

# AD03 : SAS Custom Step & R-Runner

Develop any application you can dream about

Olivier Bouchard, Principal Business Solution Manager



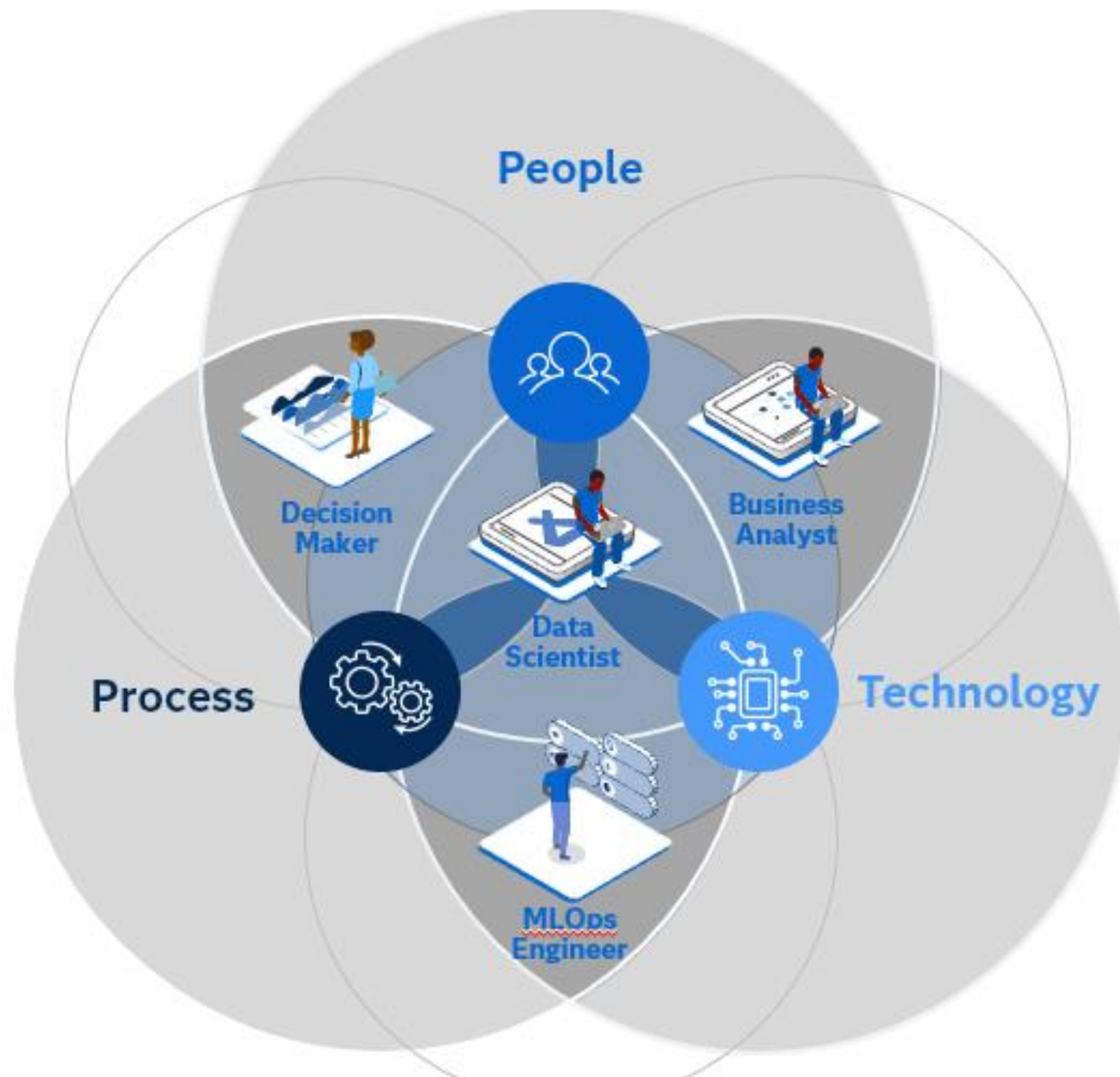
# Comparing the Performance of Propensity Score Matching Algorithms from Multiple Programming Languages

By Catherine Briggs & Sherrine Eid  
February 26, 2024



[https://phuse.s3.eu-central-1.amazonaws.com/Archive/2024/Connect/US/Bethesda/PRE\\_RE04.pdf](https://phuse.s3.eu-central-1.amazonaws.com/Archive/2024/Connect/US/Bethesda/PRE_RE04.pdf)

# AI/Analytics Democratization



Working with the language of your choice – interoperability is key



## PHUSE Single Day Events



Brussels, Belgium

Monday 23 September 2024

UCB Biosciences HQ

# Custom Steps

---

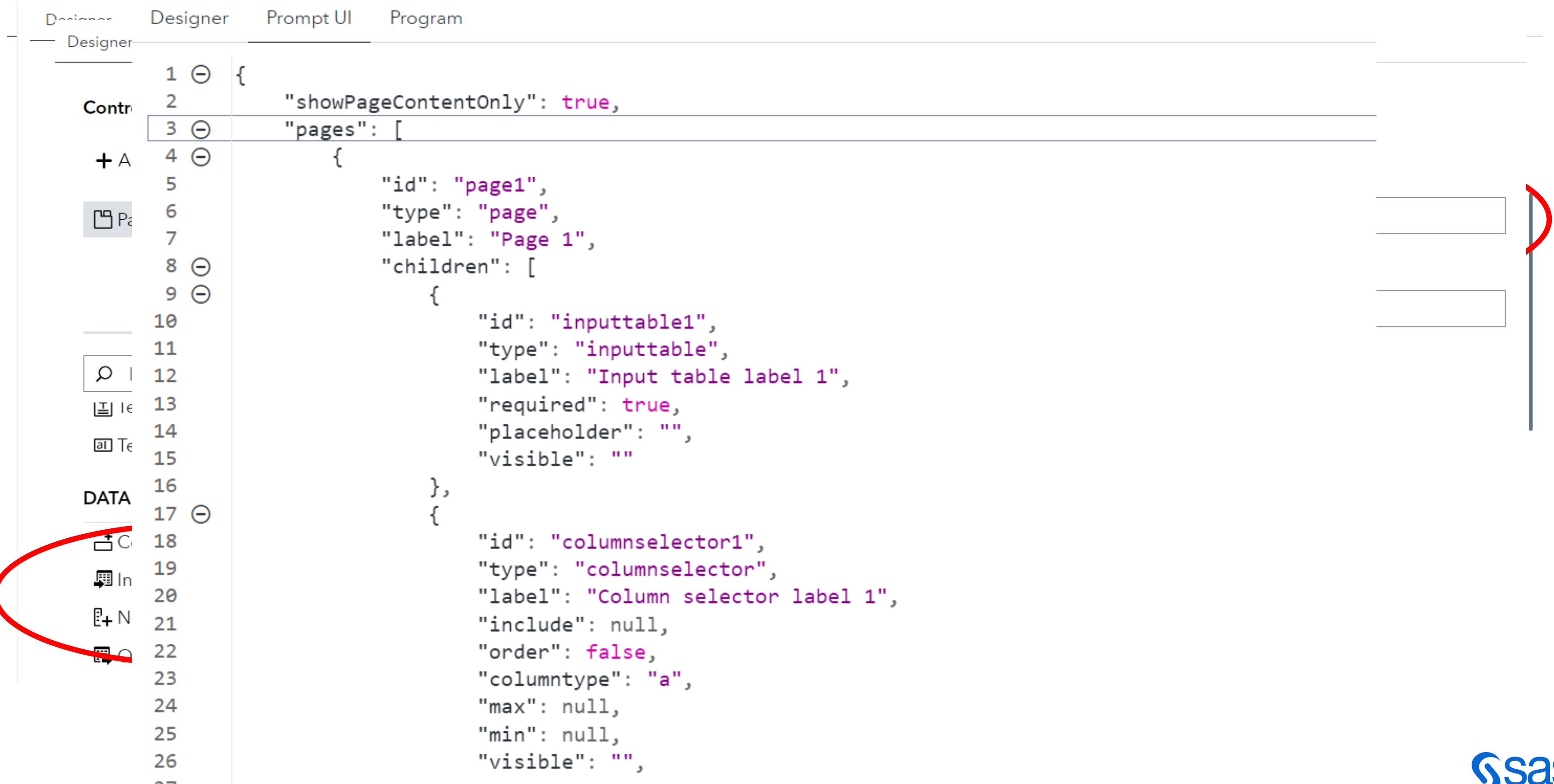
If a user does not have permission to access a specific folder in **SAS Content**, another user can share a step in that folder with them. The shared step will only appear in the Steps pane, providing access to the user without granting them permission to the entire folder. The **Shared** tab in **SAS Studio** lists all the custom steps in **SAS Content** that the user can see, including any steps authored by them or shared with them by others.

Creating a **Custom Step** in **SAS Studio** can be done in several ways, depending on the user's level of expertise. For non-programmers or users of **SAS Studio Basic**, custom steps can be created by adding JSON code to the Prompt UI tab. In **SAS Studio Analyst** and **SAS Studio Engineer**, users can use the Designer tab to quickly create **Custom Steps** with a graphical interface. These features provide users with flexibility and ease of use when creating custom steps, enabling them to optimize their workflows and increase productivity.



# Develop from Scratch

Designer	Designer	Prompt UI	Program
Designer	1 ⊖	{	
Contr	2	"showPageContentOnly": true,	
+ A	3 ⊖	"pages": [	
	4 ⊖	{	
	5	"id": "page1",	
Pa	6	"type": "page",	
	7	"label": "Page 1",	
	8 ⊖	"children": [	
	9 ⊖	{	
	10	"id": "inputtable1",	
	11	"type": "inputtable",	
	12	"label": "Input table label 1",	
	13	"required": true,	
	14	"placeholder": "",	
	15	"visible": ""	
	16	},	
DATA	17 ⊖	{	
	18	"id": "columnselector1",	
	19	"type": "columnselector",	
	20	"label": "Column selector label 1",	
	21	"include": null,	
	22	"order": false,	
	23	"columnType": "a",	
	24	"max": null,	
	25	"min": null,	
	26	"visible": "",	



# Believe me or not...

... let's build a R Ggplot into SAS

The screenshot shows the SAS Studio interface. At the top, the title bar reads "SAS® Studio - Develop Code and Flows". Below it is a menu bar with "New", "Options", "View", "Open", and "Save All". On the left is a sidebar with icons for "Open Files", "Save all", and "No items". The main workspace contains a large blue heading "Let's get to work!" followed by the text "Get started with a new program, flow, or query your data." Below this are four options: "Program in SAS", "Build a flow", "Import data", and "Query data". A mouse cursor is positioned over the workspace. In the bottom right corner, there is a status bar showing "Submission (0)".

**Let's get to work!**  
Get started with a new program, flow, or query your data.

- Program in SAS
- Build a flow
- Import data
- Query data

Submission (0)

# R-Runner – What's in it

## Advantages & Limitation

The screenshot shows the SAS R-Runner configuration window with the following fields and labels:

- Provide an input dataset:** SASHELP.HEART (dropdown menu) **SAS table**
- Note:** If you have attached input data to the "inputtable" input port of this custom step, ensure you refer to the same as r\_input\_table within your R script.
- Provide your R script location:** /path/to/your/R/Script (text field)
- Run an R snippet:** new\_df=aggregate(x=r\_input\_table\$MSRP,by=list(r\_input\_table\$Origin),FUN=mean) **R Script (type R code or select your R file)**
- Provide name of R data frame you wish to output:** new\_df (text field)
- Note:** If you are using this step, ensure that the R dataframe you refer does exist in the R session.
- Provide output dataset for R environment variables:** WORK.R\_ENV (text field) **SAS Dataset containing R variables**
- Provide desired output table:** WORK.RDF (text field) **An R data frame exported as SAS table**

- You just copy paste your R Code
- You can integrate it in a SAS Flow
- This is not a R-Editor
- There won't be syntax checks, highlighting or other convenience like in R-Studio
- It works as fast as a « normal R » : mono-threaded
- More advanced version : **CAS - Submit Python and R Code**
  - Multi-threaded using CAS Engine
  - Helpful for Modeling and Testing
  - Can process Millions of records in Seconds

# How this could look like?

The screenshot displays the SAS Visual Analytics interface for configuring propensity score matching. The browser address bar shows the URL: `viya4.globalhls.sashq-d.openstack.sas.com/SASVisualAnalytics/`. The page title is "SAS Visual Analytics - Explore and Visualize". The main content area is titled "SeperatePrompts" and shows "Inputs" and "Matching Results" tabs.

**Inputs**

Obs	Role	Inputs
1	Input Dataset	CASUSER.REFL3
2	Treatment Variable	cohort
3	Treatment Group	oploid
4	Reference Group	nonoploid
5	Outcome Variable	BPIPain_LOCF
6	Numerical Matching Variables	BMI_B BPIPain_B BPIInterf_B PHQ8_B PhysicalSymp_B FIQ_B GAD7_B MFipf_B MFimf_B CPFQ_B ISIX_B SDS_B Age
7	Class Matching Variables	Gender Race Dr_Rheum Dr_PrimaryCare

**Matching Results**

Obs	Role	Inputs
1	Distance Metric	Logit Propensity Score
2	Mahalanobis Distance Metric	NA
3	Mahalanobis Distance Variable	NA
4	Exact Match on Specific Variables	No
5	Exact Match Variables to Match	NA
6	Use a caliper width	No
7	Caliper width	.
8	Matching Method	Optimal
9	Number of Control Matches	1
10	Max number of control Matches	1
11	Weighting Type	Inverse probability of treatment weighting (IPTW)

**Configuration Panel**

Model Name:  Model Language (SAS/R/Python):

**Additional Settings**

Obs	Role	Inputs
1	Return treatment effect results	No
2	Estimation Model	NA
3	Number of iterations for Complex Bootstrapping	NA



# Don't reinvent the Wheel, ....

The Community is there to Accelerate what you need...

... Or your colleague could have already developed some IP

The screenshot shows the GitHub repository page for 'sassoftware / sas-studio-custom-steps'. The repository is public and has 1 issue, 5 pull requests, and 1,109 commits. The main branch is selected. A table of recent commits is visible, showing various contributions to the repository.

Commit	Description	Time
snlwih Update CUSTOM_STEPS_LIST.md	acb33ec · 2 weeks ago	1,109 Commits
.github	Update issue templates, added bug template	9 months ago
Airflow - Generate DAG	Removed zip files from various contributions	5 months ago
Anonymize and Mask Data	Removed zip files from various contributions	5 months ago
Append Table	Fixed some text	2 years ago
CAS - Convert Char to Varchar	Update CAS - Convert Char to Varchar	last year
CAS - Generate Unique ID	WH changes requested in PR # 80	last year
CAS - Load Tables from Folders in Filesystem	Updated Screenshot	2 years ago
CAS - Submit Python and R Code	Update README.md	8 months ago

The screenshot shows the 'Steps' panel in SAS Studio. It features a search bar with the placeholder text 'Type to filter list'. Below the search bar, there are two tabs: 'SAS Steps' and 'Shared'. A list of custom steps is displayed, with 'CustomStepChooseVars' highlighted in yellow. Other steps include AndersonDarling, CAR -Pull Data, CAS - Generate Unique ID, Cascading Prompts - Advanced1, Ch6\_Matching\_Multipage, Create Listing Of Directory CLOD, Custom Step Example, and Data Pull.

- AndersonDarling
- CAR -Pull Data
- CAS - Generate Unique ID
- Cascading Prompts - Advanced1
- Ch6\_Matching\_Multipage
- Create Listing Of Directory CLOD
- Custom Step Example
- CustomStepChooseVars**
- CustomStepPSM
- CustomStepTreatmentEffect
- Data Pull

# Conclusion

## With Custom Step....

- ... Build any Business Application you would like to apply AI/Analytics on Data you know & have access to.
- ... Use JSON or Drag&Drop Capabilities depending on your skills
- ... Expand the capabilities of your SAS Platform by collaborating on the Community
- ... Accelerate your daily work by sharing IP with Colleagues.

