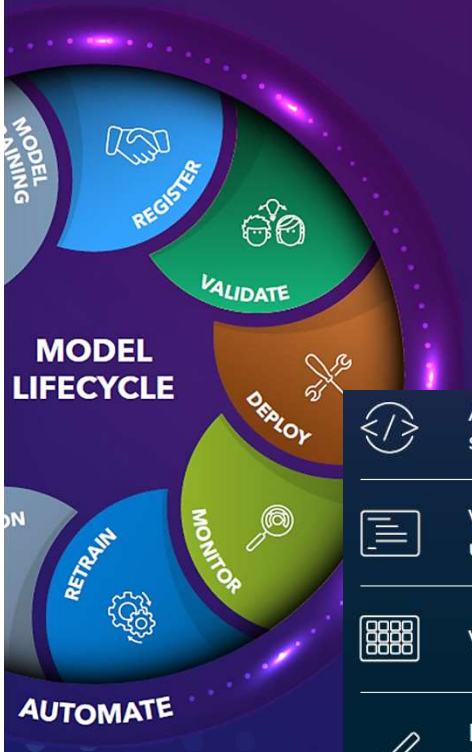
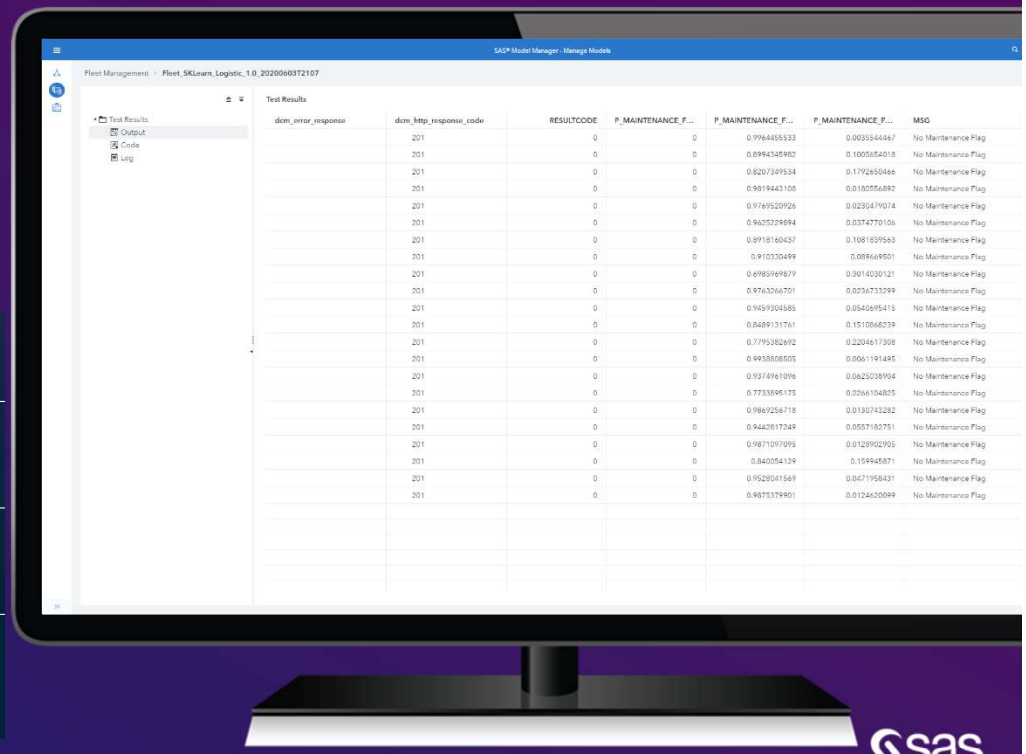
SAS MODEL MANAGEMENT

Validate

TEST AUTO-GENERATED EXECUTABLE SCORE CODE



- Automatically generate executable scoring code for Python-based models
- Validate that the model is executable using a representative test data set
- View an output table, code, and log
- Publish validation to ensure models are executing correctly in a production environment



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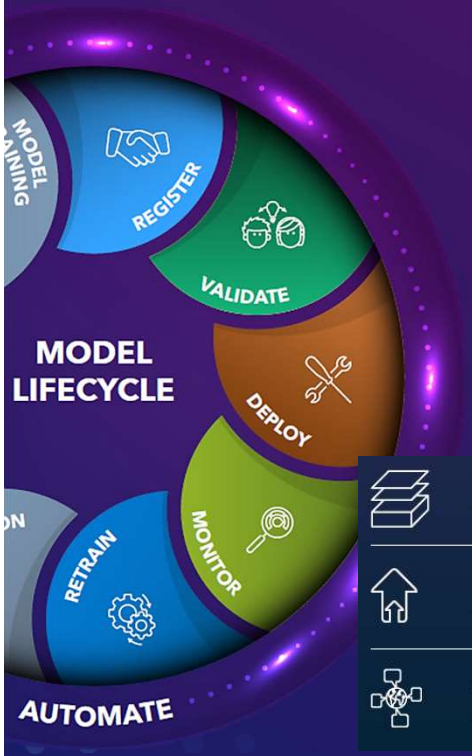
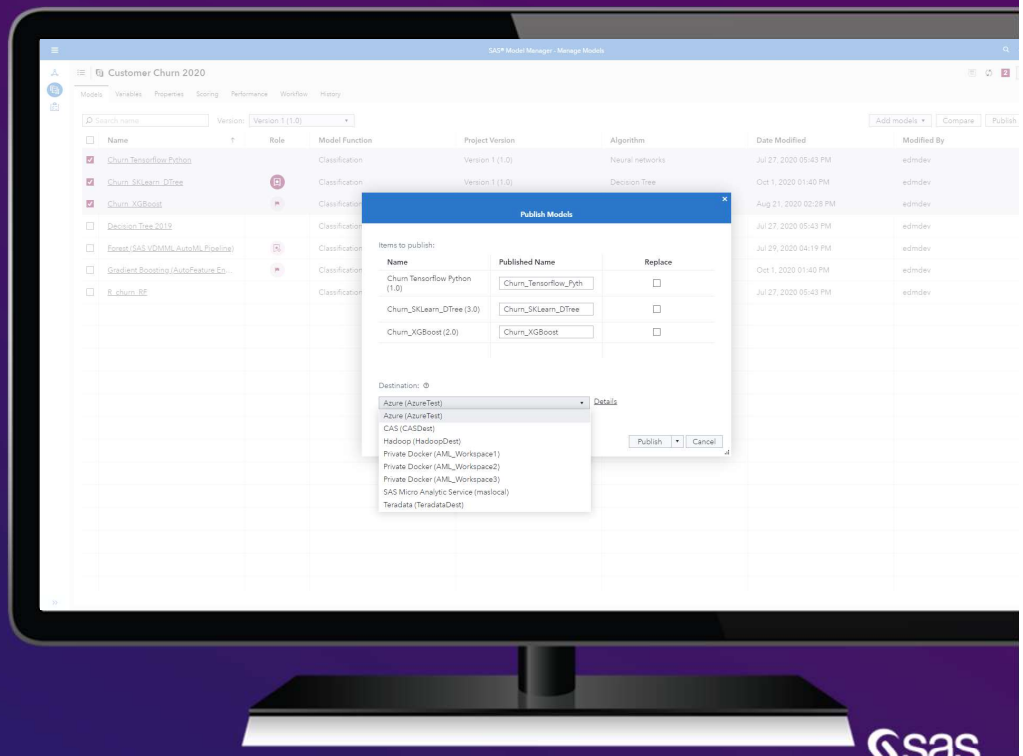
SAS MODEL MANAGEMENT

Deploy

MODEL PUBLISHING AND SCORING



- Get quick and easy access to different production environments
- Deploy in-batch, streaming, cloud or edge devices
- Support multiple publishing destinations and container destinations



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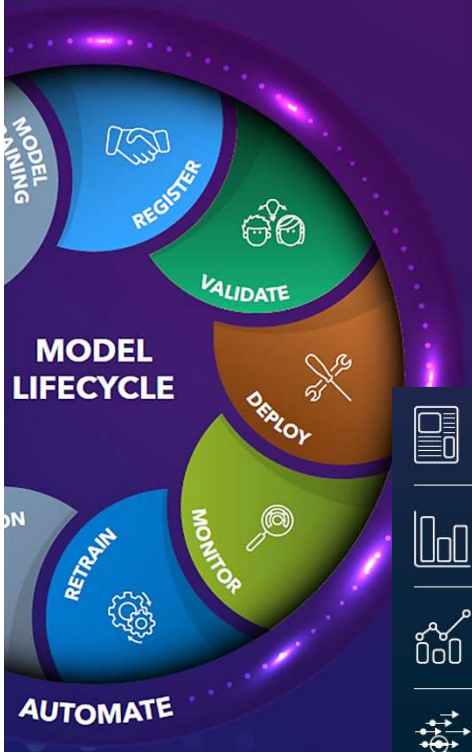
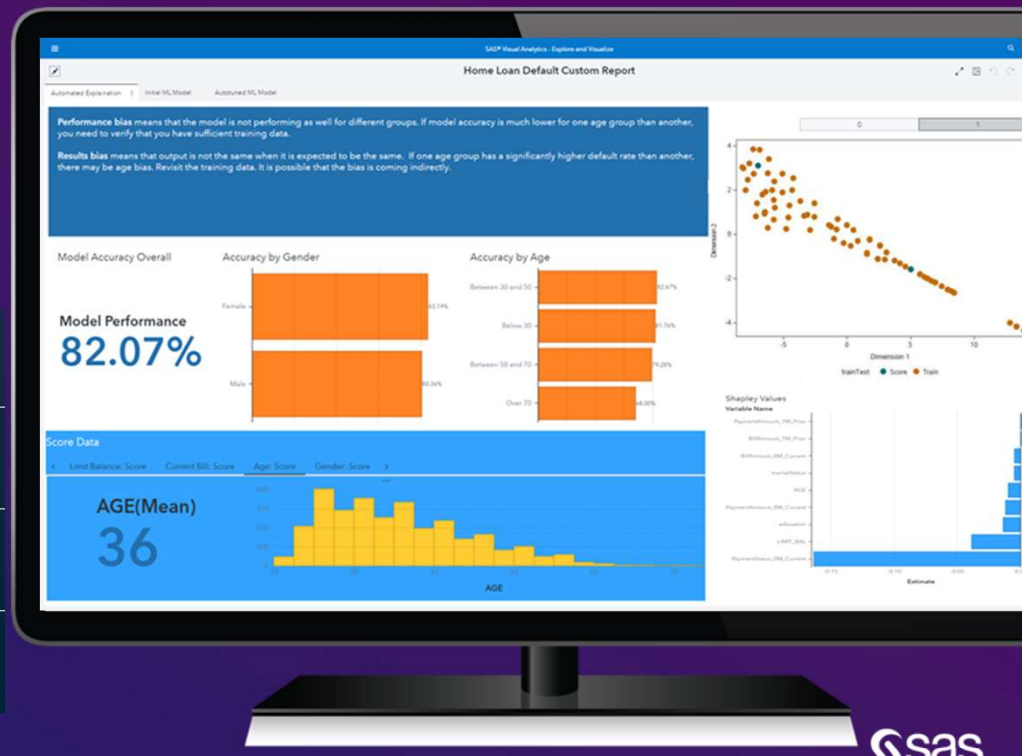
SAS MODEL MANAGEMENT

Monitor

MONITOR MODEL PERFORMANCE



- Use a handy wizard to generate out-of-the-box performance reports
- Maintain visibility of performance monitoring tasks
- Easily access data to monitor your own reports
- Monitor and Detect Model/Feature Degradation and Alerting system



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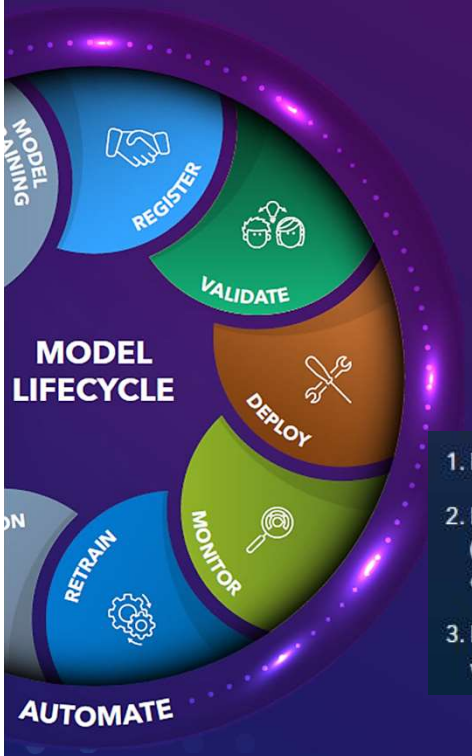
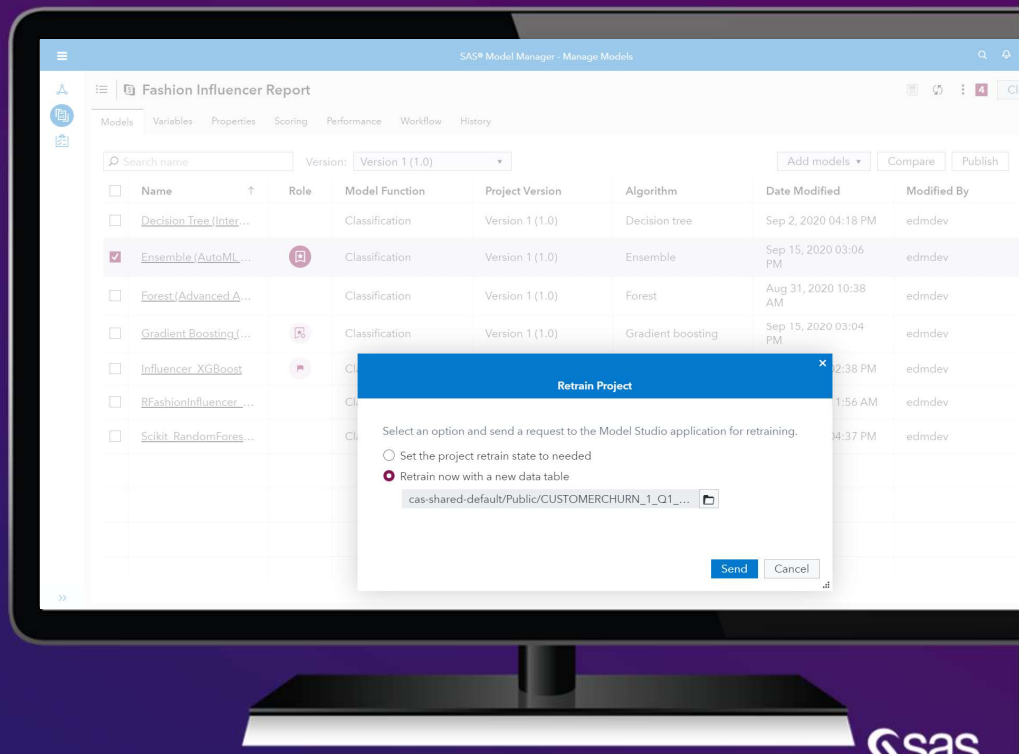
SAS MODEL MANAGEMENT

Retrain

RETRAIN MODELS



1. Retrain the existing model on new data
2. Revise the model with new techniques (such as feature engineering or new data elements)
3. Replace the model entirely with a better model.



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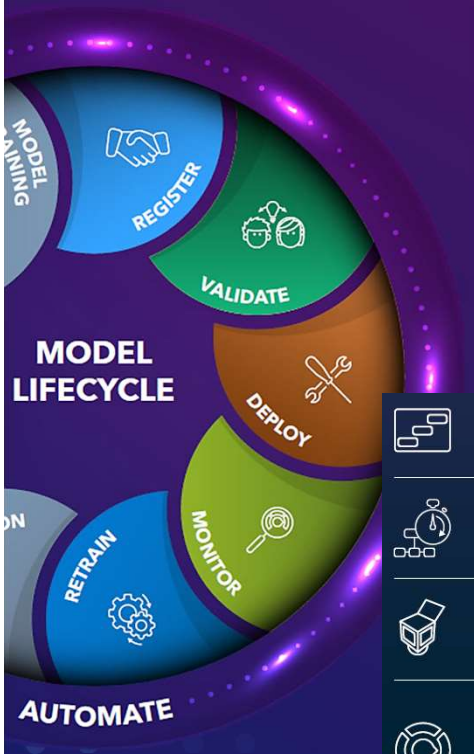
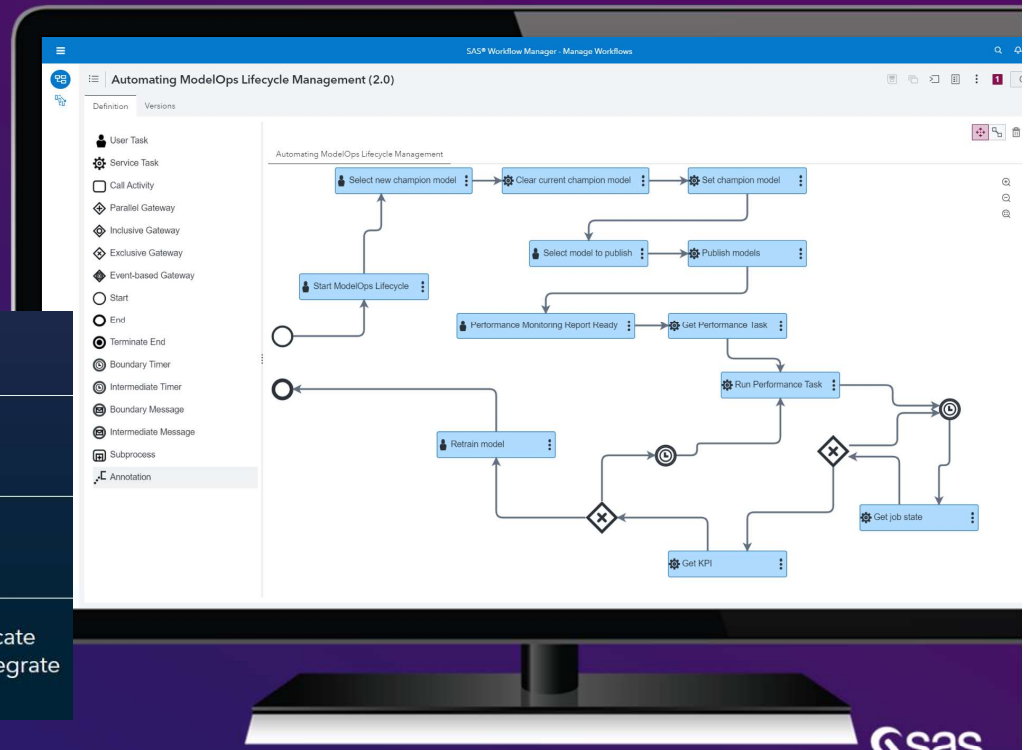
SAS MODEL MANAGEMENT

Automate

WORKFLOW-BASED APPROACH TO AUTOMATION



- Create custom workflows that match business requirements and processes
- Start a workflow process to track the progress of your project
- Apply out-of-the-box task templates
- Use the open, RESTful API to communicate with the model lifecycle system and integrate with third-party applications



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PythonZip-ModelManager (pzmm) Demo

Enable easy communication with Python runtime

Import, deploy, score, and monitor already built Python models in SAS® Model Manager directly from Python

https://github.com/sassoftware/python-sasctl/tree/master/src/sasctl/pzmm

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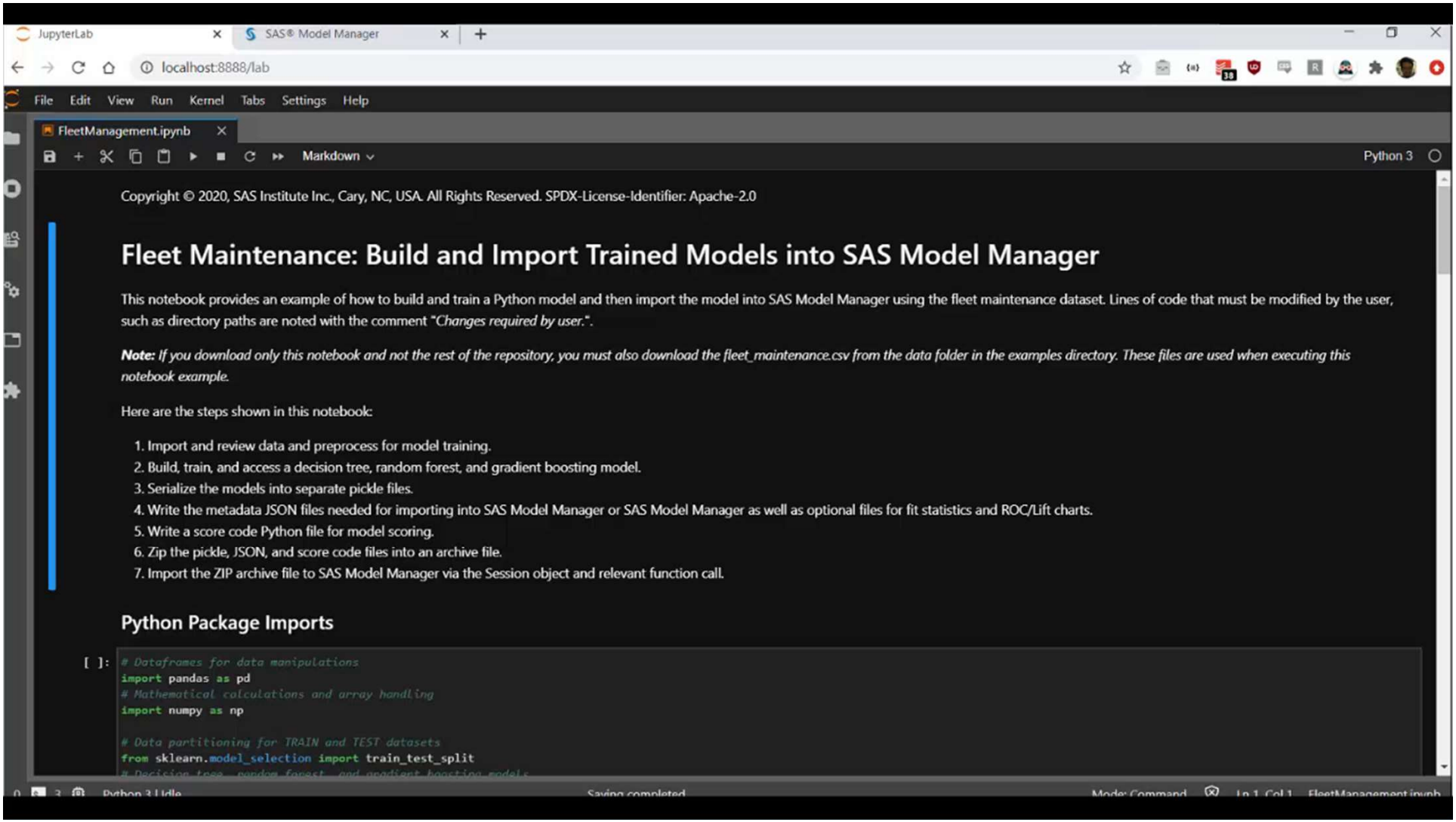
JupyterLab
SAS® Model Manager
localhost:8888/lab
File Edit View Run Kernel Tabs Settings Help
FleetManagement.ipynb
Markdown
Python 3
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Fleet Maintenance: Build and Import Trained Models into SAS Model Manager
This notebook provides an example of how to build and train a Python model and then import the model into SAS Model Manager using the fleet maintenance dataset. Lines of code that must be modified by the user, such as directory paths are noted with the comment "Changes required by user.".
Note: If you download only this notebook and not the rest of the repository, you must also download the fleet_maintenance.csv from the data folder in the examples directory. These files are used when executing this notebook example.
Here are the steps shown in this notebook:
1. Import and review data and preprocess for model training.
2. Build, train, and access a decision tree, random forest, and gradient boosting model.
3. Serialize the models into separate pickle files.
4. Write the metadata JSON files needed for importing into SAS Model Manager or SAS Model Manager as well as optional files for fit statistics and ROC/Lift charts.
5. Write a score code Python file for model scoring.
6. Zip the pickle, JSON, and score code files into an archive file.
7. Import the ZIP archive file to SAS Model Manager via the Session object and relevant function call.
Python Package Imports
[ ]:
# Dataframes for data manipulations
import pandas as pd
# Mathematical calculations and array handling
import numpy as np
# Data partitioning for TRAIN and TEST datasets
from sklearn.model_selection import train_test_split
Saving completed
Mode: Command
Ln 1, Col 1
FleetManagement.ipynb

SAS MODEL MANAGEMENT

Explore More Resources

PythonZip-ModelManager (pzmm)

Enable easy communication with Python runtime

PZMM Module

https://github.com/sassoftware/python-sasctl/tree/master/src/sasctl/pzmm

Register Python Model in SAS Model Manager

Problem

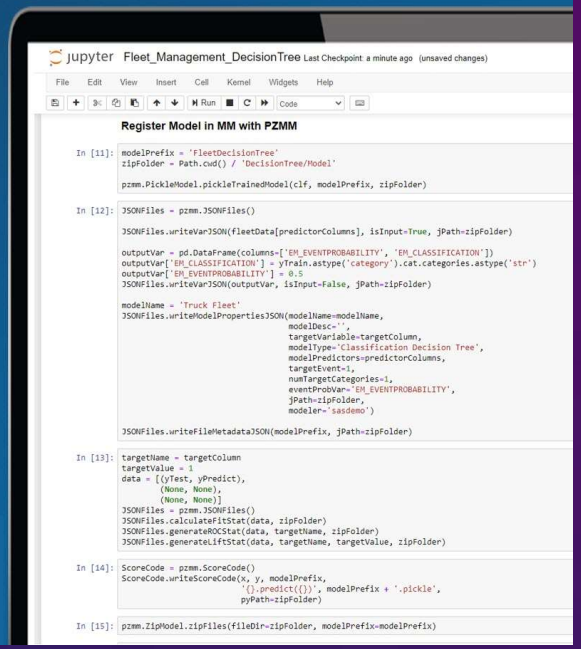
Simplify registration of a Python model into SAS Model Manager / SAS Open Model Manager

Tool

Use Python as a client

Solution

Use pickleZip-mm (pzMM) to write executable score.py file and supporting metadata JSON files, serialize trained model into binary pickle file, and load all relevant files for deployment and governance needs



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Compare all types of models Demo

Easily compare and contrast between any type of model directly within SAS® Model Manager

https://communities.sas.com/

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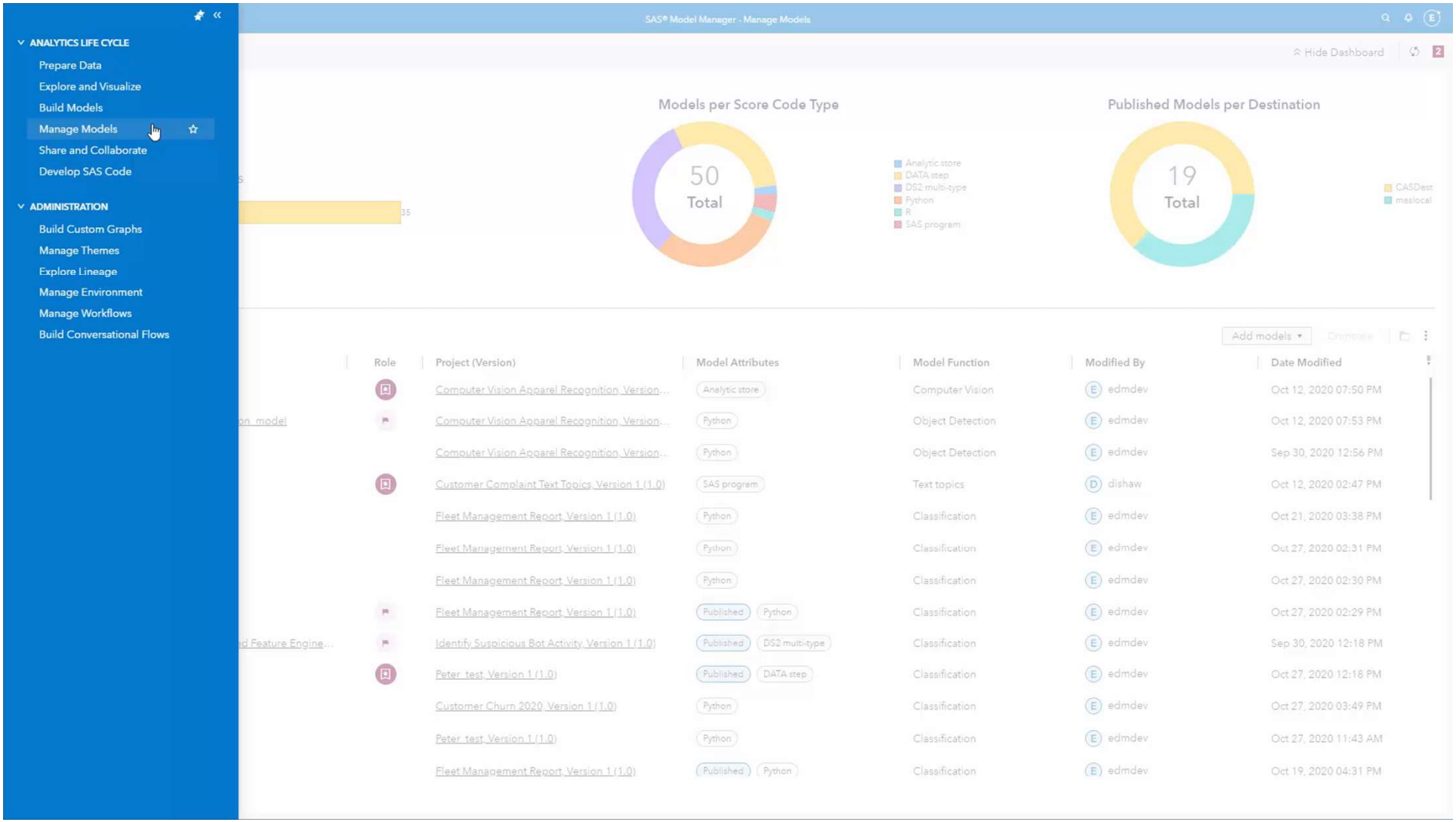
SAS® Model Manager - Manage Models
ANALYTICS LIFE CYCLE
Prepare Data
Explore and Visualize
Build Models
Manage Models
Share and Collaborate
Develop SAS Code
ADMINISTRATION
Build Custom Graphs
Manage Themes
Explore Lineage
Manage Environment
Manage Workflows
Build Conversational Flows
Hide Dashboard
Models per Score Code Type
50
Total
Analytic store
DATA step
DS2 multi-type
Python
R
SAS program
Published Models per Destination
19
Total
CASDest
maslocal
Add models
Role
Project (Version)
Model Attributes
Model Function
Modified By
Date Modified
Computer Vision Apparel Recognition, Version... Analytic store Computer Vision edmdev Oct 12, 2020 07:50 PM
Computer Vision Apparel Recognition, Version... Python Object Detection edmdev Oct 12, 2020 07:53 PM
Computer Vision Apparel Recognition, Version... Python Object Detection edmdev Sep 30, 2020 12:56 PM
Customer Complaint Text Topics, Version 1 (1.0) SAS program Text topics dishaw Oct 12, 2020 02:47 PM
Fleet Management Report, Version 1 (1.0) Python Classification edmdev Oct 21, 2020 03:38 PM
Fleet Management Report, Version 1 (1.0) Python Classification edmdev Oct 27, 2020 02:31 PM
Fleet Management Report, Version 1 (1.0) Python Classification edmdev Oct 27, 2020 02:30 PM
Fleet Management Report, Version 1 (1.0) Published Python Classification edmdev Oct 27, 2020 02:29 PM
Identify Suspicious Bot Activity, Version 1 (1.0) Published DS2 multi-type Classification edmdev Sep 30, 2020 12:18 PM
Peter_test, Version 1 (1.0) Published DATA step Classification edmdev Oct 27, 2020 12:18 PM
Customer Churn 2020, Version 1 (1.0) Python Classification edmdev Oct 27, 2020 03:49 PM
Peter_test, Version 1 (1.0) Python Classification edmdev Oct 27, 2020 11:43 AM
Fleet Management Report, Version 1 (1.0) Published Python Classification edmdev Oct 19, 2020 04:31 PM

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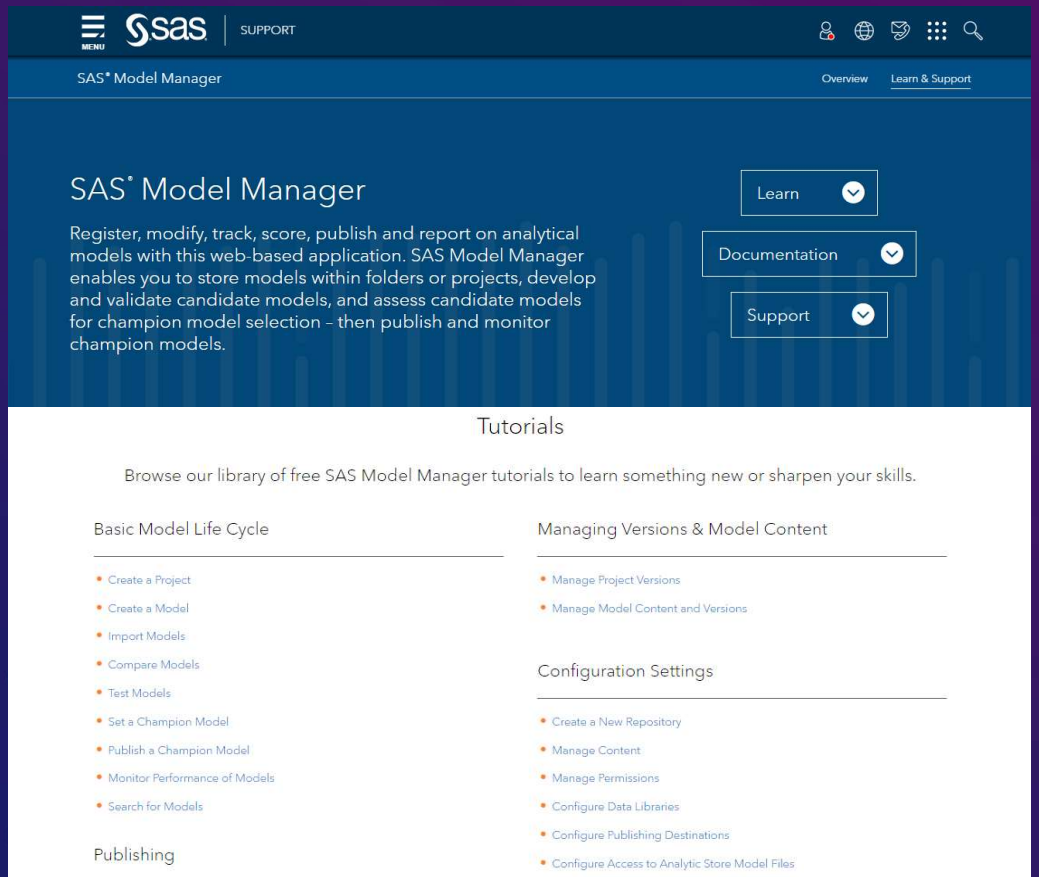
Explore More Resources



www.sas.com/en_us/software/model-manager-support.html

Consumable SAS Viya APIs Demo

Easily leverage automated modeling and automated decisioning with a custom application with SAS Viya APIs

https://developer.sas.com

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Model Ops Application

Browse...

Roles

Upload

Create AutoML Model

Publish Model

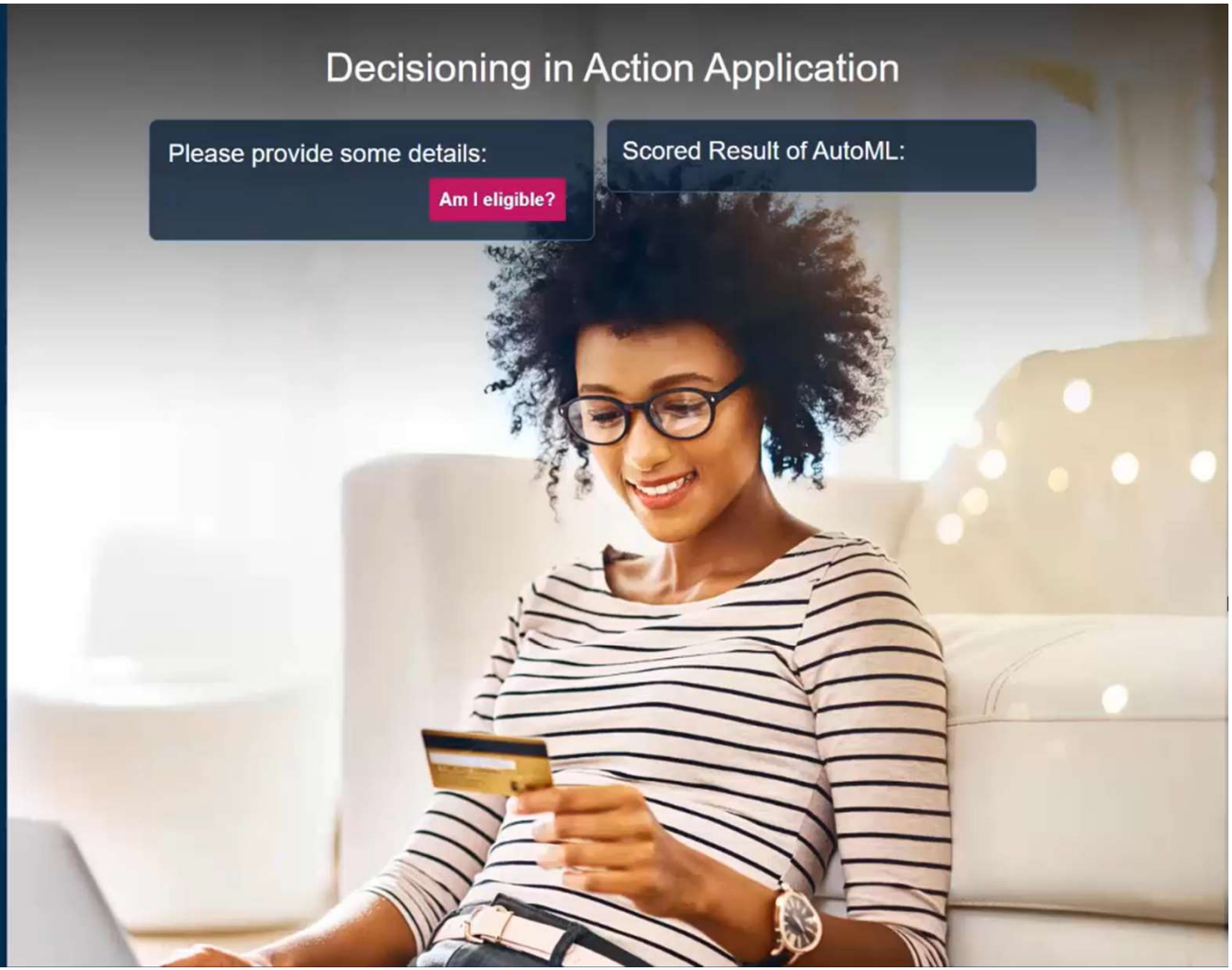
POWERED BY sas

Decisioning in Action Application

Please provide some details:

Am I eligible?

Scored Result of AutoML:



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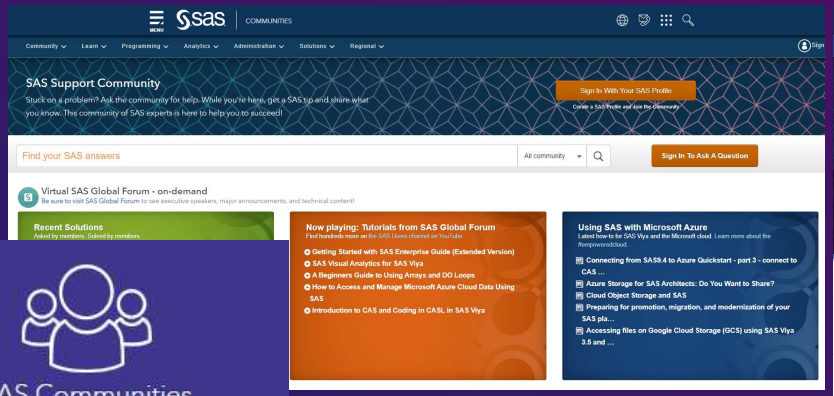
Explore More Resources

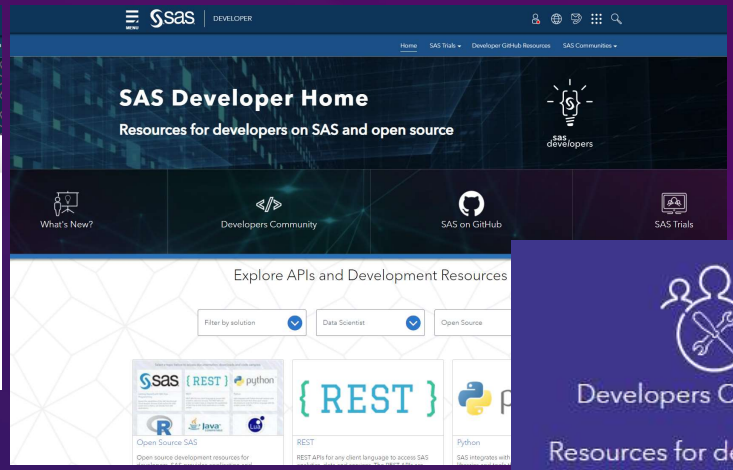


SAS Communities

Peer-to-peer support for SAS users about programming, data analysis, and deployment issues, tips & successes! Join the growing community of SAS.

Join today

communities.sas.com



developer.sas.com

Developers Community

Resources for developers on SAS and open source! Join the growing community of SAS.

Check it out

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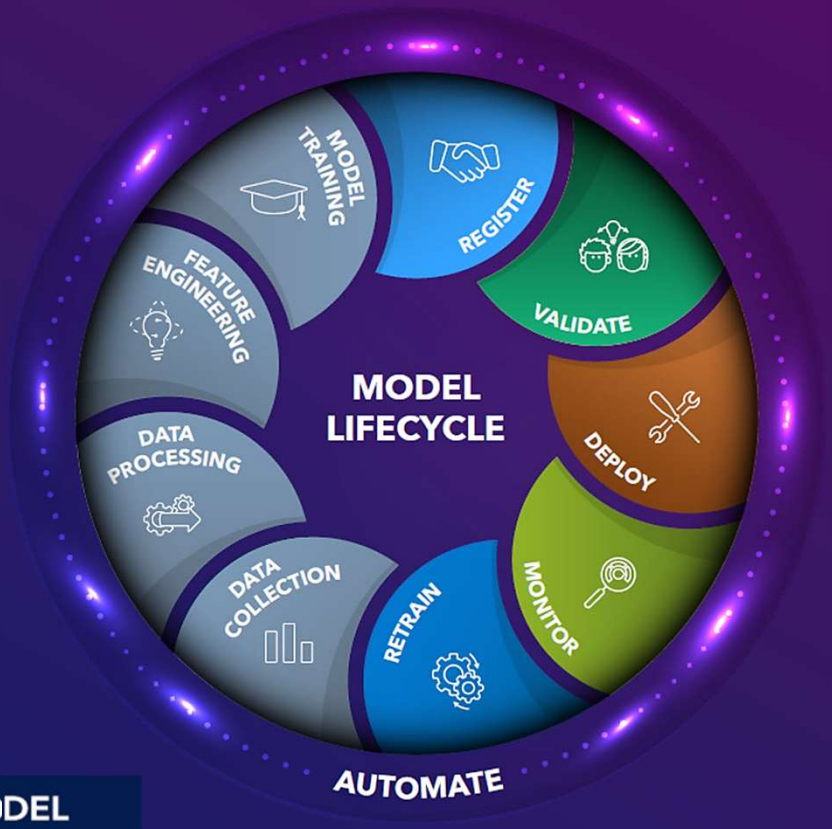
SAS® Model Manager



- Register
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- Deploy
- Monitor
- Retrain

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A modeling melting pot gives organizations the freedom to use their tools, algorithms and programming languages to develop and deploy analytical models – fueling innovation and creativity.

SAS® Viya®

Maximize Business Value. Make Better Decisions. Deliver Trusted Outcomes.

Enterprise Platform

Democratize Analytics

Embedded AI

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