

# GitHub in SAS Viya

## Connecting to GitHub Repositories in SAS Studio

Chris Parrish, Sr. Data Scientist

[chris.parrish@sas.com](mailto:chris.parrish@sas.com)

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# Steps

- 1 Identify/Create GitHub Account to Connect to SAS Viya
- 2 Create SSH Private and Public Keys
- 3 Store Public SSH Key in GitHub Account
- 4 Upload SSH Keys to SAS Viya File Explorer
- 5 Add (New) or Clone (Existing) Repository in SAS Studio
- 6 Create New Content or Make Changes to Existing Content
- 7 Commit Changes
- 8 Push Commits to Repository

The screenshot shows a GitHub repository named 'sas\_viya' by user 'christopher-parrish'. The repository is public and has 41 commits. The file list includes:

File	Description	Time
.vs	added videos and script updates	10 months ago
data	updated file names	last month
python	updated scripts	yesterday
r	added trustworthy ai file	yesterday
sas	updated with saveresult option	yesterday
videos	update new files	2 months ago
README.md	Update README.md	last year

The README.md content is: "Examples of code to create and register models in SAS Viya".

On the right sidebar, there are sections for 'About' (No description, website, or topics provided), 'Releases' (No releases published), 'Packages' (No packages published), and 'Languages' (Python 55.3%, R 33.6%, SAS 11.1%).

1

## Identify/Create GitHub Account to Connect to SAS Viya

This repository called 'sas\_viya' already contains files. New repositories can be added or an entirely new account can be created that supports a team or organization.

```
MINGW64:/c/Users/chparr/OneDrive - SAS/git/sas_viya
@1101001 MINGW64 ~/ /sas_viya (main)
$ ssh-keygen -t ecdsa -b 521 -C " " Insert email in quotes that is associated with GitHub account
Generating public/private ecdsa key pair.
Enter file in which to save the key (/c/Users/ /ssh/id_ecdsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /c/Users/ /ssh/id_ecdsa
Your public key has been saved in /c/Users/ /ssh/id_ecdsa.pub
The key fingerprint is:
The key's randomart image is:
+---[ECDSA 521]---+
|
|
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|
|
|
+-----[ ]-----+
@1101001 MINGW64 ~/ /git/sas_viya (main)
$ clip < ~/.ssh/id_ecdsa.pub
@1101001 MINGW64 ~/ /git/sas_viya (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
@1101001 MINGW64 ~/ /git/sas_viya (main)
$ git pull
```

2

## Create SSH Private and Public Keys

SAS Viya requires *ecdsa* security keys. [GitHub](#) has detailed instructions on how and where to create keys.

This key was developed in the Git Bash console on a laptop under the main branch of the repository that is going to be cloned in SAS Viya. As noted in the log, the public and private keys were stored in the `.../.ssh/` directory on the laptop. File and passphrases are optional.


Once generated, copy (clip) the public key. This will be used in the next step.




Christopher Parrish (christopher-parrish)


Your personal account

[Go to your personal profile](#)

 Public profile


 Account

 Appearance


 Accessibility

 Notifications


Access


 Billing and plans


 Emails

 Password and authentication


 Sessions


 **SSH and GPG keys**

 Organizations

 Moderation

Code, planning, and automation


 Repositories

 Codespaces


 Packages

 Copilot

 Pages


 Saved replies

Security

 Code security and analysis

Integrations

 Applications

 Scheduled reminders

Archives

## Add new SSH Key

Title

new key

Key type

Authentication Key

Key

Begins with 'ssh-rsa', 'ecdsa-sha2-nistp256', 'ecdsa-sha2-nistp384', 'ecdsa-sha2-nistp521', 'ssh-ed25519', 'sk-ecdsa-sha2-nistp256@openssh.com', or 'sk-ssh-ed25519@openssh.com'

Add SSH key

Emoji Win+Period

Undo Ctrl+Z

Redo Ctrl+Shift+Z

Cut Ctrl+X

Copy Ctrl+C

Paste Ctrl+V

Paste as plain text Ctrl+Shift+V

Select all Ctrl+A

Spell check

Writing Direction

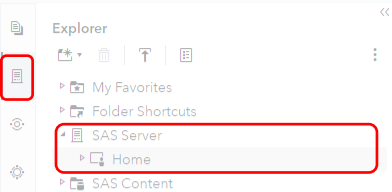
Inspect

3

## Store Public SSH Key in GitHub Account

Navigate to GitHub account settings. Click on Add New SSH Key under *SSH and GPG keys*, give it a name, and right-click->paste public key from clipboard (prior step).

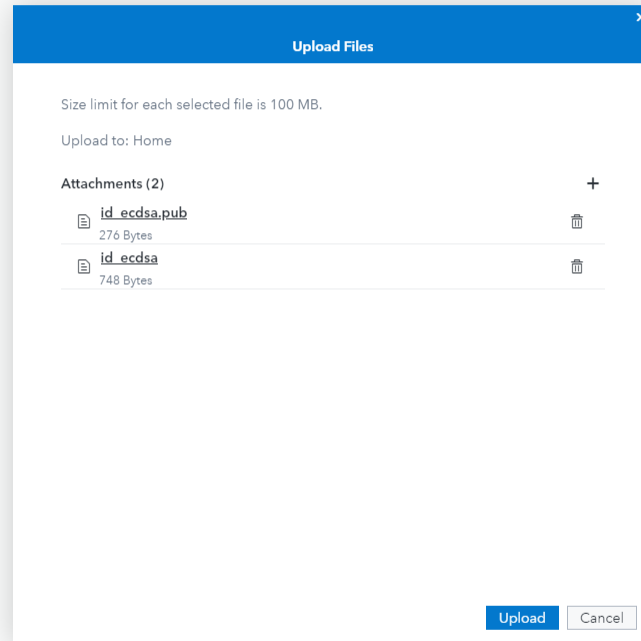
The Key box should become populated with the public key.



4

## Upload SSH Keys to SAS Viya File Explorer

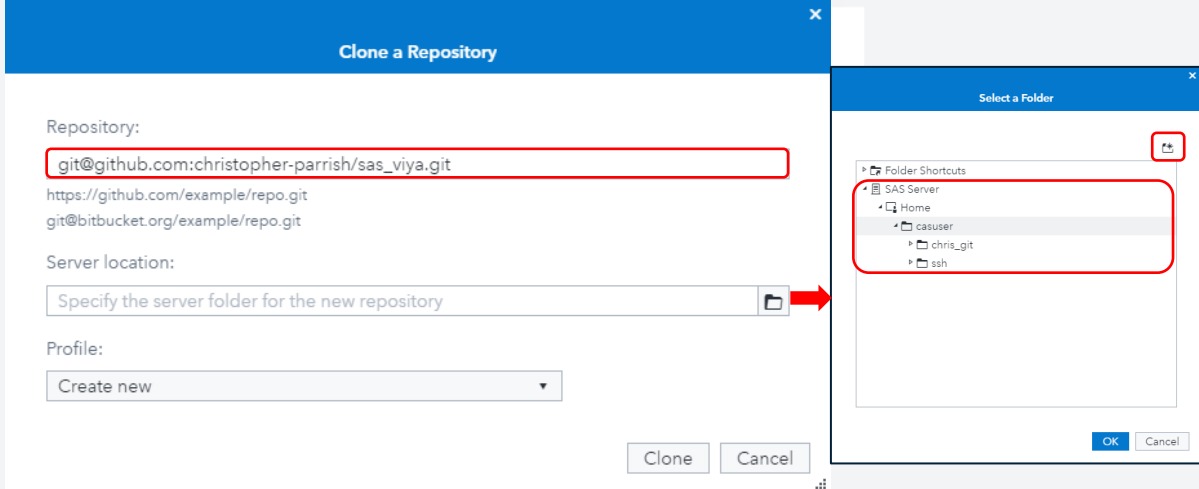
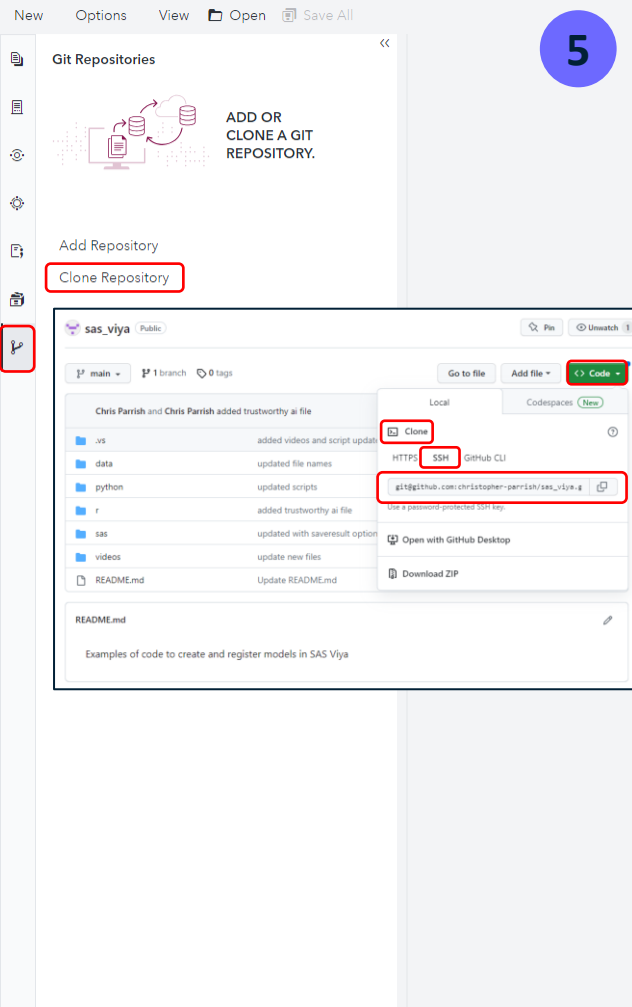
Within SAS Studio, navigate to Explorer, and on the SAS Files directory, right click-> Upload Files on the directory where the SSH keys will sit. When the Upload Files box appears, navigate to the local directory where the keys were created and select both the public and private keys to be uploaded.



5

## Add (New) or Clone (Existing) Repository in SAS Studio

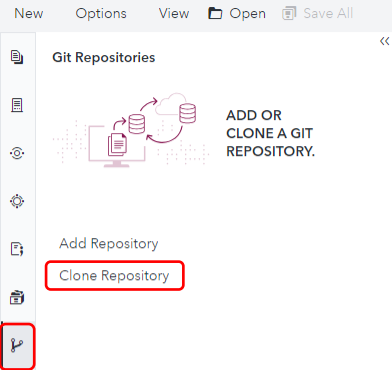
Navigate to Git in SAS Studio. Click Add or Clone Repository. Adding a repository simply adds a folder to SAS File Explorer, and new content can be generated at that point. If cloning, a prompt will appear to insert a repository name. Go to GitHub repository and copy URL: Code->Clone->SSH->Copy URL. Paste URL into SAS Viya prompt box (SAS Viya is SSH, it will be git@...). A server location will need to be selected, and the directory must not contain any files (a new folder icon is in the top right, if necessary). Lastly, a profile will either need to be selected from an existing list or a new one must be created.



5

## Add (New) or Clone (Existing) Repository in SAS Studio

A profile is where the SSH keys will be stored so that SAS Viya can communicate with the repository. Provide a profile name to identify the repository. Also, include the repository account username, associated email, and password. Then, assign the path to the public key (\*.pub extension) and the private key that were uploaded to SAS Viya in Step 4. This will complete the connection and the files in the repository will begin to be downloaded to SAS Viya. Any errors will likely be the result of incorrect credentials or SSH keys. Again, the SSH keys must use [ecdsa security](#). And as a first step, [Git must be enabled by the SAS Viya admin](#).



**Add a Profile**

SSH HTTPS

Profile name: \*

User name: \*

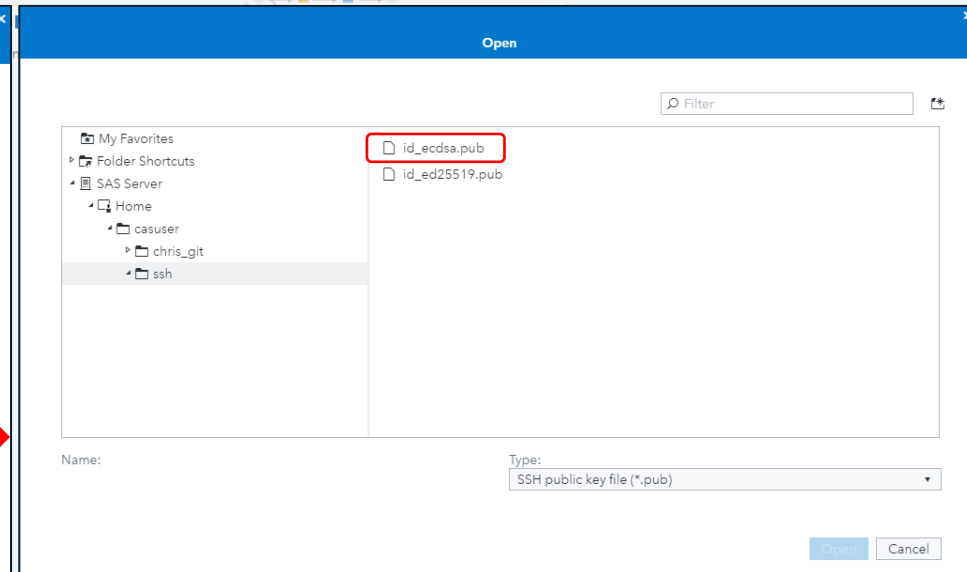
Email: \*

Password:

Public SSH file path:

Private SSH file path:

OK Cancel





New

Options

View

Open

Save All

Explorer

My Favorites

Folder Shortcuts

SAS Server

Home

casuser

chris\_git

data

python

black\_scholes\_python

data\_step\_action\_python

fedsql\_action\_python

gradient\_boosting\_action\_python

gradient\_boosting\_xgboost\_python

gradient\_boosting\_xgboost\_python\_sas\_viya

logit\_action\_python

logit\_mflow\_python

logit\_python

logit\_python\_sas\_viya

aml\_bank

financial\_services

logit\_python\_modelStudio\_finsvcs.py

logit\_python\_modelStudio\_score\_finsvcs.py

logit\_python\_sasStudio\_finsvcs.py

logit\_python\_sasStudio\_no\_swat\_finsvcs.py

random\_forest\_python

text\_python

time\_series\_python

trustworthy\_ai\_python

tweedie\_regressor\_python

readme.md

table\_actions.py

r

sas

videos

README.md

ssh

\_MM\_SYS\_KPI\_sashdat

Start Page

chris\_git

logit\_python\_sasStudio\_no\_swat\_finsvcs.py

Run

Cancel

Copy to My Snippets

+ Code to Flow

Clear Log

Code

```
135     ## estimate & fit model
136     dm_model = LogisticRegression(**logit_params)
137     dm_model.fit(X_train, y_train)
138
139     ## score full data
140     fullX = dm_inputdf.loc[:, dm_input]
141     fully = dm_inputdf[dm_dec_target]
142     dm_scoreddf_prob = pd.DataFrame(dm_model.predict_proba(fullX), column
143     dm_scoreddf_class = pd.DataFrame(dm_model.predict(fullX), columns=[d
144     dm_scoreddf = pd.concat([dm_scoreddf_prob, dm_scoreddf_class], axis=
145
146     ## create tables with predicted values
147     trainProba = dm_model.predict_proba(X_train)
148     testProba = dm_model.predict_proba(X_test)
149     validProba = dm_model.predict_proba(X_valid)
150     trainData = pd.concat([y_train.reset_index(drop=True), pd.Series(dat
151     testData = pd.concat([y_test.reset_index(drop=True), pd.Series(data=
152     validData = pd.concat([y_valid.reset_index(drop=True), pd.Series(dat
153
154     ## print model & results
155     predictions = dm_model.predict(X_test)
156     cols = X_train.columns
157     predictors = np.array(cols)
158     tn, fp, fn, tp = confusion_matrix(y_test, predictions).ravel()
159     print(description)
160     print('model_parameters')
161     print(dm_model)
162     print(' ')
163     print('model_performance')
164     print('score_test:', dm_model.score(X_test, y_test))
165     print('score_valid:', dm_model.score(X_valid, y_valid))
166     print('confusion_matrix:')
167     print('(tn, fp, fn, tp)')
168     print((tn, fp, fn, tp))
169     print('classification_report:')
170     print(classification_report(y_test, predictions))
171     if model_type == 'logistic_regression':
172         orat = np.exp(dm_model.coef_, out=None)
173         c1 = np.vstack([predictors, orat])
174         c2 = np.transpose(c1)
175         c3 = pd.DataFrame(c2, columns=['predictors', 'odds_ratio'])
176         print('intercept:')
177         print(dm_model.intercept_)
178         print('odds_ratios:')
179         print(c3)
180
181     SAS.df2sd(dm_scoreddf, "python_score")
```

Log

Errors (0) Warnings (0) Notes (0)

There are no messages.

6

Create New Content or Make Changes to Existing Content

The git repository files are located in the directory location selected/created as part of the prior step. A script is opened and edited (the change is simply one line at the bottom of the script). The script is then saved.

chris\_git

(0)

(0)

Line 181 Column 1 UTF-8 Recover (4) Submission (0)

NewOptionsViewOpenSave All

Explorer

My Favorites

Folder Shortcuts

SAS Server

Home

casuser

chris\_git

data

python

black\_scholes\_python

data\_step\_action\_python

fedsql\_action\_python

gradient\_boosting\_action\_python

gradient\_boosting\_xgboost\_python

gradient\_boosting\_xgboost\_python\_sas\_viya

logit\_action\_python

logit\_mflow\_python

logit\_python

logit\_python\_sas\_viya

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logit\_python\_modelStudio\_finsvcs.py

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logit\_python\_sasStudio\_no\_swat\_finsvcs.py

random\_forest\_python

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tweedie\_regressor\_python

readme.md

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r

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videos

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ssh

\_MM\_SYS\_KPI\_sashdat

Start Pagechris\_git xlogit\_python\_sasStudio\_no\_swat\_finsvcs.py +

chris\_git

Current repository

main

Current branch

Pull main

Last pulled: Aug 2, 2023, 3:48:02 PM

Push main

Last pushed: Aug 2, 2023, 3:48:02 PM

CommitHistory

Unstaged Changes (1)

python/logit\_python\_sas\_viya/financial\_services/logit\_python\_sasStudio\_no\_swat\_fin...

diff --git a/python/logit\_python\_sas\_viya/financial\_services/logit\_python\_sasStudio\_no\_swat\_finsvcs.py@@ -177,3 +177,5 @@ if model\_type == 'logistic\_regression':print(dm\_model.intercept\_)print('odds\_ratios:')print(c3)  
+SAS.df2sd(dm\_scoreddf, "python\_score")  
\\ No newline at end of file

Staged Changes (0)

No items

Enter a commit comment

Commit

7

Commit Changes

Navigating back to the git tab in SAS Studio, the saved changes to the script show up in 'Unstaged Changes'. The additions (green) and deletions (red) to the script show up to the right. Select the plus (+) icon to add Unstaged Changes to Staged Changes.

chris\_git

(0)

(1)

Recover (3)

Submission (0)

```
defn = get(a/python/logit_python_sas_viya/financial_services/logit_python_sasStudio_no_swat_finsvc.p
@@@:177.3+177.5 @@ if model_type == 'logistic_regression':
print(dm_model.intercept_)
print('odds_ratios:')
print(c3)
#
+SAS.df2sd(dm_scoreddf, "python_score")
\ No newline at end of file
```

## 7 Commit Changes

Once the script is staged for committing, a message is required before clicking on the 'Commit' button that provides context on the type of revisions that have occurred.

Commit	History	Message	Author	Date	Commit ID
		✓ main added line of code to store scored dataset	christopher-parrish	Aug 2, 2023, 5:42:04 PM	aea419d
		origin/main added trustworthy ai file	Chris Parrish	Jul 31, 2023, 6:16:11 PM	de3889f
		Merge branch 'main' of https://github.com/christopher-parrish...	Chris Parrish	Jul 31, 2023, 5:27:28 PM	9949a7c
		updated scripts	Chris Parrish	Jul 31, 2023, 5:27:04 PM	60d2bd3
		updated with saveresult option	christopher-parrish	Jul 31, 2023, 12:26:08 PM	a06787f
		updated code	christopher-parrish	Jul 25, 2023, 1:17:23 PM	d62c9a0
		update sas file	christopher-parrish	Jul 25, 2023, 12:53:19 PM	773e6a7
		updating files	Chris Parrish	Jul 24, 2023, 6:15:53 PM	d465a40
		updated file names	Chris Parrish	Jul 7, 2023, 3:32:24 PM	65aa9cb
		update new files	Chris Parrish	Jun 6, 2023, 3:49:10 PM	24534b4
		add images	Chris Parrish	May 1, 2023, 11:22:25 AM	a44f3d0
		alc video	Chris Parrish	Nov 3, 2022, 3:39:50 PM	7bdc411
		updating gbtree script	Chris Parrish	Nov 2, 2022, 10:55:57 PM	0330f22

Aug 2, 2023, 5:42:04 PM

aea419d27e9387032f35752bc4a2d90e1715450c

added line of code to store scored dataset

Parent: [de3889f](#)

python/logit\_python\_sas\_viya/financial\_service...

```
diff --git a/python/logit_python_sas_viya/financial_services/logit_python_sasStudio_no_swat_finsvc.py b/python/logit_python_sas_viya/financial_services/logit_python_sas_viya
@@@ -177,3 +177,5 @@@ if model_type == 'logistic_regression':
print(dm_model.intercept_)
print('odds_ratios:')
print(c3)
+
+SAS.df2sd(dm_scoreddf, "python_score")
\ No newline at end of file
```

## Push Commits to Repository

Once committed, the items in the staging box will move to the History tab. A red box in the 'Push main' tab will appear indicating that a commit is pending a push to the main repository. To complete the change and allow all users to access the change, click on the 'Push main' tab.

File Explorer

My Favorites

Folder Shortcuts

SAS Server

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casuser

chris\_git

data

python

black\_scholes\_python

data\_step\_action\_python

fedsql\_action\_python

gradient\_boosting\_action\_python

gradient\_boosting\_xgboost\_python

gradient\_boosting\_xgboost\_python\_sas\_viya

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tweedie\_regressor\_python

readme.md

table\_actions.py

r

sas

videos

README.md

ssh

\_MM\_SYS\_KPI\_sashdat

SAS Studio - Develop Code and Flows

SAS Studio compute context

Start Pagechris\_gitxlogit\_python\_sasStudio\_no\_swat\_finsvcs.py

chris\_gitCurrent repositorymainCurrent branchPull mainLast pulled: Aug 2, 2023, 3:48:02 PMPush mainLast pushed: Aug 2, 2023, 5:47:30 PM

Commit	History	Message	Author	Date	Commit ID
✓ main	origin/main	added line of code to store scored data...	christopher-parrish	Aug 2, 2023, 5:42:04 PM	aea419d
		added trustworthy ai file	Chris Parrish	Jul 31, 2023, 6:16:11 PM	de3889f
		Merge branch 'main' of https://github.com/christopher-parrish...	Chris Parrish	Jul 31, 2023, 5:27:28 PM	9949a7c
		updated scripts	Chris Parrish	Jul 31, 2023, 5:27:04 PM	60d2bd3
		updated with saveresult option	christopher-parrish	Jul 31, 2023, 12:26:08 PM	a06787f
		updated code	christopher-parrish	Jul 25, 2023, 1:17:23 PM	d62c9a0
		update sas file	christopher-parrish	Jul 25, 2023, 12:53:19 PM	773e6a7
		updating files	Chris Parrish	Jul 24, 2023, 6:15:53 PM	d465a40
		updated file names	Chris Parrish	Jul 7, 2023, 3:32:24 PM	65aa9cb
		update new files	Chris Parrish	Jun 6, 2023, 3:49:10 PM	24534b4
		add images	Chris Parrish	May 1, 2023, 11:22:25 AM	a44f3d0
		alc video	Chris Parrish	Nov 3, 2022, 3:39:50 PM	7bdc411
		updating gbtree script	Chris Parrish	Nov 2, 2022, 10:55:57 PM	0330f22

Author: christopher-parrishAug 2, 2023, 5:42:04 PMaea419d27e9387032f35752bc4a2d90e1715450c

added line of code to store scored dataset

Parent: de3889fpython/logit\_python\_sas\_viya/financial\_service...

diff --git a/python/logit\_python\_sas\_viya/financial\_services/logit\_python\_sasStudio\_no\_swat\_finsvcs.py b/python/logit\_python\_sas\_viya/financial\_services/logit\_python\_sasStudio\_no\_swat\_finsvcs.py  
@@ -177,3 +177,5 @@ if model\_type == 'logistic\_regression':  
 print(dm\_model.intercept\_)  
 print('odds\_ratios:')  
 print(c3)  
+ SAS.df2sd(dm\_scoreddf, "python\_score")  
\\ No newline at end of file

8

## Push Commits to Repository

Once pushed, the History tab shows that the latest commit is now merged into the origin/main branch of the repository.

chris\_git

(0) (0)

Recover (3)Submission (0)

Code

main

Go to file

- > .vs
- > data
- > python
  - > black\_scholes\_python
  - > data\_step\_action\_python
  - > fedsq\_action\_python
  - > gradient\_boosting\_action\_python
  - > gradient\_boosting\_xgboost\_python/aml\_bank
  - > gradient\_boosting\_xgboost\_python\_sas\_viya/aml\_bank
  - > logit\_action\_python/aml\_bank
  - > logit\_mflow\_python/aml\_bank
  - > logit\_python
  - > logit\_python\_sas\_viya
    - > aml\_bank
    - > financial\_services
      - logit\_python\_modelStudio\_finsvcs.py
      - logit\_python\_modelStudio\_score\_finsvcs.py
      - logit\_python\_sasStudio\_finsvcs.py
      - logit\_python\_sasStudio\_no\_swat\_finsvcs.py
  - > random\_forest\_python/aml\_bank
  - > text\_python
  - > time\_series\_python
  - > trustworthy\_ai\_python/aml\_bank
  - > tweedie\_regressor\_python
    - readme.md
    - table\_actions.py
- > r
- > sas

sas\_viya / python / logit\_python\_sas\_viya / financial\_services /

Add file ...

christopher-parrish added line of code to store scored dataset aea419d · 8 minutes ago History

Name	Last commit message	Last commit date
..		
logit_python_modelStudio_finsvcs.py	updating files	last week
logit_python_modelStudio_score_finsvcs.py	updating files	last week
logit_python_sasStudio_finsvcs.py	updating files	last week
logit_python_sasStudio_no_swat_finsvcs.py	added line of code to store scored dataset	8 minutes ago



## Push Commits to Repository

This can also be confirmed by navigating to the file in the GitHub account. As the last commit message indicates, this revision is from the commit/push in SAS Viya.