MagicINFO Analytics

Brightics AI

User Guide v1.0

Samsung

Table of Contents

Preface

Users of this guide

This user manual contains information on the use and management of Brightics AI.
This manual is intended for those who will perform analytics using Brightics AI. Users need to familiarize themselves with using a web browser.

Conventions

This document uses the following conventions:

Boldface	Boldface indicates graphical user interface elements, menus, navigation trees and directories within the main text, yet use quotation marks for portal, window, wizard among graphical user interface elements.
Italics	*Italics* indicates parameter names and values, and titles of other printed references.
Monospace	Monospace font indicates commands and codes. Use bold monospaced font for names of commands, parameters, registries, scripts, and process. Also use italic monospaced font for variables and parameter values.

Notes and notices

Notes provide additional information to users such as tips, recommendations, exceptions, and restrictions.

> (sample) Make sure to install the 64-bit version of the driver to use the 64-bit version of the ABC statistics software. The 32-bit version of the driver is not compatible with the software.

Revision History

Manual Version	Revised Date	Revised Details
1.0	2019. 08. 30	Created

1 Introduction

This chapter gives you an overview of Brightics AI.

- Section 1.1 Overview
- Section 1.2 Characteristics
- Section 1.3 Key Features

1.1 Overview

Brightics AI is a business solution capable of big data processing and advanced analytics. It can process big data using analytics functions and selectively load domain-specific reference analytics models. Brightics AI is equipped with a GUI-based modeling function to help effectively develop analytics models, and Data Flow created accordingly represents input/output data of each function enabling easier and faster analysis. Brightics AI extracts meaningful data from massive data in each domain with diverse analytics functions, detects issues and predicts the future aiming to offer a better service to customers.

1.2 Characteristics

Brightics AI offers a high-performance business data analytics environment capable of analyzing large-scale data with ease.

1.2.1 High-performance Statistical Analysis Function

Brightics AI supports diverse analytics techniques encompassing basic statistical functions and advanced analytics functions.

1.2.2 Ready-to-Use Analytics Model

Brightics AI offers frequently-used basic models ensuring fast implementation.

1.2.3 GUI-based Data Flow Modeling

Brightics AI enables easy and fast Data Flow Modeling with GUI-based Drag & Drop functionality.

1.2.4 High-performance Big Data Framework

Statistical analysis functions are implemented through parallel processing thereby enabling big data analytics which was impossible before.

1.3 Key Features

Below are the key features of Brightics AI.

1.3.1 Hadoop Analytics Engine

Hadoop Analytics Engine offers basic statistical functions and data processing capability in the Hadoop System.

1.3.2 Data Flow Modeling

Data Flow Modeling enables modeling while verifying the data before and after each function is executed.

1.3.3 Script Modeling

Script Modeling enables creation/testing of Scala Scripts, creation of user-defined functions, and creation/testing of SQL Scripts for advanced users.

1.3.4 Deep Learning Modeling

Deep Learning Modeling is equipped with a functionality to allow a user to create a model by training the model on the refined input data and enter the data into the trained model.

1.3.5 Report

Report offers modeling functionality to support easy creation of report based on the data created through analysis.

2 Execution Environment

This chapter describes an execution environment for Brightics AI.

- Section 2.1 System Requirements
- Section 2.2 Software Requirements
- Section 2.3 Run Brightics AI

2.1 System Requirements

The following system requirements must be satisfied in order to run Brightics AI.

	Required Specification
Operating System	Any operating system using Windows (32-bit)
Network	To be installed on a network-enabled computer
CPU	1-GHz or more
Memory	2 GB RAM or more
Disk Space	1GB or more disk space recommended
Resolution	1920 * 1080 (minimum: 1280 * 900)

Table 2-1 System Requirements

Note	Brightics AI is dependent on the system constraints of a 3rd-party product (middleware, database, etc.).

2.2 Software Requirements

The following software requirements must be met to run Brightics AI.

Name	**Required Specification**
Chrome	Latest version recommended (Version 50.0 or higher)

Table 2-2 Software Requirements

2.3 Execute Brightics AI

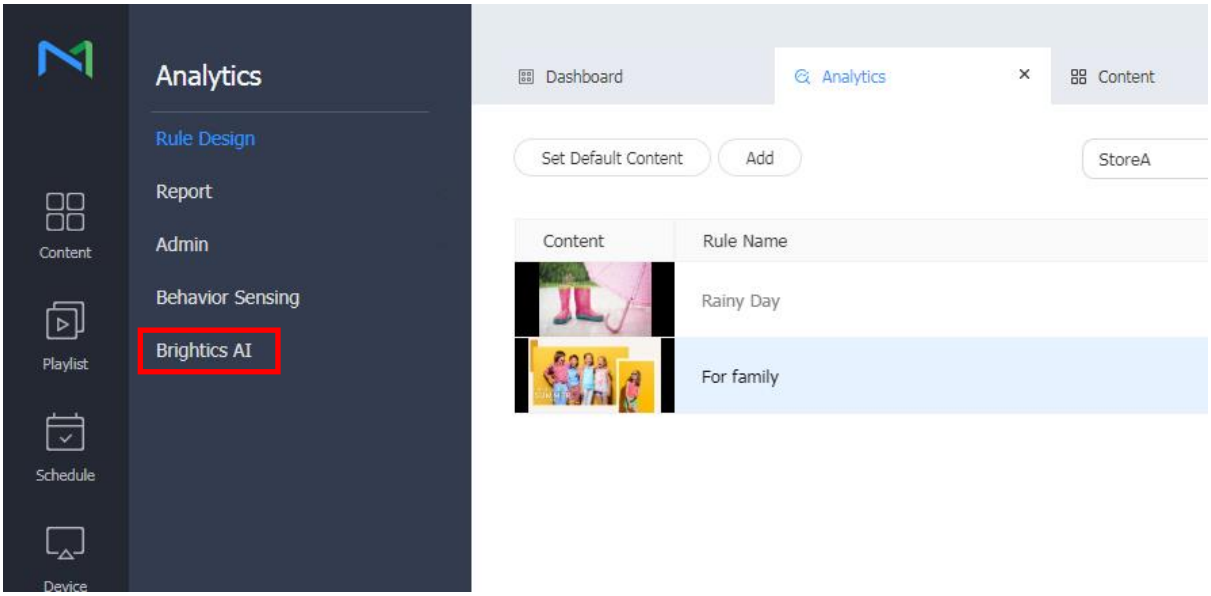


Figure 2-1 Brightics AI Main Screen

After selecting Brightics AI menu, Brightics AI Project View opens.

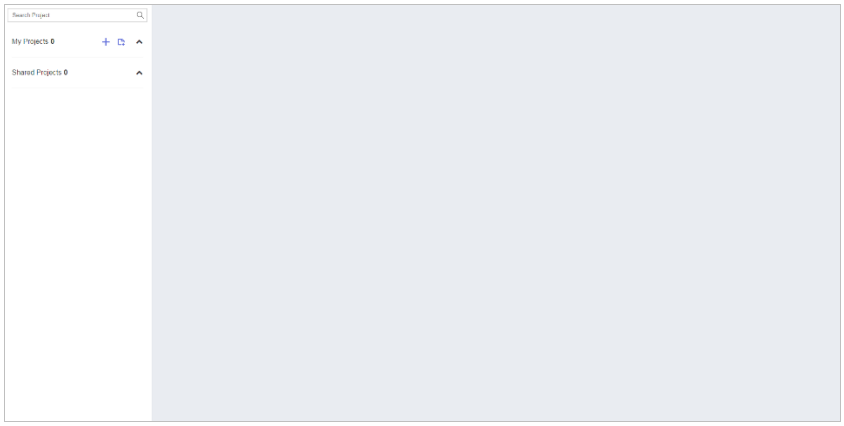


Figure 2-2 Home Screen of Brightics AI

3 Screen Components

Brightics AI consists of [Editor], [View], and [Menu] et al for editing/executing an analytics model.
This chapter describes each component of Brightics AI as below.

- Section 3.1 GNB (Global Navigation Bar)
- Section 3.2 Project View
- Section 3.3 Data Flow Model Editor
- Section 3.4 Script Model Editor
- Section 3.5 Deep Learning Model Editor
- Section 3.6 Report Editor
- Section 3.7 Management

3.1 GNB (Global Navigation Bar)

GNB shows a currently running analytics model and a report in use in the form of a tab. GNB allows a user to go back to the Home screen, create/move a model and check any notice and user profile.

Figure 3-1GNB

Name	Icon	Description
Home (Brightics)	Brightics AI	Go back to the Home screen of Brightics AI
Model Tab	Data Flow	Display a currently running analytics model in the form of a tab
Open Model	+	Call *Open Model* pop-up window
Documentation		Open Brightics Documentation site with New Tab
Notice		Verify the list of the most recent notices and their detailed contents
Settings		Call *Setting* pop-up window
Profile		Call *User Information* pop-up window
Logout	Logout	Log out

Table 3-1 GNB Components

3.1.1 Notice Dialog

If you click Notice icon in GNB, you can verify the notices written by admin.

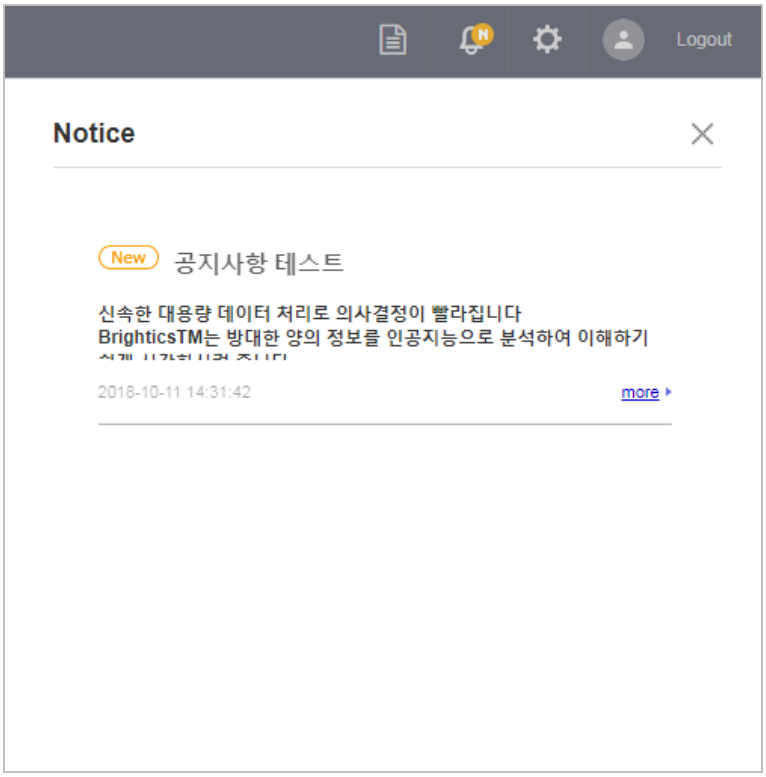


Figure 3-2 Notices Window

When the detailed content of a notice is long, you can click ‘more’ in the bottom right-hand side of the screen and click Notice Detail window to verify the entire contents.

Figure 3-3 Notice Details Window

3.1.2 Settings

If you click Settings button, Settings pop-up window appears as below.

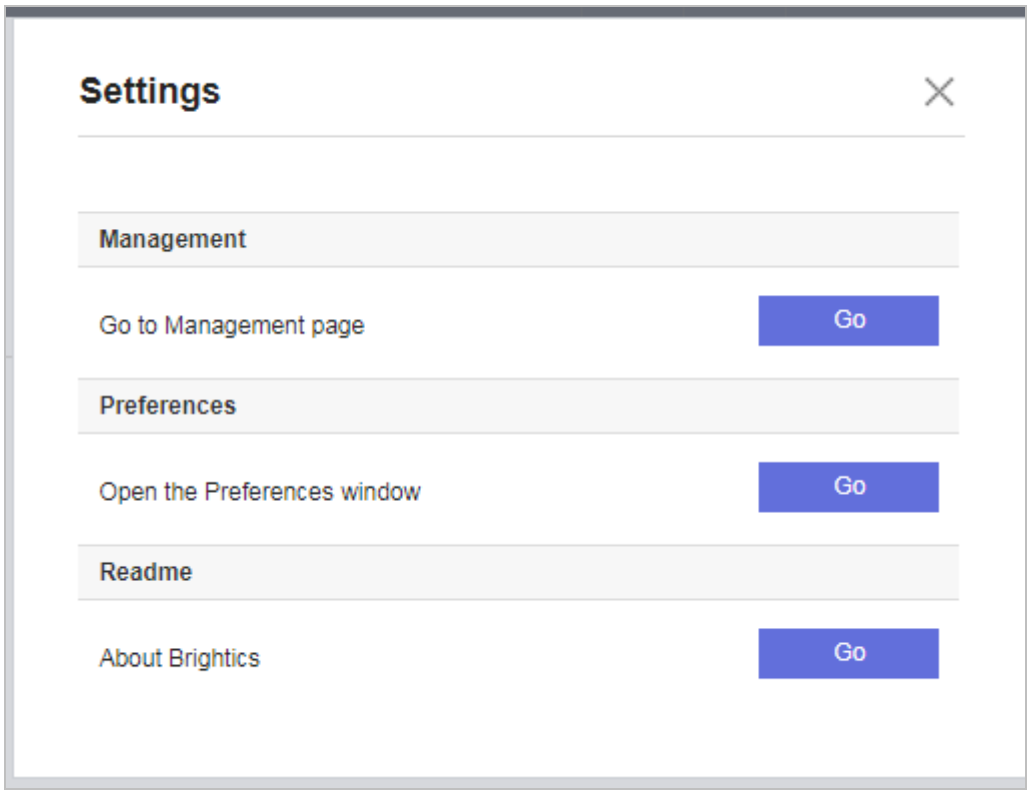


Figure 3-4 Settings Window

If you click Go button located next to 'Go to Management page' of Management, the following Management screen appears. This page allows admins to manage Brightics users by making it easier for them to manage the users including assigning permission to use by user, register notice, etc. The following user list is invisible in this manual for privacy purposes, but it will be visible in actual user's Brightics screen.

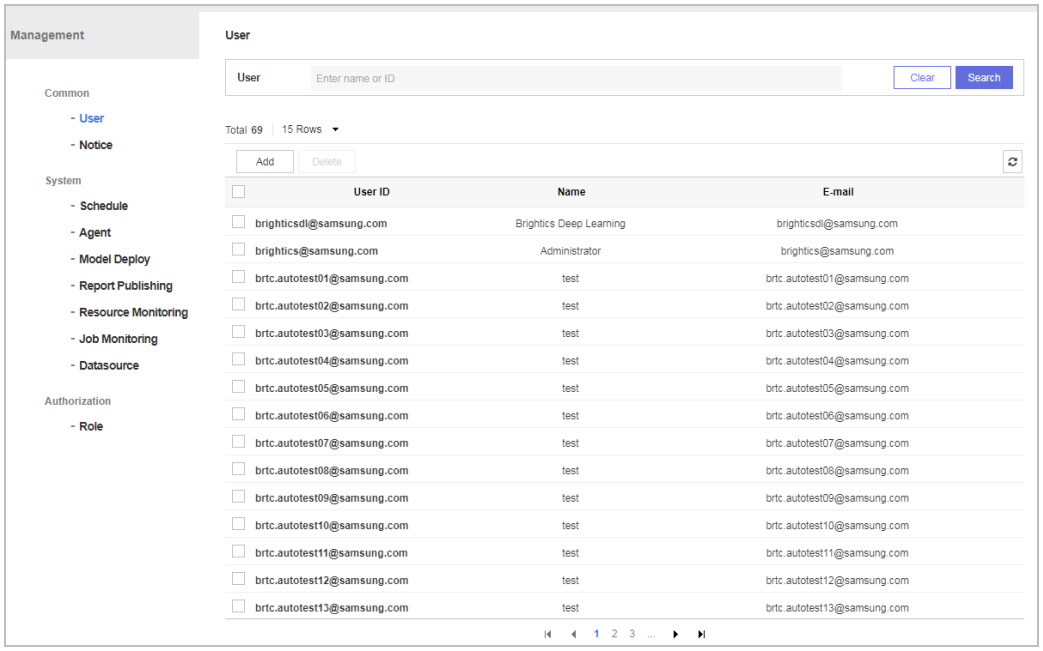


Figure 3-5 Management Screen

3.1.3 Preferences

If you click the Go button located next to 'Open the Preference window' of Management, the following Preference screen appears.

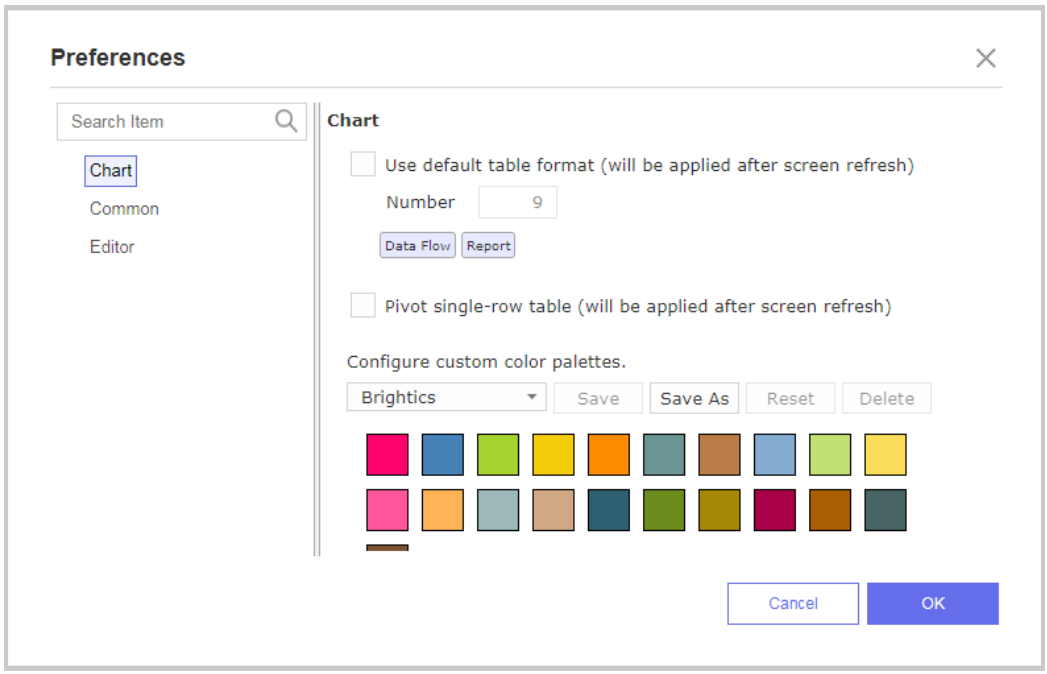


Figure 3-6 Preference Screen

It is a window for setting up an environment to use Brightics. You can choose whether or not to continually enable Scroll bar in Common menu from the left-sided list. In Editor Menu, you can enter such values as minimap, double click, variable, and default row number values. By checking a desired feature or entering a number, and clicking the OK button, you can get the configuration values reflected.

3.1.4 Readme

If you click the Go button next to About Brightics in Management, Readme screen is displayed as follow. It describes the current version of Brightics in use and features supported by that version. It also provides additional convenience feature that allows you to verify newly added feature from the previous version and whether action was taken on the error that occurred in the previous version.

3.1.5 Profile

If you click Profile icon  in GNB, the information of currently logged in user appears as follow.

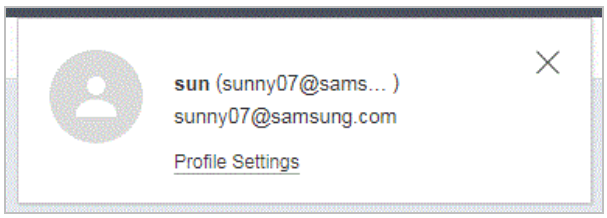


Figure 3-7 Profile Screen

If you click Profile Settings link, you are redirected to user information modify screen.

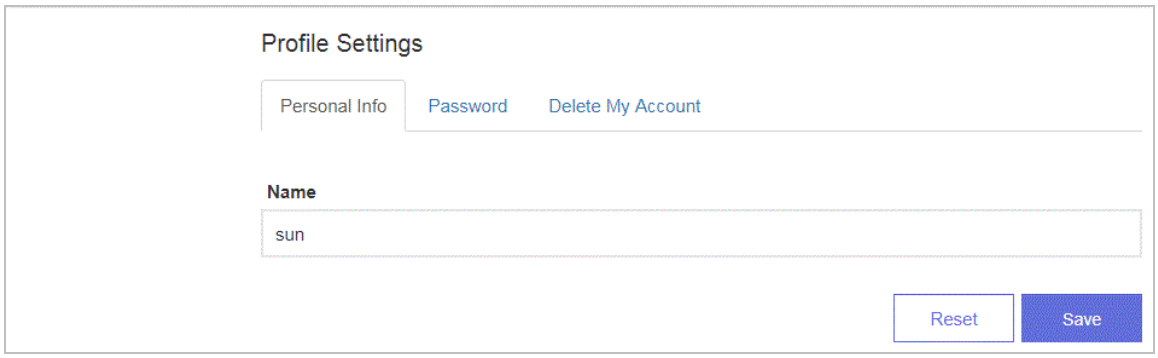


Figure 3-8 Profile Settings Screen

The above screen provides a feature to enter user name and password, and delete an account.

3.2 Project View

Project View allows you to view project list, analytics models by project, and report list.
Project View is composed of menu buttons to create/modify/delete a Project, Model, and Report.

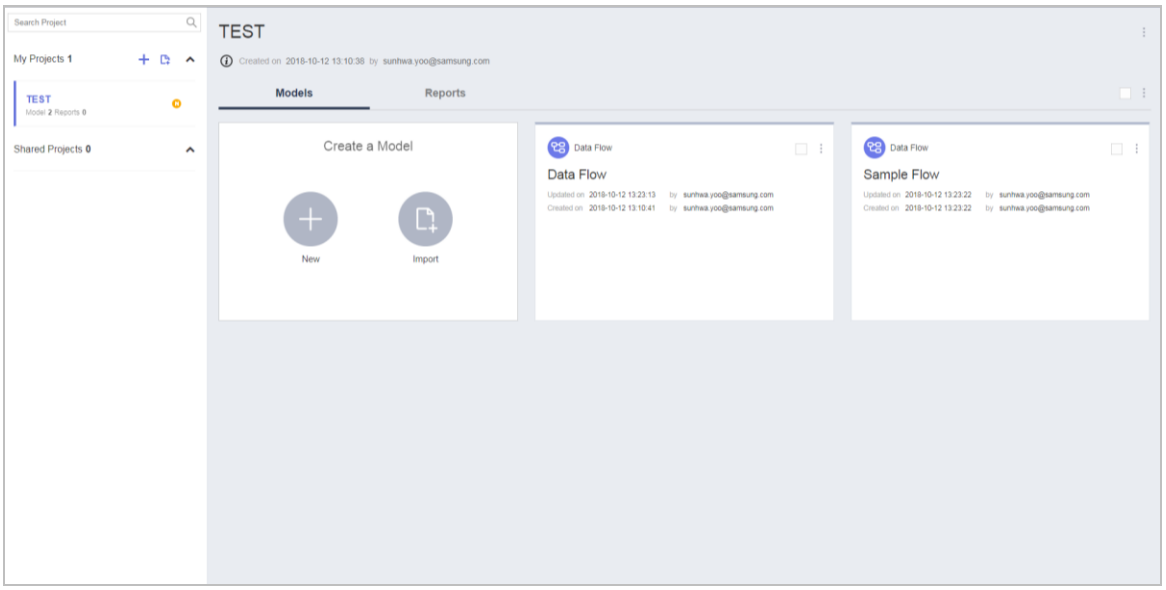


Figure 3-9 Project View

3.2.1 Project List

Project List displays a list of projects accessible to logged in users. When you select a project, analytics models and reports included in the project are displayed on the right-sided Model List.

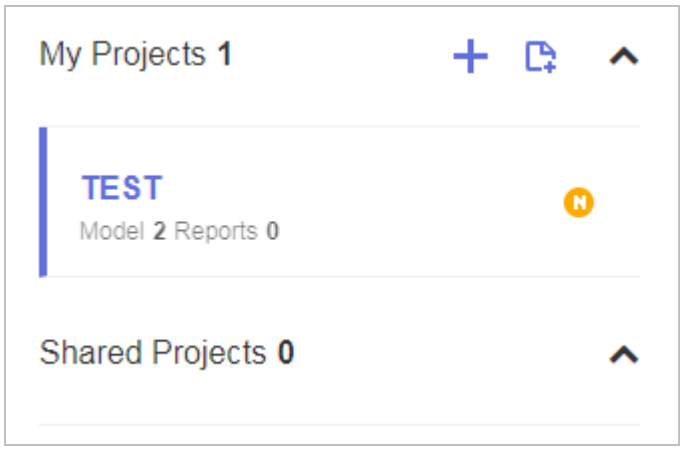


Figure 3-10 Project List

3.2.2 Model List

Model List shows the list of analytics models and reports included in the selected project. Model List consists of a menu to modify/delete a project and a menu to create/modify/delete an analytics model and report.

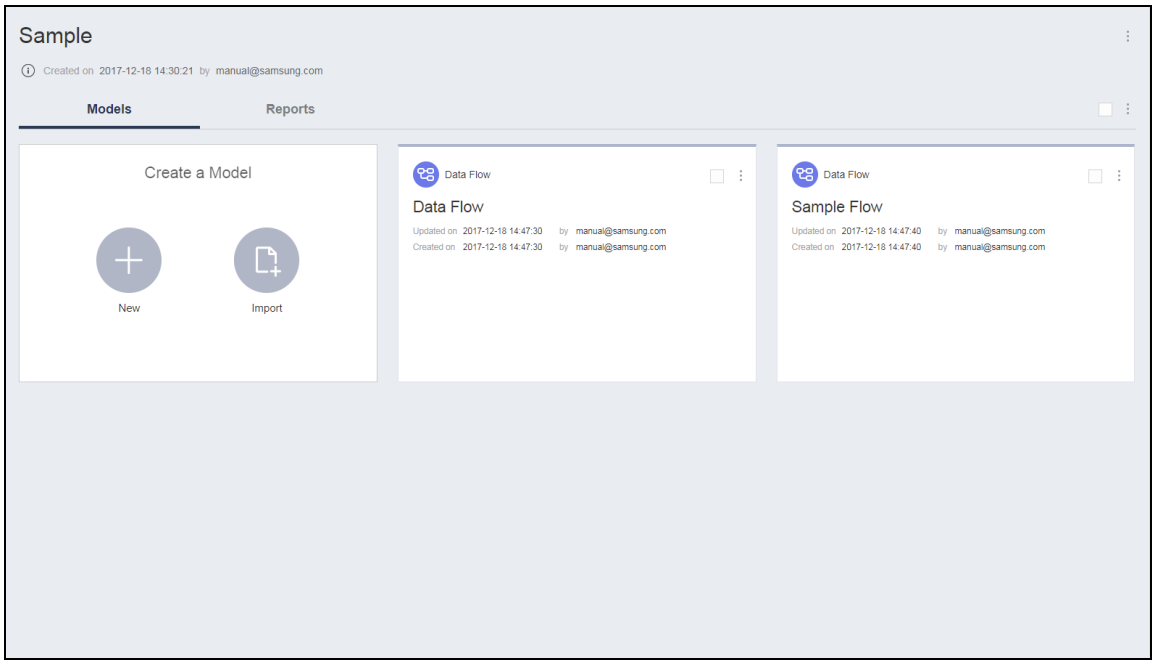


Figure 3-11 Model List

Below is the list of features of Model List accessible to users.

Name	Icon	Description
Project Menu	-	Click ⋮ at the top right side of Model List to enable this feature. You can modify or delete a Project Name or enable Member management feature.
New	+	Add a new analytics model or report to the selected project
Import		Import an analytics model to the selected project. You can select a model file (.json) from user PC

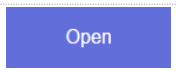
Name	Icon	Description
Model Menu	-	Click  at the top right side of each model to enable this feature. This feature allows you to modify/delete/copy/export/deploy the selected model. A particular menu is not available depending on the menu.
Open		This button becomes visible when you mouse over a model. Click the button and open the model.

Table 3-2 Model List Menu

3.3 Data Flow Model Editor

Data Flow Model Editor consists of [Editor] for analytics modeling, [View], and [Menu] that displays available functions and data.

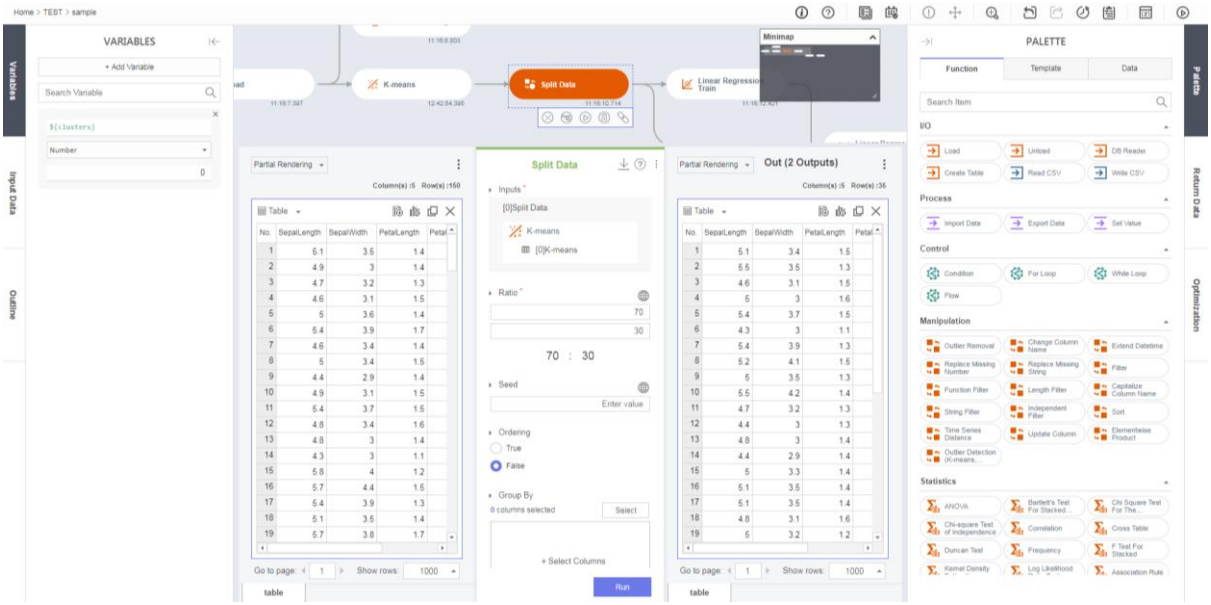


Figure 3-12 Data Flow Model Editor

3.3.1 Toolbar

Below are the Toolbar items.

Name	Icon	Description
Model Information		Show simple information about the model that is currently running
Function Reference		Function reference information in Documentation site is created and displayed as a new tab.
Function Clipboard		Some functions are selected and added to Clipboard, and the list of the functions is displayed in Function Clipboard. Drag one of the functions to add to the Diagram.
Version Management		Enable version management feature.
Tooltip		Provide Tooltip to the function. Memo function is provided.
Move Mode		When enabled, a panel created at the bottom when a function is clicked on is not created. The panel is created when the function is disabled.

Name	Icon	Description
Zoom		Zoom in/out the diagram
Schedule		Enable a feature to register schedule
Undo		Undo a task.
Redo		Redo a task.
History		Call a pop-up window to verify job history
Variables		Enable View to enter variable.
Run		Execute functions written in the diagram in a sequential manner.

Table 3-3 Toolbar Components

3.3.2 Diagram Editor

Diagram Editor allows a user to see the flow of an analytics model and add, modify, delete or selectively choose a function.

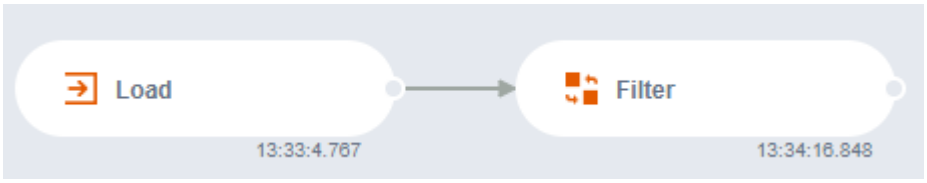


Figure 3-13 Diagram Editor

Below are the components of Diagram Editor.

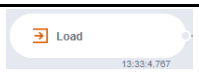
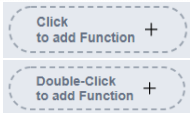
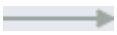
Name	Icon	Description
Function		If you select a function used for a model, the information of the selected function is displayed at Properties View, at the bottom of Diagram Editor.
Add Function		This icon becomes visible when you mouse over an empty space in Editor. Click the icon and call a popup window to select a function.
Connection		This line connects a function with another function. The output of the starting point becomes the input of the arriving point. Multiple lines can be sent or received. (varying by function)

Table 3-4 Diagram Editor Components

3.3.2.1 Function Mouse Over

Below components become visible when you mouse over a function created in the Diagram.

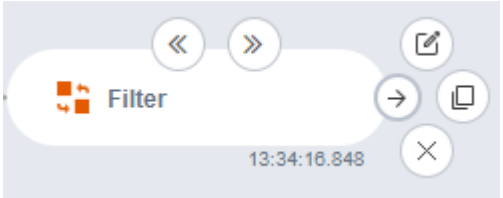


Figure 3-14 Function Mouse-Over Menu

Name	Icon	Description
Shift Left		Shift a function to the left.
Shift Right		Shift a function to the right.
Change Function		Call a popup window to change a selected function into another function
Connect		Connect a selected function to another function. Drag and drop to a function you want to connect to.
Duplicate		Copy a selected function. Drag and drop to a desired location
Step Into		Step into an internal logic.
Remove Function		Delete a selected function.

Table 3-5 Function Mouse-Over Menu Components

Note	You can connect to functions on the right side ONLY

3.3.2.2 Selectively Choose Diagram

Below components appear when you selectively choose a diagram in Diagram Editor.

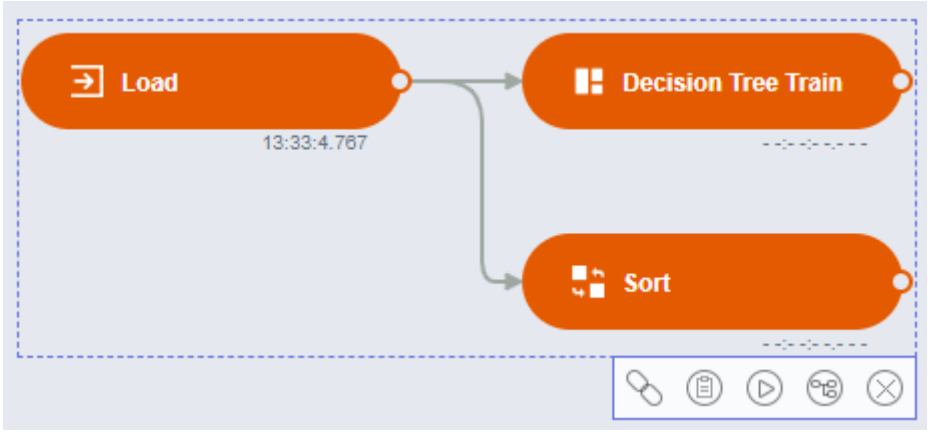


Figure 3-15 Selectively Chosen Diagram

Name	Icon	Description
Bind for OPT		Bind selected functions to OPT.
Add to Clipboard		Add selected functions to clipboard.
Run		Execute selected functions.
Add to Template		Add selected functions to a library.
Remove		Delete selected functions.

Table 3-6 Menu Components for Selectively Chosen Diagram

3.3.3 Sheet Editor

Sheet Editor consists of [Data Panel] to show In/Out Data of a selected function and [Properties Panel] to enter parameters required to execute a function.

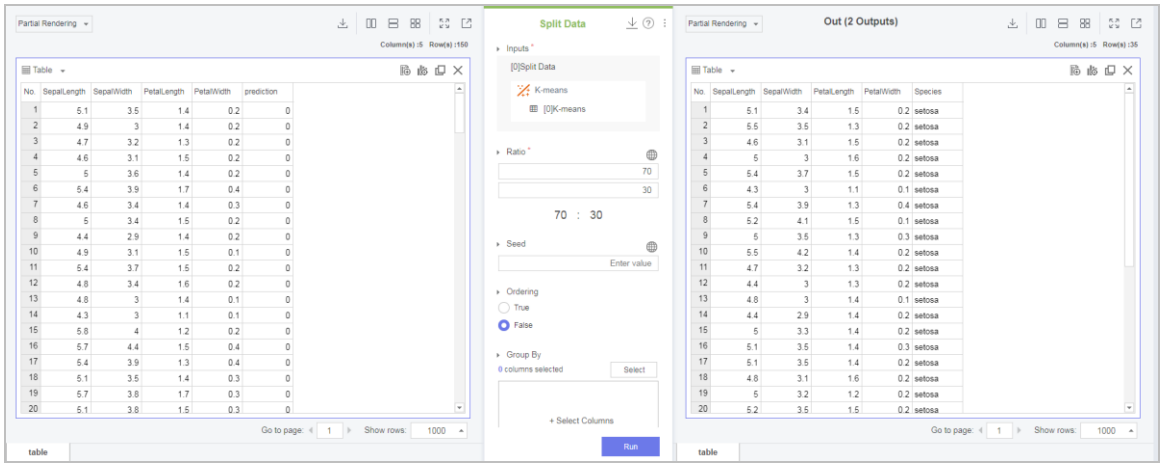
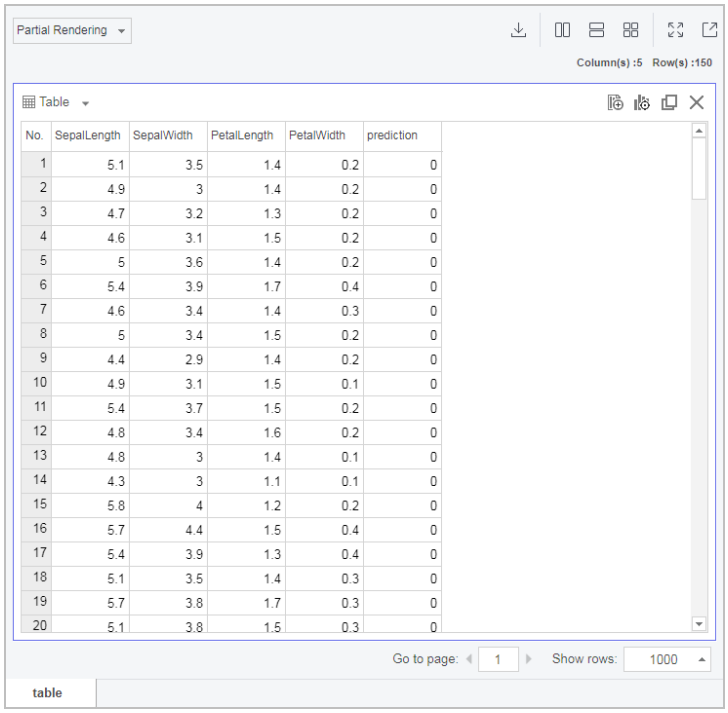


Figure 3-16 Sheet Editor

3.3.3.1 Data Panel

Data Panel represents input/output data of each function. In other words, [In Data Panel] shows input data of respective functions, and [Out Data Panel] shows execution results of respective functions.



No.	SepalLength	SepalWidth	PetalLength	PetalWidth	prediction
1	5.1	3.5	1.4	0.2	0
2	4.9	3	1.4	0.2	0
3	4.7	3.2	1.3	0.2	0
4	4.6	3.1	1.5	0.2	0
5	5	3.6	1.4	0.2	0
6	5.4	3.9	1.7	0.4	0
7	4.6	3.4	1.4	0.3	0
8	5	3.4	1.5	0.2	0
9	4.4	2.9	1.4	0.2	0
10	4.9	3.1	1.5	0.1	0
11	5.4	3.7	1.5	0.2	0
12	4.8	3.4	1.6	0.2	0
13	4.8	3	1.4	0.1	0
14	4.3	3	1.1	0.1	0
15	5.8	4	1.2	0.2	0
16	5.7	4.4	1.5	0.4	0
17	5.4	3.9	1.3	0.4	0
18	5.1	3.5	1.4	0.3	0
19	5.7	3.8	1.7	0.3	0
20	5.1	3.8	1.5	0.3	0

Figure 3-17 Data Panel's Input Data Screen

Note	Either [In Data Panel] or [Out Data Panel] is NOT available for particular functions such as Load/Unload.

Below are the features of Sheet Editor's Data Panel accessible to users via screen.

Name	Icon	Description
Vertical		Lay out Chart/Table in Data Panel vertically
Horizontal		Lay out Chart/Table in Data Panel horizontally

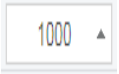
Name	Icon	Description
Evenly		Lay out Chart/Table in Data Panel in grid
Maximize		Maximize Data Panel
Minimize		Minimize Data Panel
Download		Download data in Data Panel as CSV file
Pop up Chart		Open Data Panel in a new window
Data Paging		In Partial Rendering mode, the entire data is displayed over multiple pages according to the pre-defined data size per a single page. So in this mode, you can move to another page and set the data size per each page

Table 3-7 Data Panel Toolbar Menu

Note	Modifications made in popup chart are not saved.

In Partial Rendering mode, you can add/delete Chart/Table that can represent data in Data Panel. Below features are available for each Chart/Table.

Name	Icon	Description
Multichart		Provide a feature to group multiple charts into a new chart as a new window.
Add to Report		Add a selected Chart/Table to Report as Data Source Template
Chart Settings		Change the options of Chart/Table
Duplicate		Duplicate a selected Chart/Table to add
Create a Details		You can represent the area selected with  button on a new chart.
Close		Close Chart/Table

Table 3-8 Chart/Table Toolbar Menu

Note	[Multichart] and [Create a Details] functions are provided by particular charts ONLY.

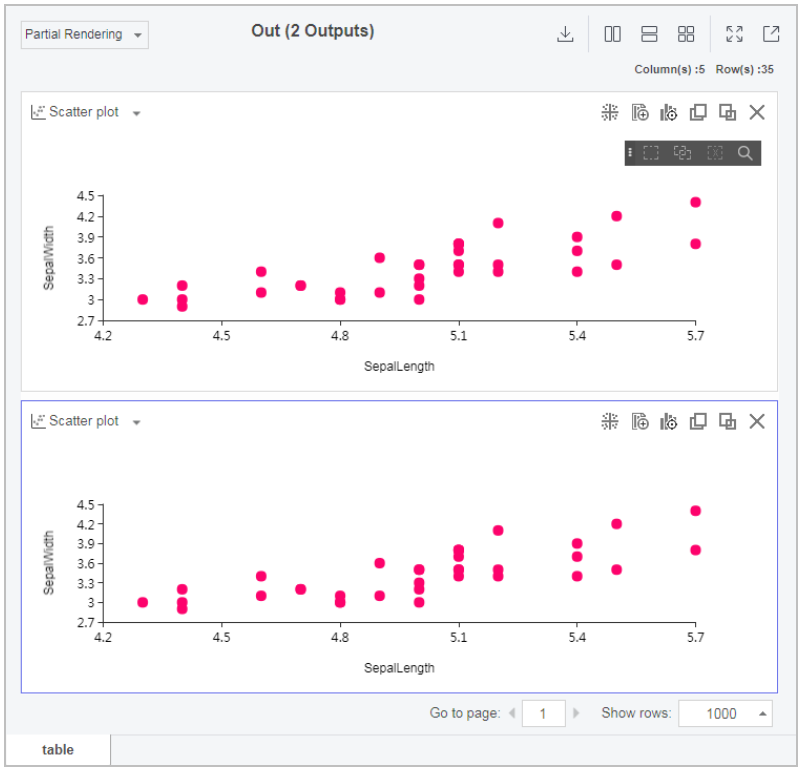


Figure 3-18 Chart/Table Added in Data Panel's Partial Rendering Mode

In Full Rendering mode, Chart and Table are displayed at the top and the bottom, respectively by default, and chart shows the entire data.

Figure 3-19 Data Panel Full Rendering Mode

Note	Full Rendering mode has restrictions on some features including Chart Type modification.

3.3.3.2 Properties Panel

Properties Panel allows you to define each function's name and parameters.

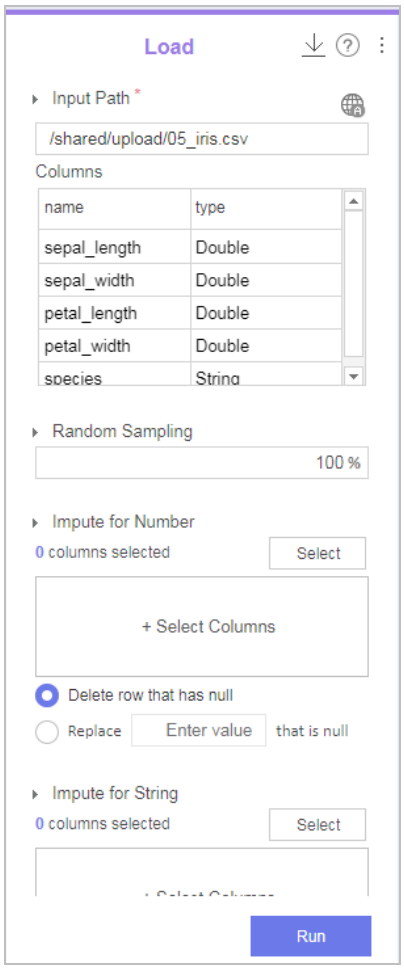


Figure 3-20 Properties Panel

Name	Icon	Description
Function Menu	-	Click  at the top right of Properties Panel to enable this icon. You can modify the name/description of a function or change into another function.
Close		Close Properties Panel.
Help		Show the description of a selected function
Set as variable		Replace a parameter with a defined variable. This feature is available for particular functions ONLY.
Run		Run a function with the parameter you've entered. Its output data is displayed at the right-sided [Out Data Panel].

Table 3-9 Properties Panel

3.3.4 Variables View

[Variables View] shows the list of variables used to dynamically change parameters in [Properties Panel] and allows you to add/modify/delete each variable.

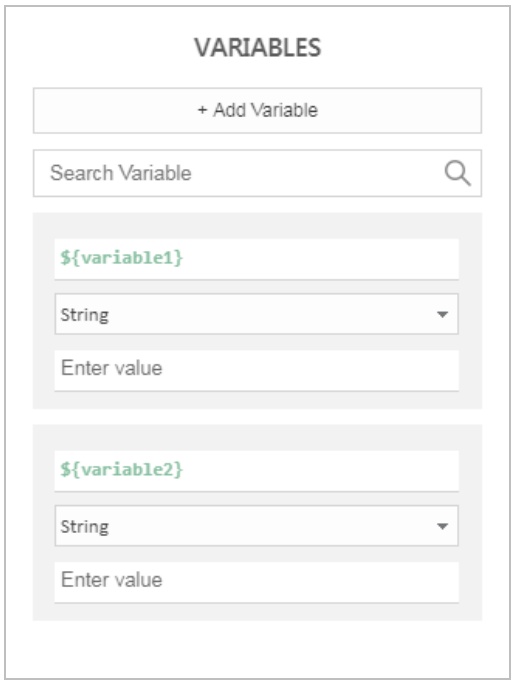


Figure 3-21 Variables View

3.3.5 Input Data View

[Input Data View] shows the list of data that can be used as an input data in Diagram Editor, and allows you to create/modify/delete each input data.

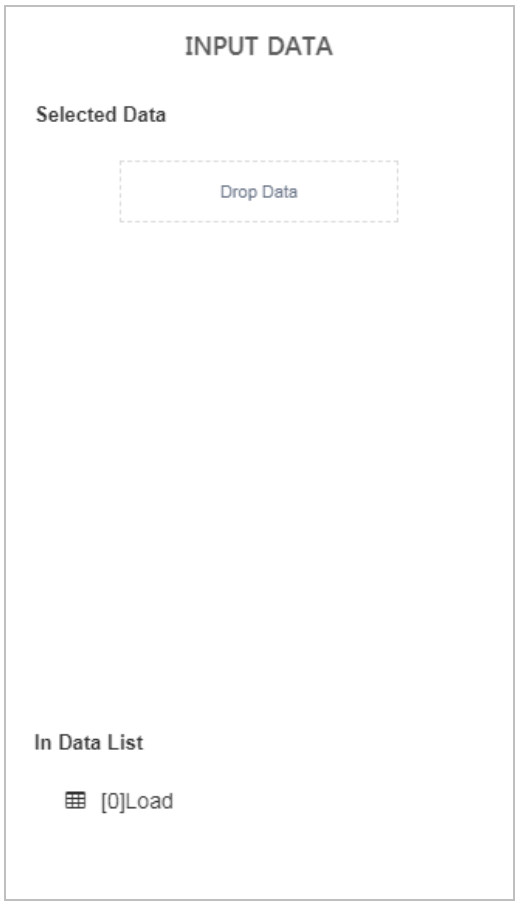


Figure 3-22 Input Data View

3.3.6 Return Data View

[Return Data View] shows the list of data that can be used as an output data in Diagram Editor, and allows you to create/modify/delete each output data.

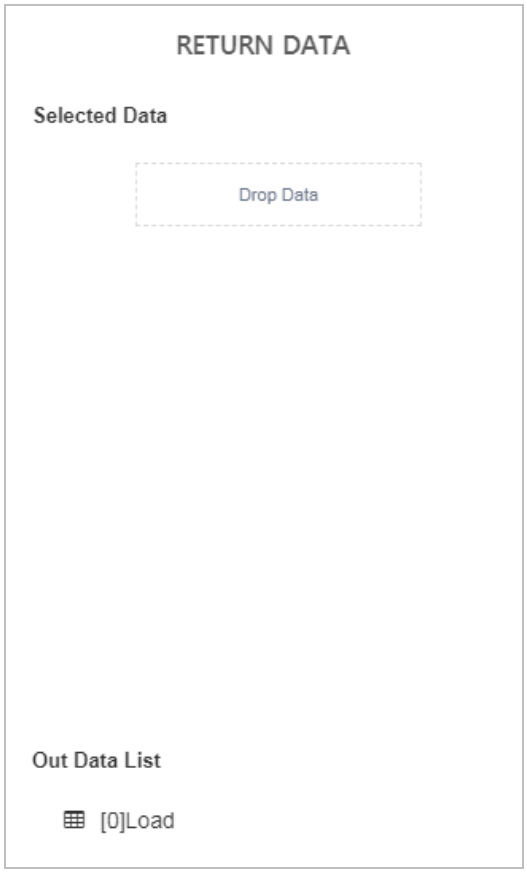


Figure 3-23 Return Data View

3.3.7 Palette View

[Palette View] consists of [Function Tab] that shows the list of available functions for Diagram Editor, [Template Tab] that shows the list of templates that can be shared among models, and [Data Tab] that displays the list of data that are stored in a repository.

3.3.7.1 Function Tab

[Function Tab] shows the list of available functions for Diagram Editor. Enter a keyword to search a function you want. When you select a function and drag and drop to a desired location in Diagram Editor, a selected function will be created.

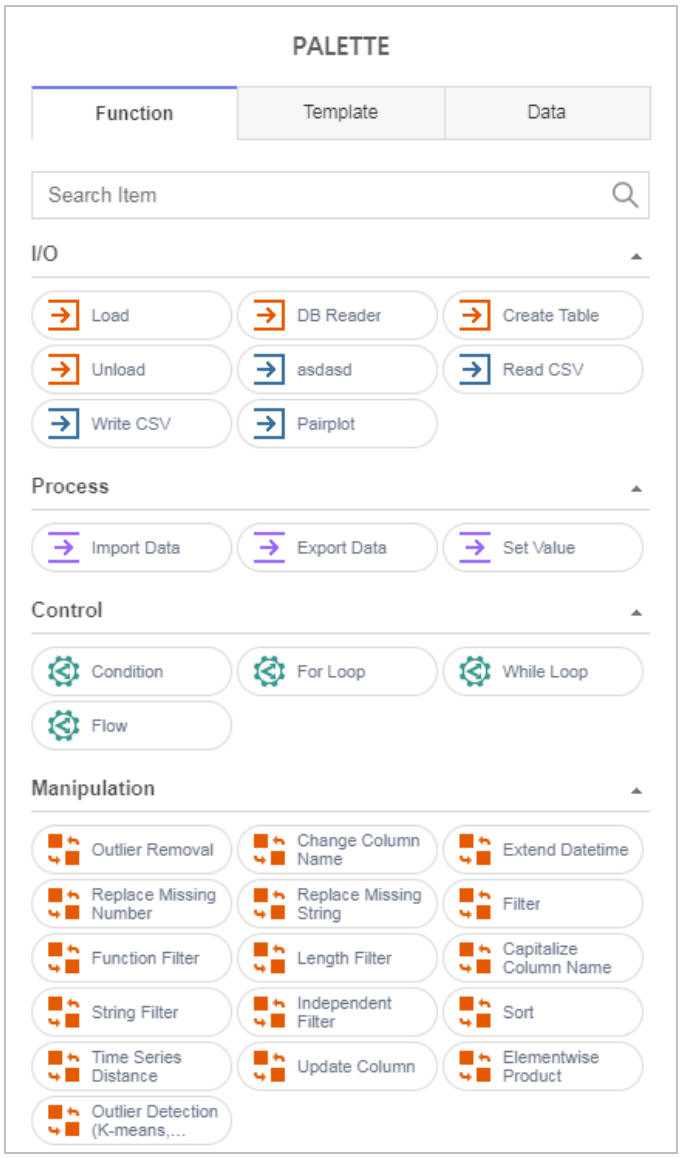


Figure 3-24 Function Tab

Name	Icon	Description
Search Item	-	Enter a keyword to see the list of matching functions

Table 3-10 Function Tab Components

3.3.7.2 Template Tab

Frequently used functions for a model can be stored at the Template repository for further use. You can drag & drop a stored template to add to the Diagram Editor.

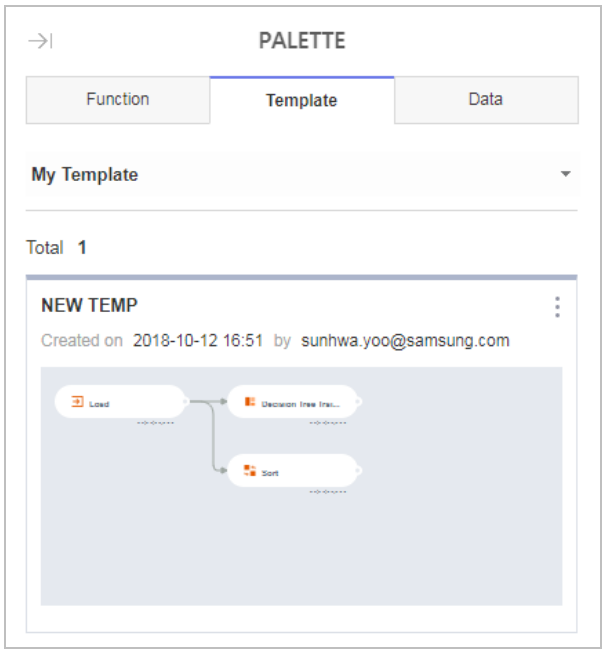


Figure 3-25 Template Tab

Name	Icon	Description
Template Menu	-	Click  at the top right-hand corner of each template to enable this feature. You can modify/delete a template.

Table 3-11 Template Tab Components

3.3.7.3 Data Tab

[Data Tab] allows you to look up the information of data repository used for Brightics AI. You can look up shared data and user-specific data.

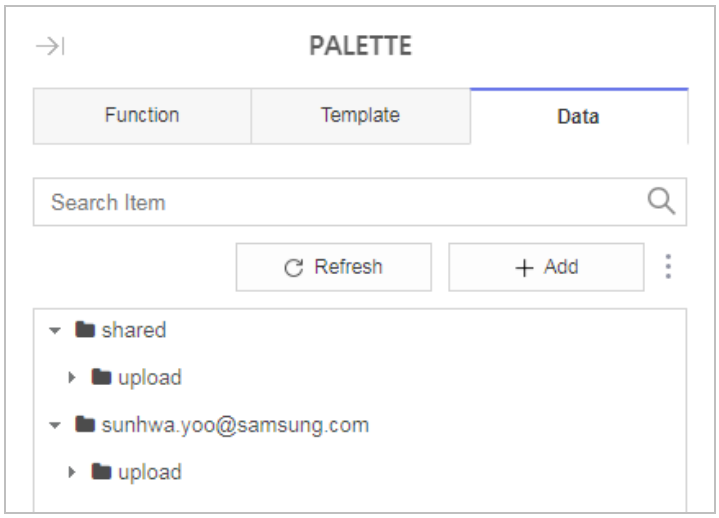


Figure 3-26 Data Tab

Below are Data Tab components.

Name	Icon	Description
Data Tree	-	Show Shared/User data
Search Item	-	Enter a keyword for data search

Name	Icon	Description
Refresh	Refresh	Refresh data list
Add	+ Add	Upload a local file
Data Tree Menu	-	Click  at the top right-hand corner of Data Tree to enable this feature. You can modify/delete data.

Table 3-12 Data Tab Components

3.3.8 Optimization

Optimization consists of [Bind for OPT button], [Optimization Settings palette], and [Optimization Progress window]. You can select target function for optimization using Bind for OPT button and adjust the configuration in Optimization Settings. And you can verify the progress of optimization through Optimization Progress window when executing a model.

3.4 Script Model Editor

Script Model Editor consists of [Editor] to write Scala and SQL script and [Views] necessary to write Script. Script Model Editor is a Script Editor intended for advanced and general users, and allows the user to test Scala and SQL script that they wrote and test the function used in existing Dataflow. And it provides a feature to create user-defined function that allows the user to use the Scala script that they wrote in Dataflow.

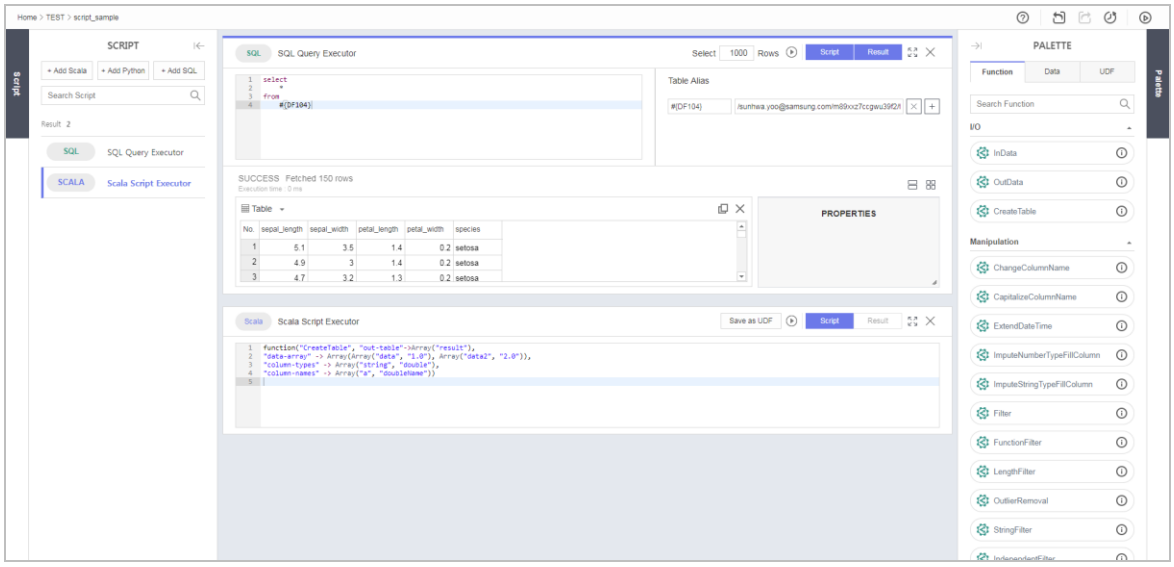


Figure 3-27 Script Model Editor

3.4.1 Toolbar

Below are the components of Toolbar.

Name	Icon	Description
Function Reference		Create/show Function Reference information of Documentation site in a new tab.
Undo		Undo a task.
Redo		Redo a task.
History		Call a popup window to verify task history.

Name	Icon	Description
Run		Run all functions written in Diagram in a sequential manner.

Table 3-13 Toolbar Components

3.4.2 Script Editor

Script Editor allows the users to write/modify/delete/test Script by themselves.

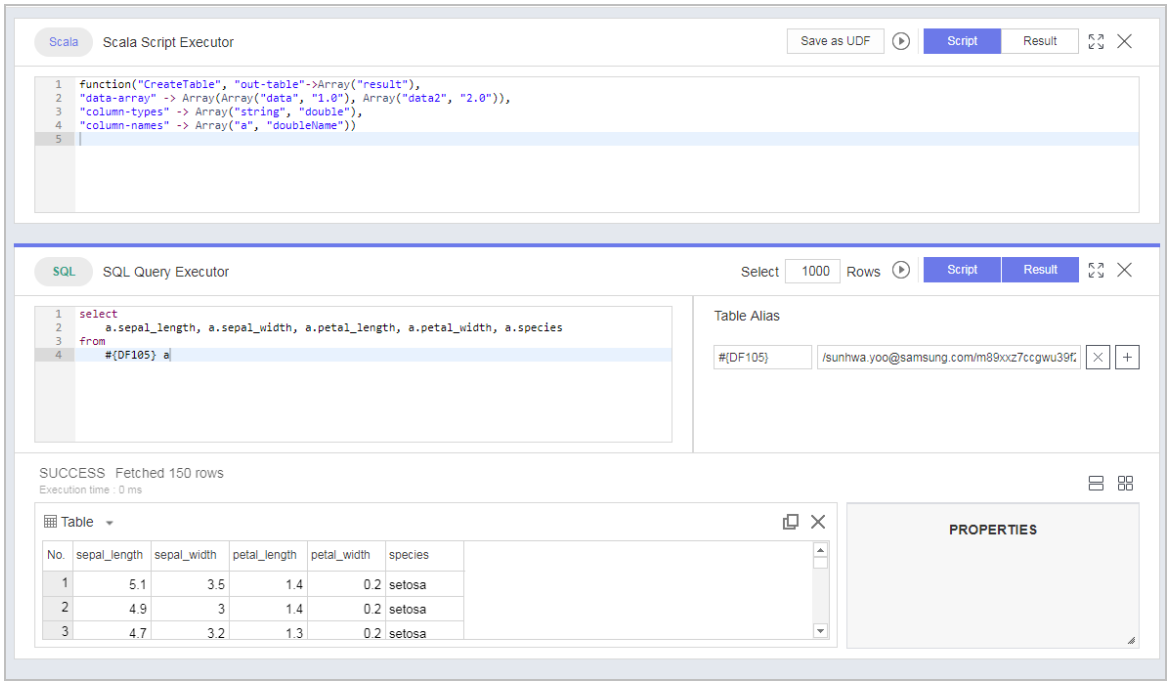


Figure 3-28 Scala Script-added Script Editor

3.4.3 Script View

Script View allows the user to add or search Scala Script, Python Script and SQL Script. Search Script can be used to search a desired script.

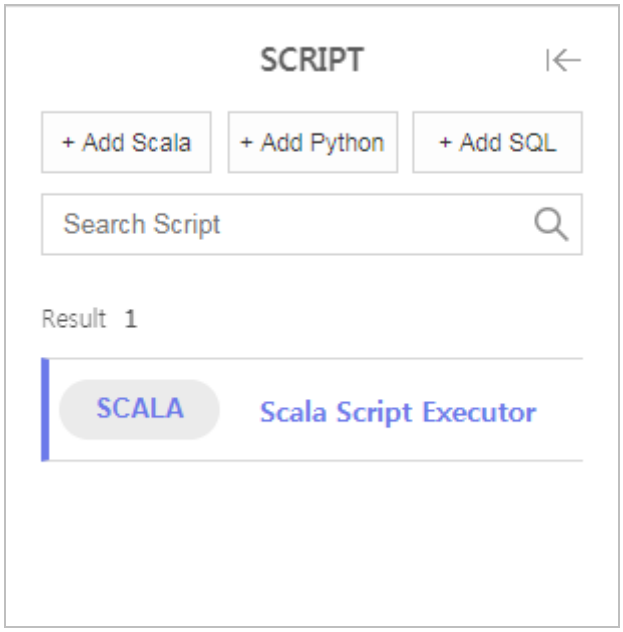


Figure 3-29 Script View

Below are the features used in Scala View.

Name	Icon	Description
Add Scala	+ Add Scala	Add Scala Script
Add Python	+ Add Python	Add Python Script
Add SQL	+ Add SQL	Add SQL Script
Search Script	-	Search the Script written.

Table 3-14 Script View Components

3.4.4 Scala Script

Scala Script is an area where a user can write Scala Script.

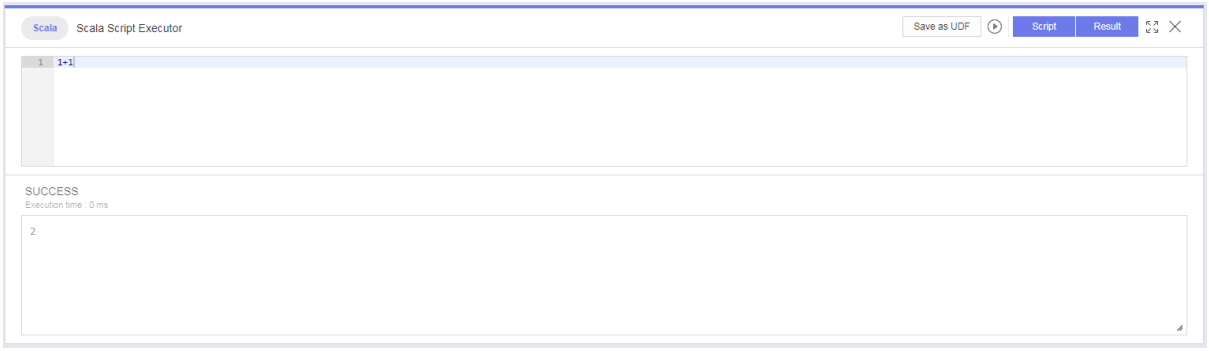


Figure 3-30 User has Written/Run Scala Script

Below are the components of Scala Script's Toolbar.

Name	Icon	Description
Scala Script Name	-	Show the name of an added Script for editing
Save as UDF	Save as UDF	Save the written Scala Script as UDF
Run		Run the written Script
Script	Script	Expand/Collapse the Script area
Result	Result	Expand/Collapse the Result area
Maximize/Minimize		Maximize/Minimize the selected Script.
Remove		Remove the selected Script.

Table 3-15 Scala Script Toolbar Components

3.4.5 Python Script

Python Script an area where a user can write Python Script.

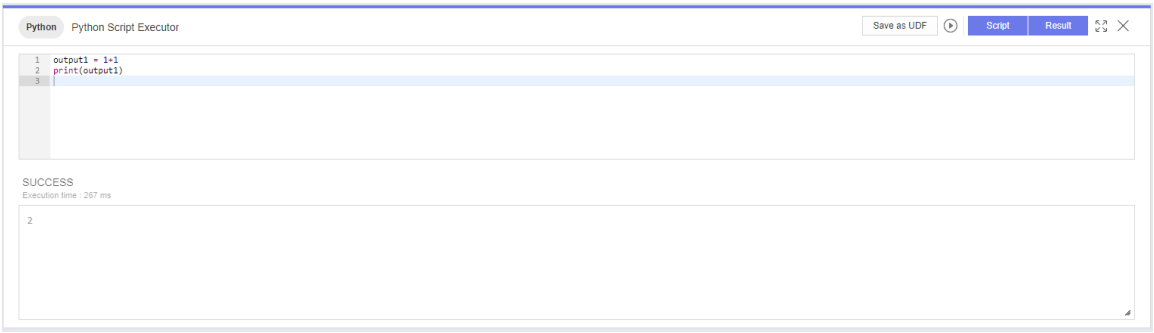


Figure 3-31 User has Written/Run Python Script

Below are Python Script's Toolbar components.

Name	Icon	Description
Python Script Name	-	Show the name of an added Script for editing
Save as UDF	Save as UDF	Save the written Python Script as UDF
Run		Run the written Script
Script	Script	Expand/Collapse the Script area
Result	Result	Expand/Collapse the Result area
Maximise/Minimize		Maximize/Minimize the selected Script
Remove		Remove the selected Script

Table 3-16 Python Script Toolbar Components

3.4.6 SQL Script

SQL Script is an area where a user can write SQL Script.

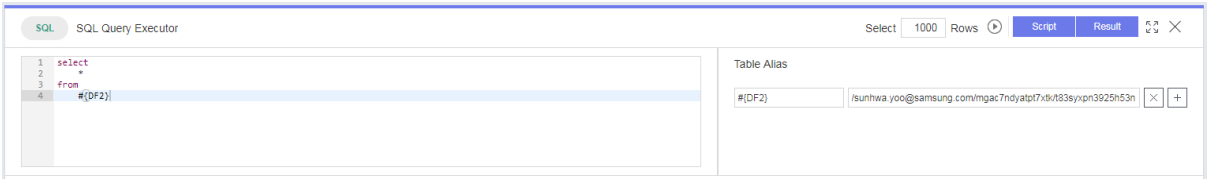


Figure 3-32 User-written SQL Script

Below are SQL Script's Toolbar components.

Name	Icon	Description
SQL Script Name	-	Show the name of an added Script for editing
Limit	Select 1000 Rows	Specify the number of limit for the data being displayed.
Run		Run the written Script
Script	Script	Expand/Collapse the Script area
Result	Result	Expand/Collapse the Result area
Maximize/Minimize		Maximize/Minimize the selected Script
Remove		Remove the selected Script

Table 3-17 SQL Script Toolbar Components

3.4.7 Palette View

3.4.7.1 Function Tab

It is a collection of available functions for Scala Script. You can drag & drop a function to Scala Script area. When you mouse over ⓘ, corresponding function's prototype is provided in Tooltip, and when you click it, you are redirected to Help Document Page of the corresponding function.

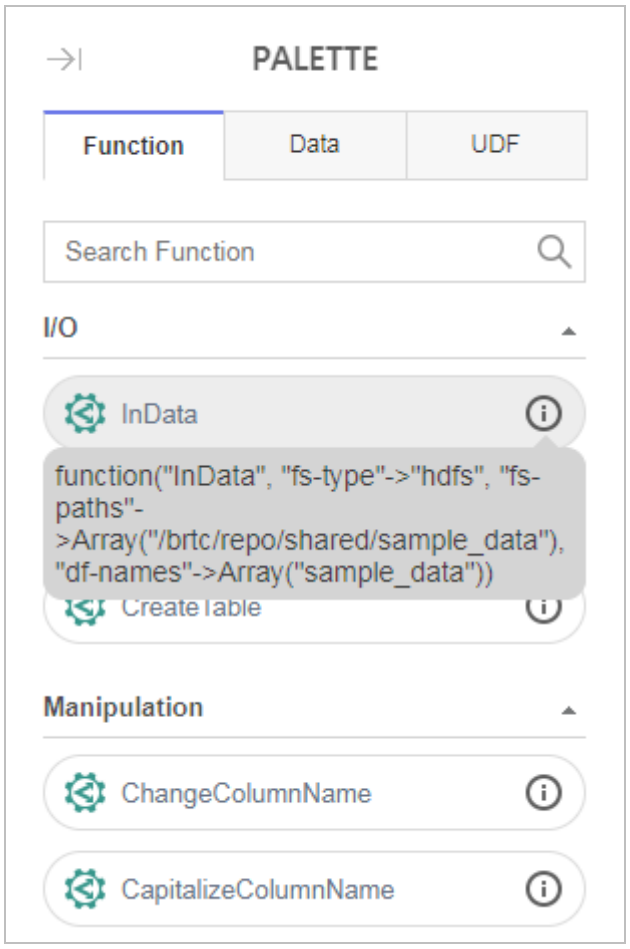


Figure 3-33 Function Tab

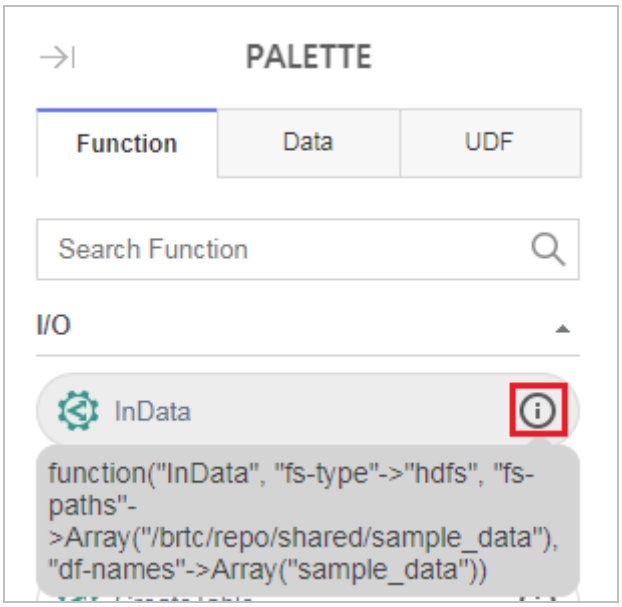


Figure 3-34 Help Document Page in Function Tab

3.4.7.2 Data Tab

It shows a list of tables saved after Scala/Python Script and Data Flow's function was executed. You can drag and drop SQL statement to SQL Script area. Update the list by clicking on Refresh button.

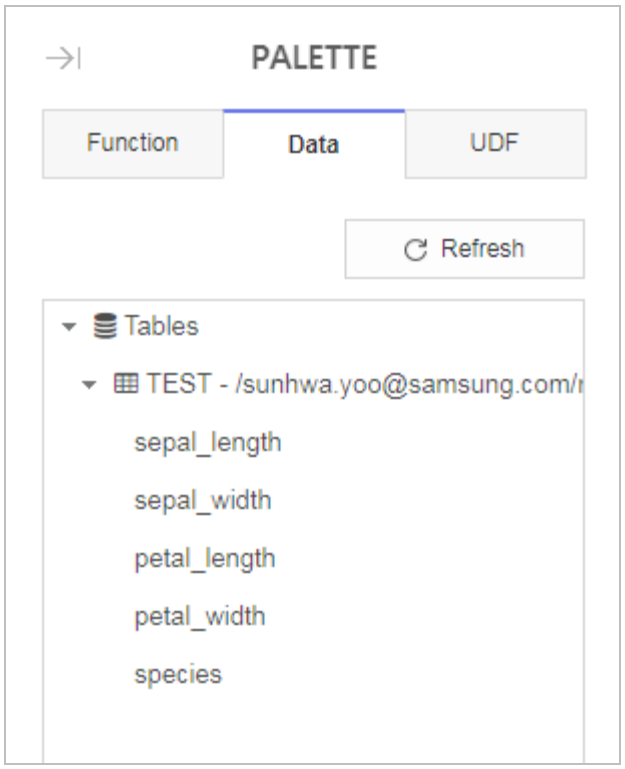


Figure 3-35 Data Tab

3.4.7.3 UDF Tab

It shows a list of UDFs when scripts written in Scala/Python Script is registered as UDF. You can search a desired UDF using Search Script.

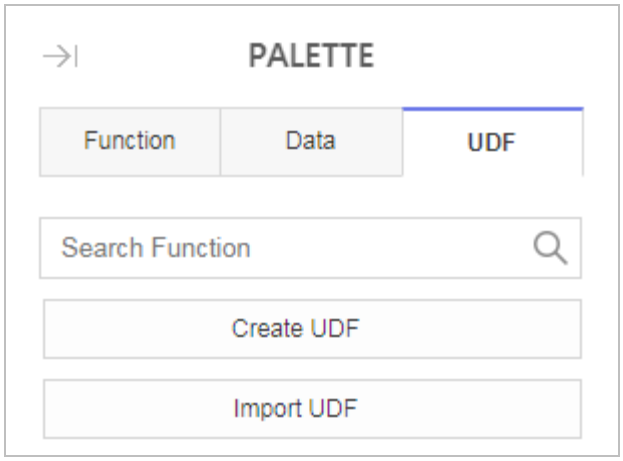


Figure 3-36 UDF Viewer

3.5 Deep Learning Model Editor

Deep Learning Model Editor is equipped with a functionality to allow a user to create a model by training the model on refined input data and enter the data into the trained model.

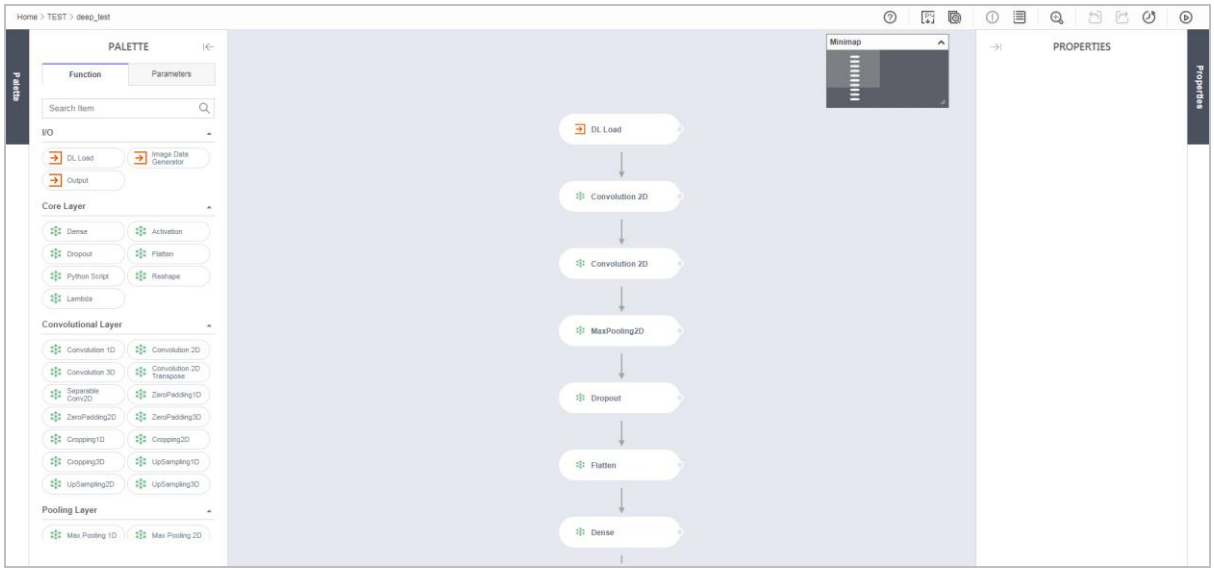


Figure 3-37 Report Editor

3.5.1 Toolbar

Below are Toolbar components.

Name	Icon	Description
Function Reference		Show Function Reference information of Documentation site in a new tab
Export		Download currently running Model as .py file
Summary		Show the layer of currently running Model and its expected execution result
Tooltip		Provide Tooltip to a function. It also provides memo function.
Index		Provides the Index of a Function written in a Diagram. When this icon is clicked, Focus moves to the selected Function.
Zoom		Zoom in/out of a Diagram
Undo		Undo a task
Redo		Redo a task
History		Call a popup window to verify task history
Run		Call a popup window to execute the function written in a diagram. The dialog called runs/stops the model, and shows the current status and result

Table 3-18 Toolbar Components

3.5.1.1 Run

When you click the Run button at the bottom right-hand side of the screen, the written model is executed.

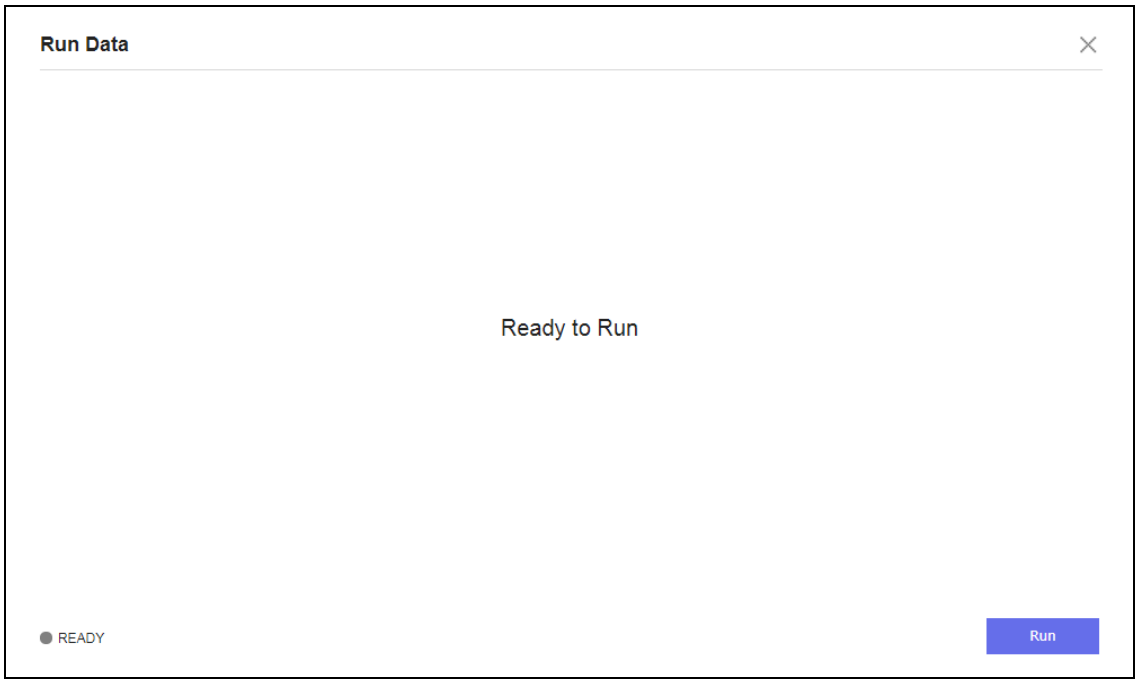


Figure 3-38 RunData Dialog – Run

3.5.1.2 Stop

If you click Terminate button at the bottom right-hand side of the screen, the model being run stops.

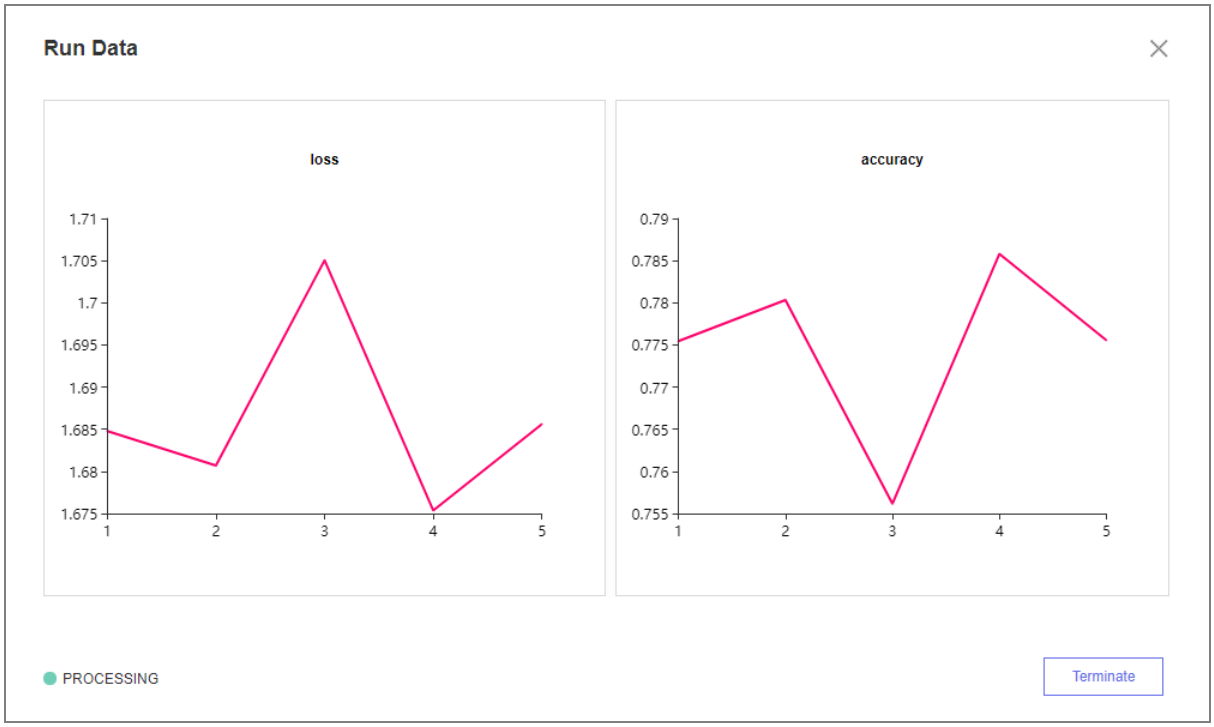


Figure 3-39 RunData Dialog – Stop

3.5.1.3 Success

You can verify the loss and accuracy of the model which are model execution results. If you click Run button, you can re-run it.

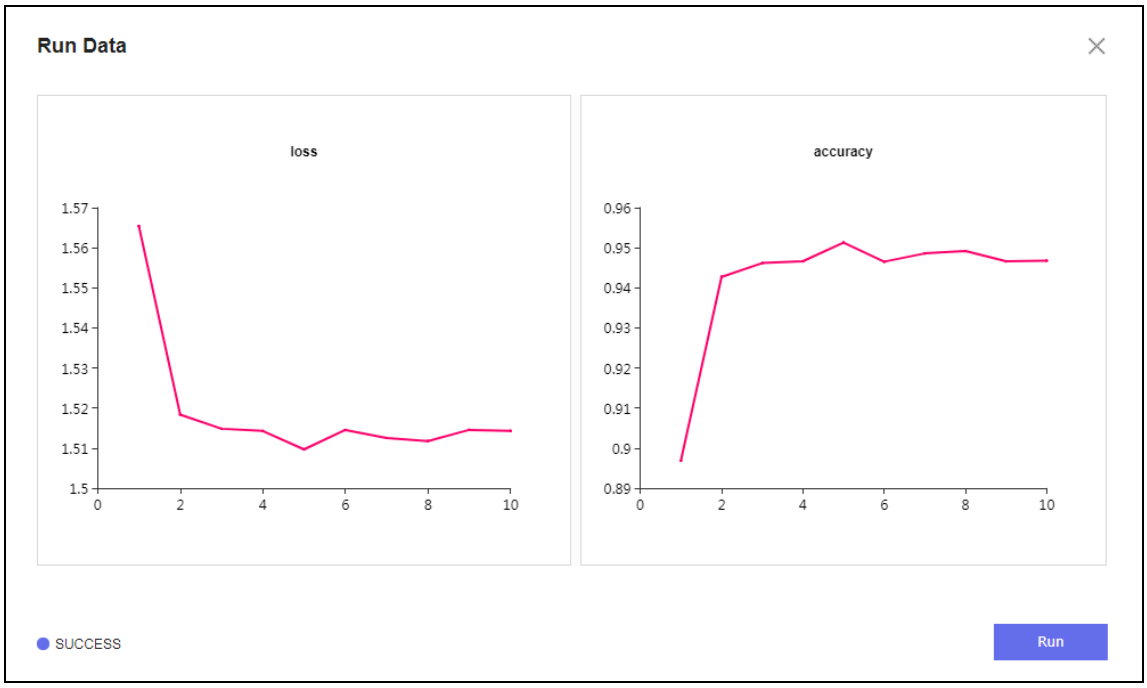


Figure 3-40 RunData Dialog – Success

3.5.1.4 Fail

The following status is shown when the model is stopped by a user or terminated due to Exception. If you click Detail button, you can see the detailed reason of the error.

Figure 3-41 RunData Dialog – Fail

3.5.2 Diagram Editor

Deep Learning Diagram Editor allows you to see the flow of an analytics model and add, modify, delete or selectively choose Layer Function.

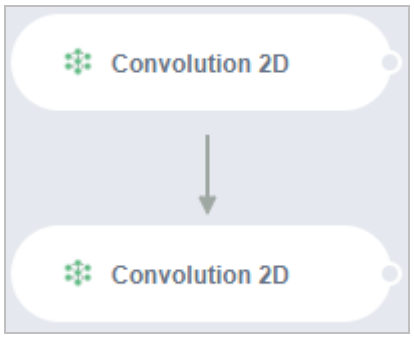


Figure 3-42 Deep Learning Diagram Editor

Below are the components of Diagram Editor.

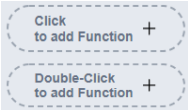
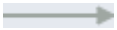
Name	Icon	Description
Function		If you select a Function used for a Model, the information of the selected Function is displayed at Properties View on the right-hand side of Deep Learning Diagram Editor screen
Add Function		This icon becomes visible when you mouse over an empty space in Editor. Click the icon and call a popup window to select a Function.
Connection		This line connects a function with another function. The output of the starting point becomes the input of the arriving point. Multiple lines can be sent or received. (varying by function)

Table 3-19 Diagram Editor Components

3.5.2.1 Function Mouse Over

Below components become visible when you mouse over a function created in the Diagram.

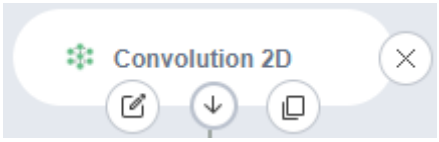


Figure 3-43 Function Mouse Over-visible Menu

Name	Icon	Description
Change Function		Call a popup window to change a selected function to another function
Connect		Connect a selected function to another function. Drag and drop to a function you want to connect to.
Duplicate		Copy a selected function. Drag and drop to a desired location
Remove		Delete a selected function

Table 3-20 Function Mouse-Over Menu Components

Note	You can connect the functions in a downward direction ONLY

3.5.2.2 Selectively Choose Diagram

Below are the components shown when you selectively choose a diagram in Deep Learning Diagram Editor.

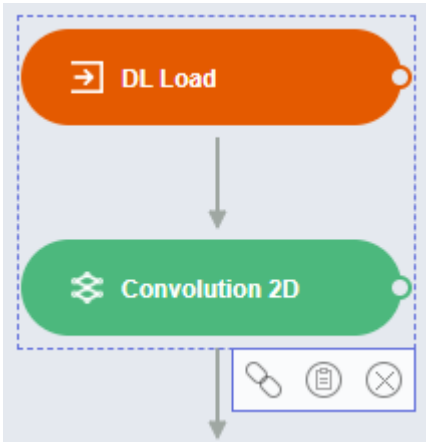


Figure 3-44 Selectively Chosen Diagram

Name	Icon	Description
Remove		Remove the selected functions.

Table 3-21 Selectively Choose Diagram Menu Components

3.5.3 Properties View

[Properties View] is used to dynamically change the parameter value of the function.

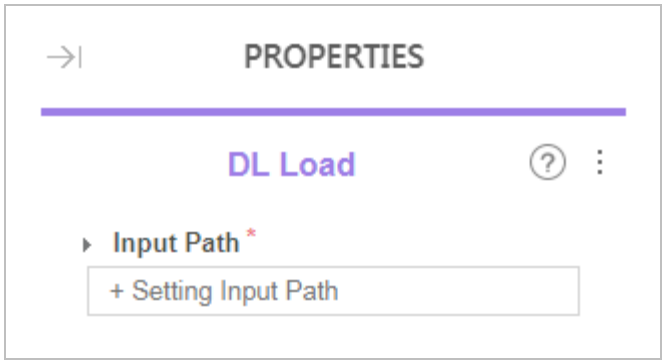


Figure 3-45 Properties View

3.5.4 Palette View

[Palette View] is composed of [Function Tab] that shows the list of available functions for Deep Learning Model Editor and [Parameters Tab] that shows the list of common parameters.

3.5.4.1 Function Tab

[Function Tab] shows the list of available functions for Deep Learning Model Editor. Enter a keyword to search a function you want. When you select a function and drag and drop to a desired location in Deep Learning Model Editor, the selected function will be created.

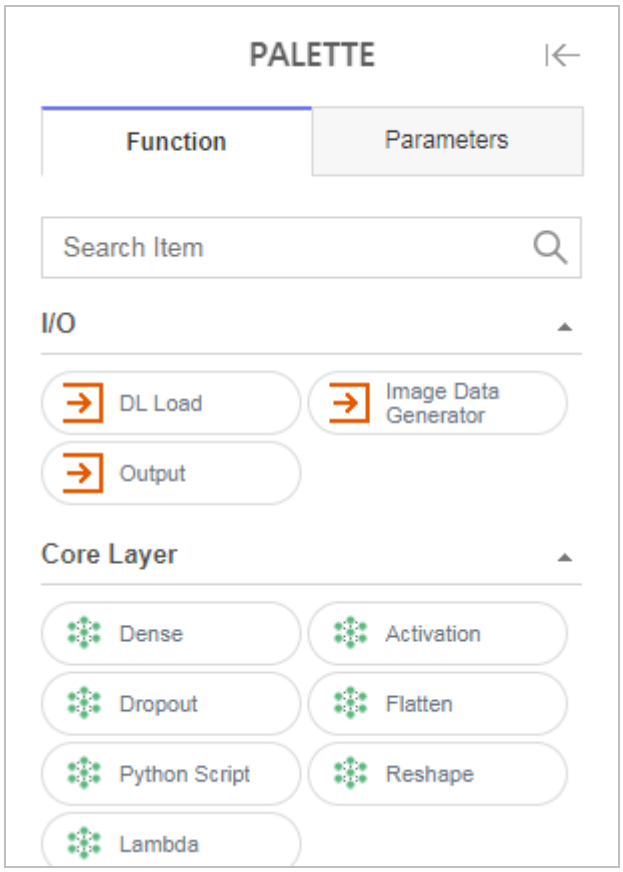


Figure 3-46 Function Tab

Name	Icon	Description
Search Item	-	If you enter a keyword, a list of matching functions is displayed.

Table 3-22 Function Tab Components

3.5.4.2 Parameter Tab

[Parameter Tab] shows a list of parameters that can modify the common parameters of Deep Learning model.

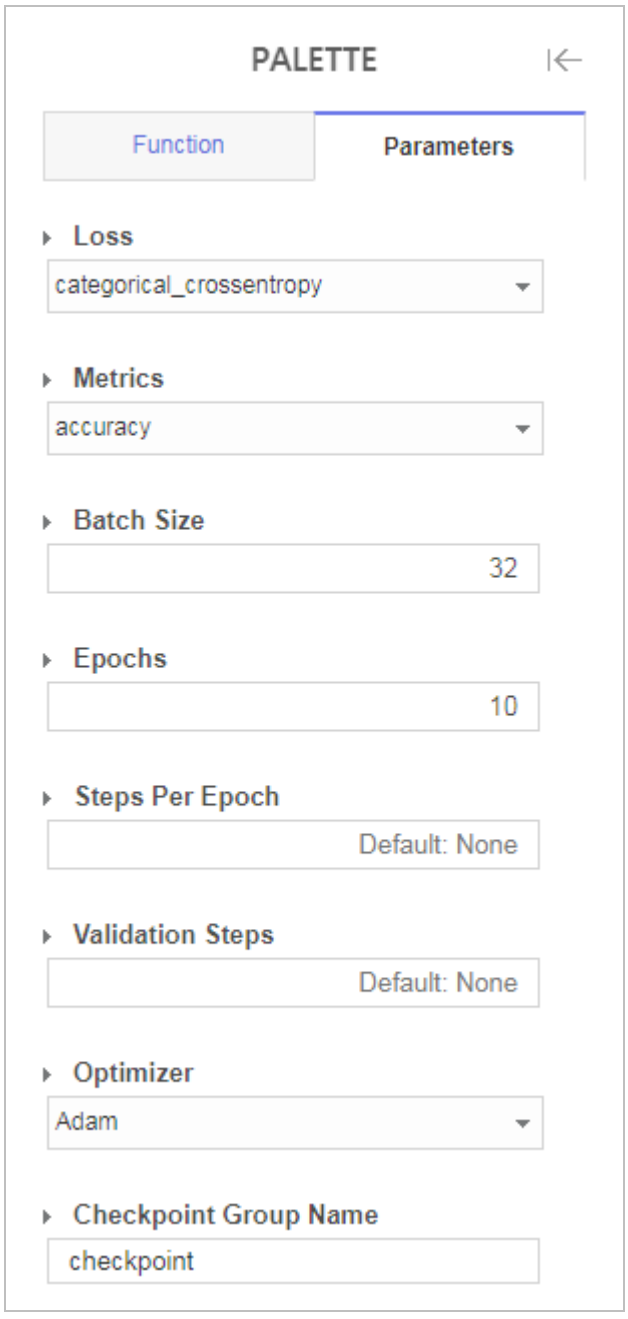


Figure 3-47 Parameters Tab

3.6 Report Editor

Report Editor provides Modeling feature to make Report with ease based on the data created through analysis.

Figure 3-48 Report Editor

3.6.1 Toolbar

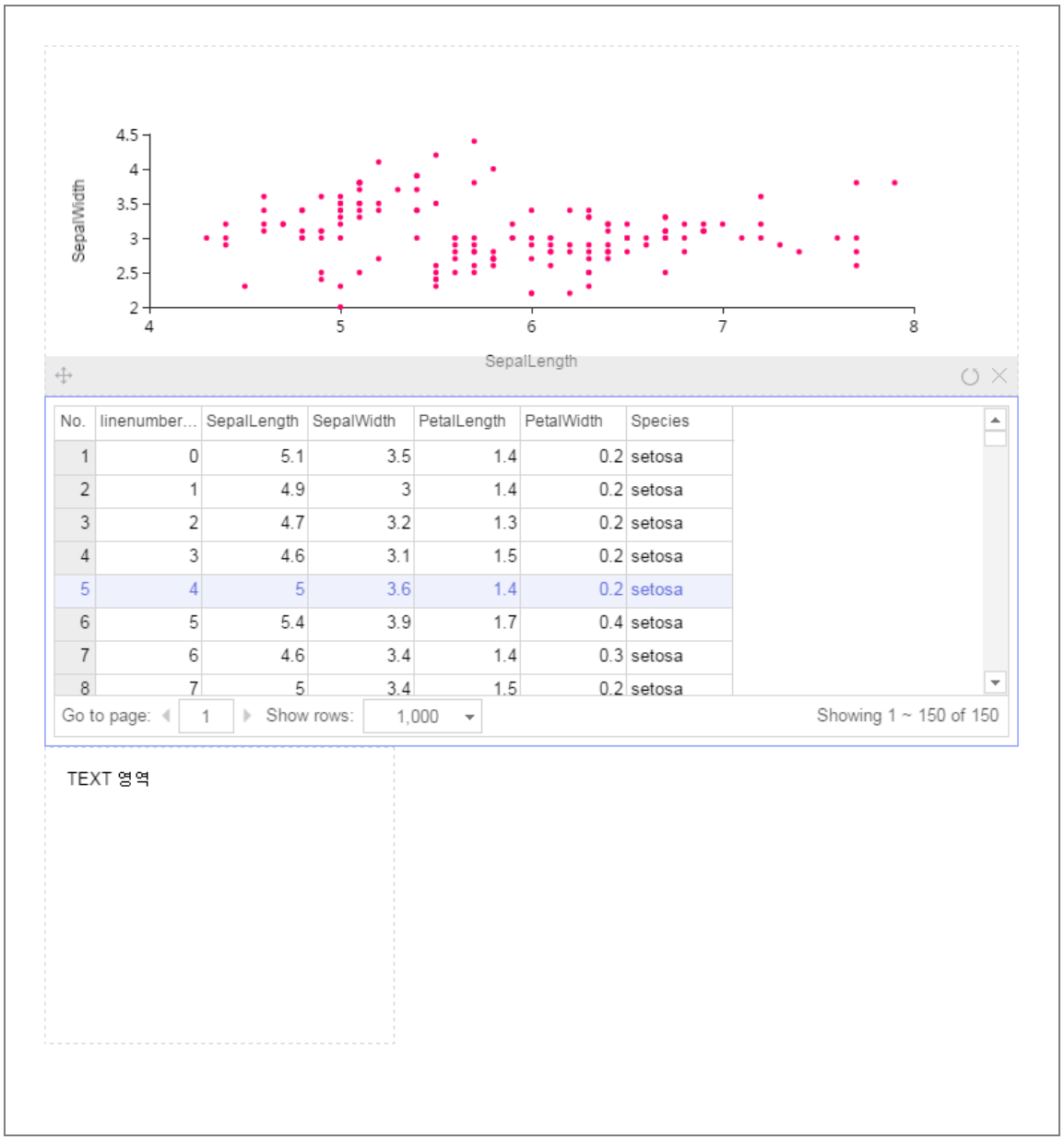
Below are the components of Toolbar.

Name	Icon	Description
Thumbnails		Thumbnails show the preview of each page and allow you to change the order of pages
Add Page		Add a Page
Delete Page		Delete a Page
Export PDF		Export a Report as PDF
Refresh		Refresh Report Data
Publish		Publish a Report
Content Outline		Change the Outline view settings of Content represented in the Report
Zoom		Change the diameter of Diagram and display the result
Undo		Undo a task
Redo		Redo a task

Table 3-23 Toolbar Components

3.6.2 Page Editor

In Report, you can add or edit Chart, Table and Text Unit in each added page.



No.	linenumber...	SepalLength	SepalWidth	PetalLength	PetalWidth	Species
1	0	5.1	3.5	1.4	0.2	setosa
2	1	4.9	3	1.4	0.2	setosa
3	2	4.7	3.2	1.3	0.2	setosa
4	3	4.6	3.1	1.5	0.2	setosa
5	4	5	3.6	1.4	0.2	setosa
6	5	5.4	3.9	1.7	0.4	setosa
7	6	4.6	3.4	1.4	0.3	setosa
8	7	5	3.4	1.5	0.2	setosa

Go to page: 1 Show rows: 1,000 Showing 1 ~ 150 of 150

Figure 3-49 Page Editor

Below are the components of Page Editor Content.

Name	Icon	Description
Move Content		Move a corresponding Content.
Refresh		Bring the data from the data source set in the content again.
Remove		Remove the corresponding content

Table 3-24 Page Editor Content Components

3.6.3 Data Box View

[Data Box View] shows the list of Data Sources linked to a report and allows you to add/modify the name of/remove/refresh Data Source, remove Chart Template, and connect Data Source Schedule.

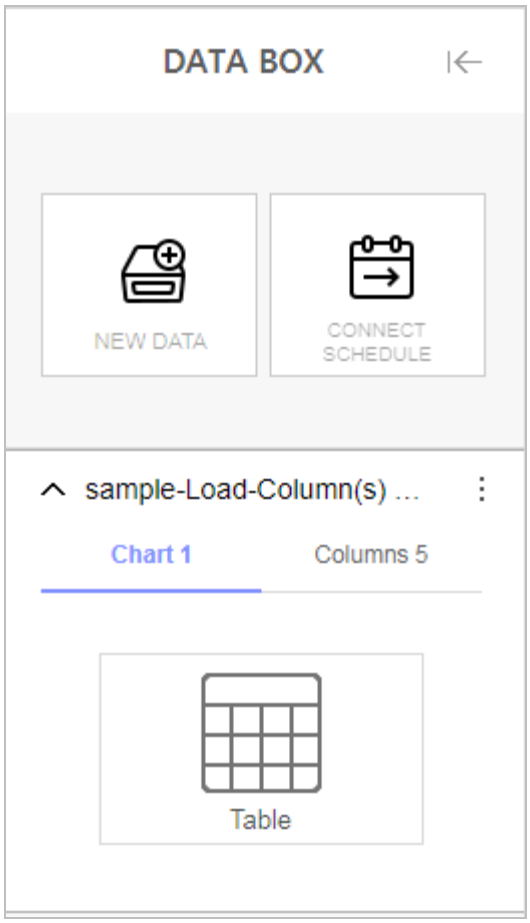


Figure 3-50 Data Box View

Below are the components of Data Box View.

Name	Icon	Description
New Data		Create a new Data Source
Connect Schedule		Modify the created Data Sources into Schedule Data
Data Source Menu	-	A function is provided that allows you to modify/delete Data Source name, and connect to Schedule Data

Table 3-25 Data Box View Components

3.6.4 Object/Properties View

[Object/Properties View] allows you to add a new content or set options for a selected content. If content is NOT selected, you can define Page properties.

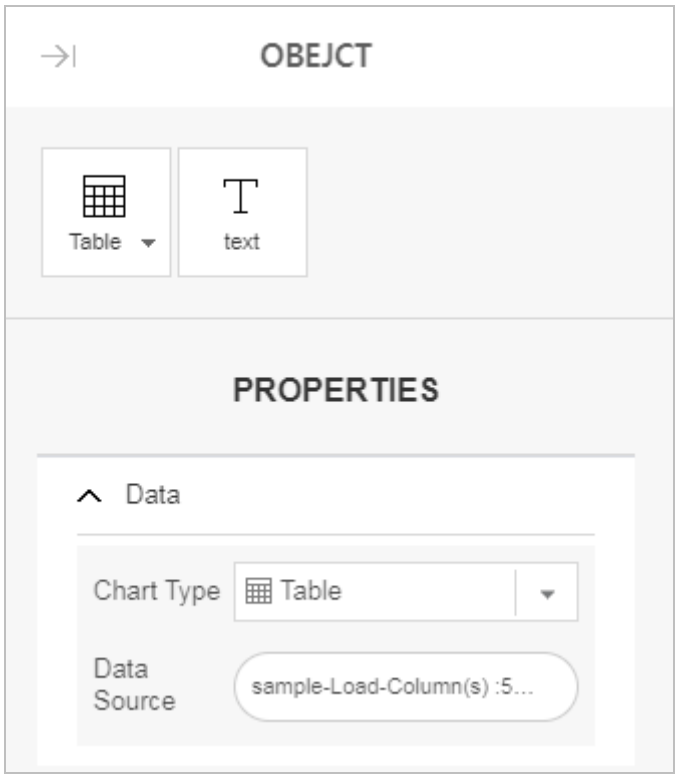


Figure 3-51 Object/Properties View

Below are the components of Object/Properties View.

Name	Icon	Description
Add Chart		If the selected content is a chart, the icon is changed to corresponding chart's icon. You can open the list of charts and add a desired chart to the Page.
Add Text		Add a text content to the page
Properties	-	Show the properties of a selected content. Any change you make is incorporated into the content.
Arrange		When there is other content which overlaps with the selected content, you can change the arrangement of the contents.

Table 3-26 Object/Properties View Components

3.7 Management

[Management] consists of screens that allow you to manage User, Notice, Schedule, (Spark) Agent, Deploy, Publish, Role, and Datasource.

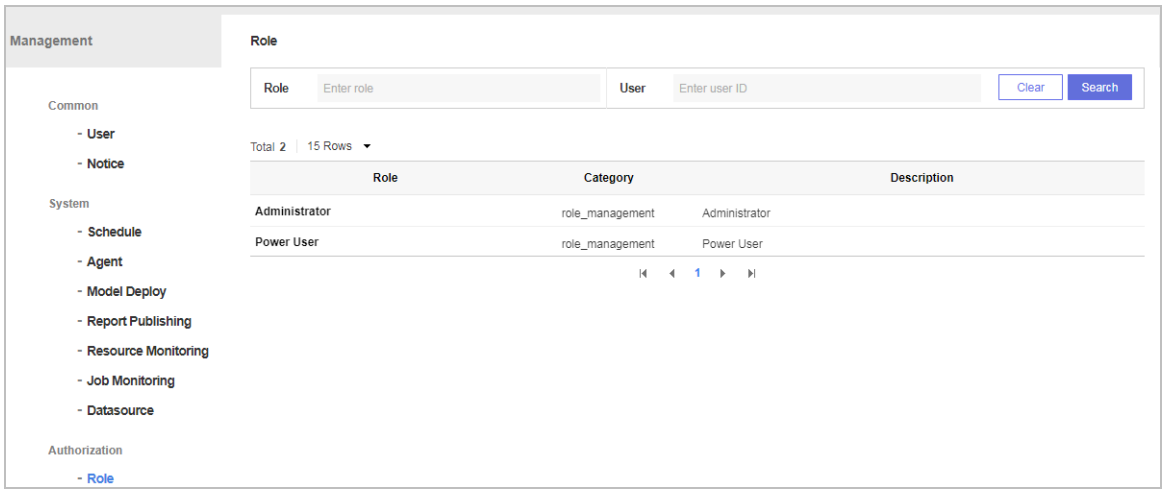


Figure 3-52 Management

Name	Description
User	Show the list of users along with a feature to add/modify/remove a user
Notice	Show the list of notices along with a feature to add/modify/remove a notice
Schedule	Schedule List shows the status and the history of schedules, enabling to add/modify/remove a schedule
Agent	Show the list of agents along with a feature to add/modify/delete an agent
Model Deploy	Show the list of deployments along with a feature to remove/download a deployed model
Report Publishing	Show the list of published reports and you can copy a link and embed code
Resource Monitoring	Show the CPU and memory usage of the agent currently in use
Job Monitoring	Show the resource usage of the user who recently executed a job
Role	Define the role of each user
Datasource	Provide a feature to add/modify/delete datasource along with datasource list

Table 3-27 Management Components

Note	Access to a specific admin page can be restricted depending on the pre-defined user's role

4 Getting Started

This chapter describes how to use Brightics AI for analysis.

- Section 4.1 Create a Project
- Section 4.2 Create an Analytics Model
- Section 4.3 Create Data Load Function and Upload Data
- Section 4.4 Create and Run Manipulation Function
- Section 4.5 Create an Analytics Function and Display a Result

4.1 Create a Project

A. Click + in the Project View

B. Enter *Name* in [Create Project] window and click **OK** button

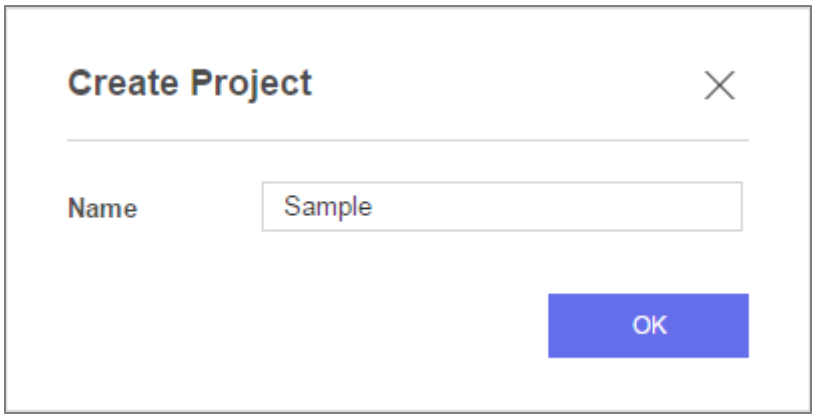


Figure 4-1 Create Project

C. [Project List] shows the added project

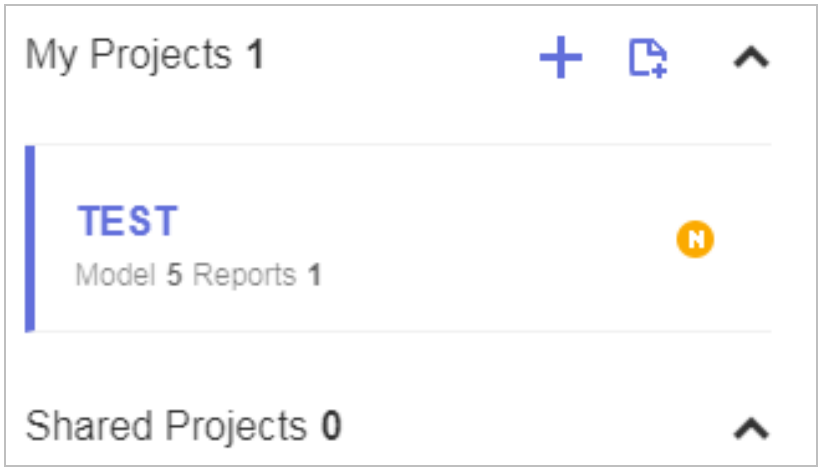


Figure 4-2 Project List after Addition

4.2 Create an Analytics Model

A. Click button in the [Project View].

B. After selecting a model type, enter *Name* and click the **OK** button.

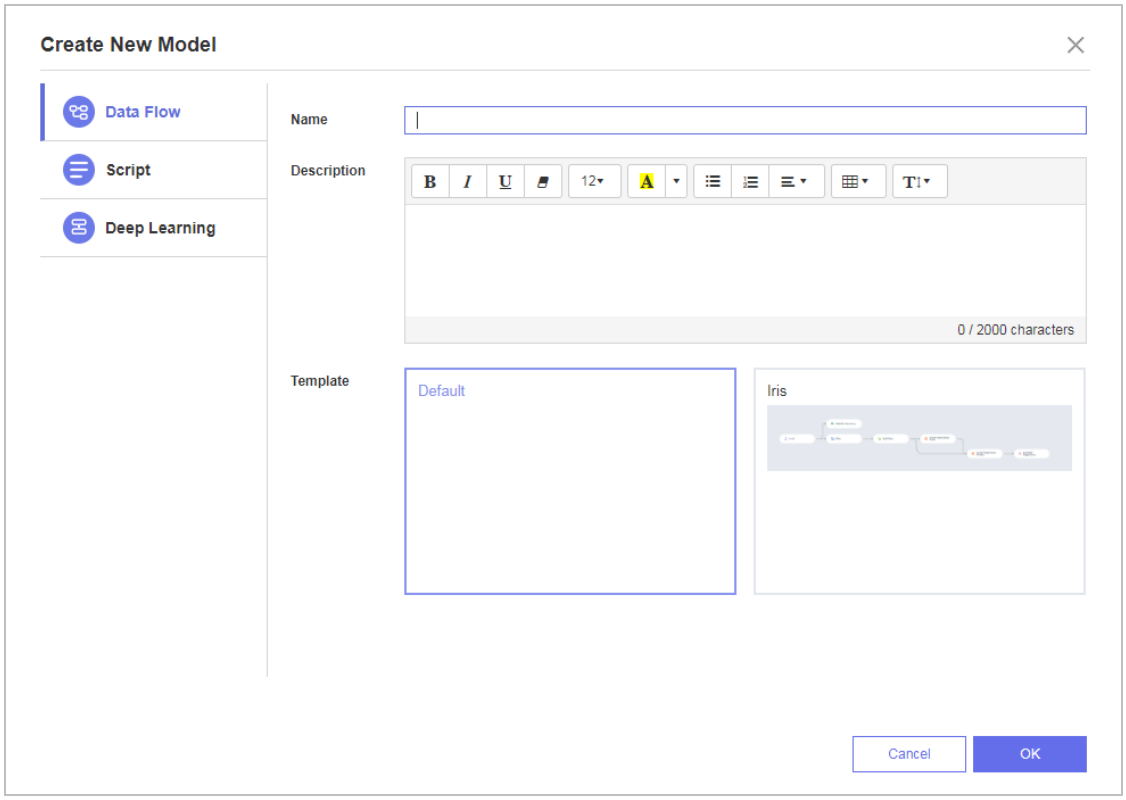


Figure 4-3 Create New Model

C. An Analytics model is created based on input data, and the screen is switched to [Model Editor].

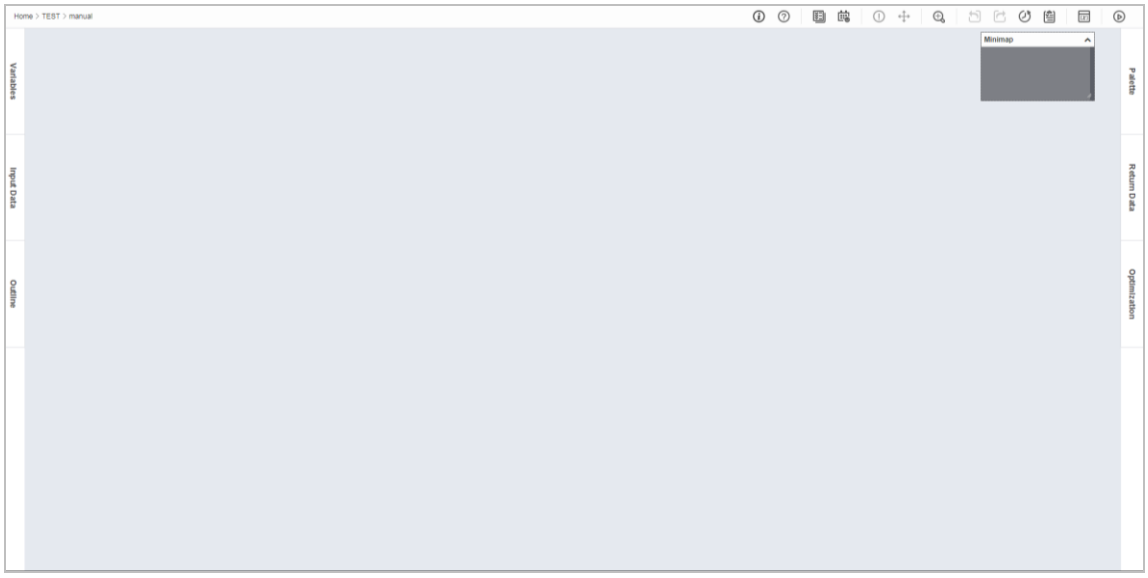


Figure 4-4 Screen after Model Creation

4.3 Create Data Load Function and Upload Data

A. Open right-sided [Palette View] and create a Load Function using Drag and Drop.

Figure 4-5 Create Load Function

B. Select the created Load Function to enable [Properties Panel]. Click **Input Path** to enable [Browse Repository] window.

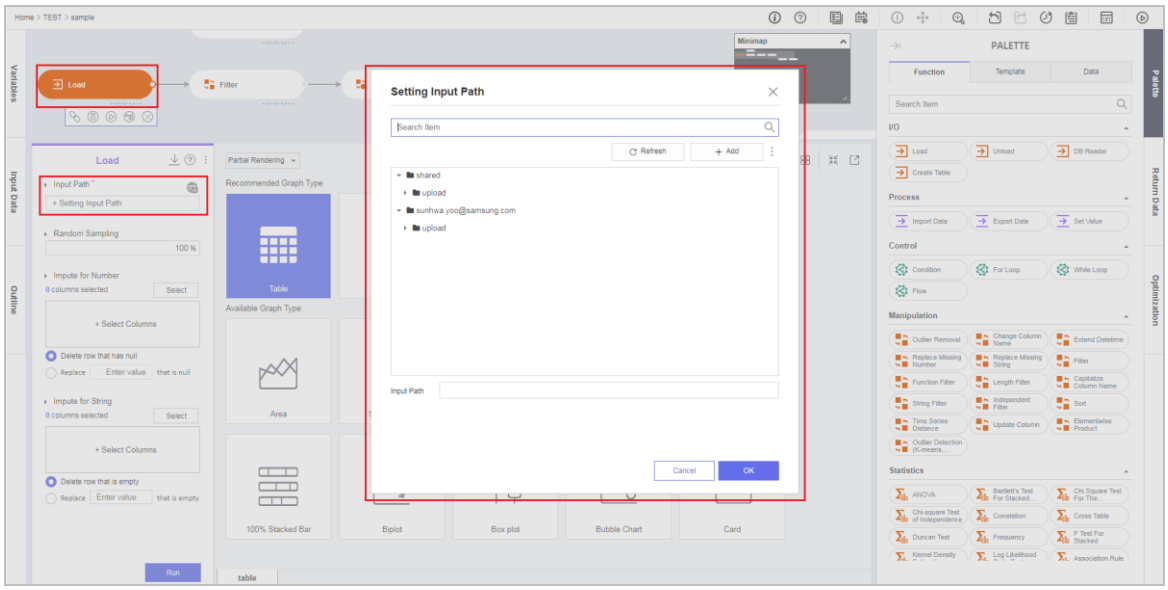


Figure 4-6 Set Properties after Creating Load Function

C. Click [Data Upload] button to enable Data Upload Wizard.

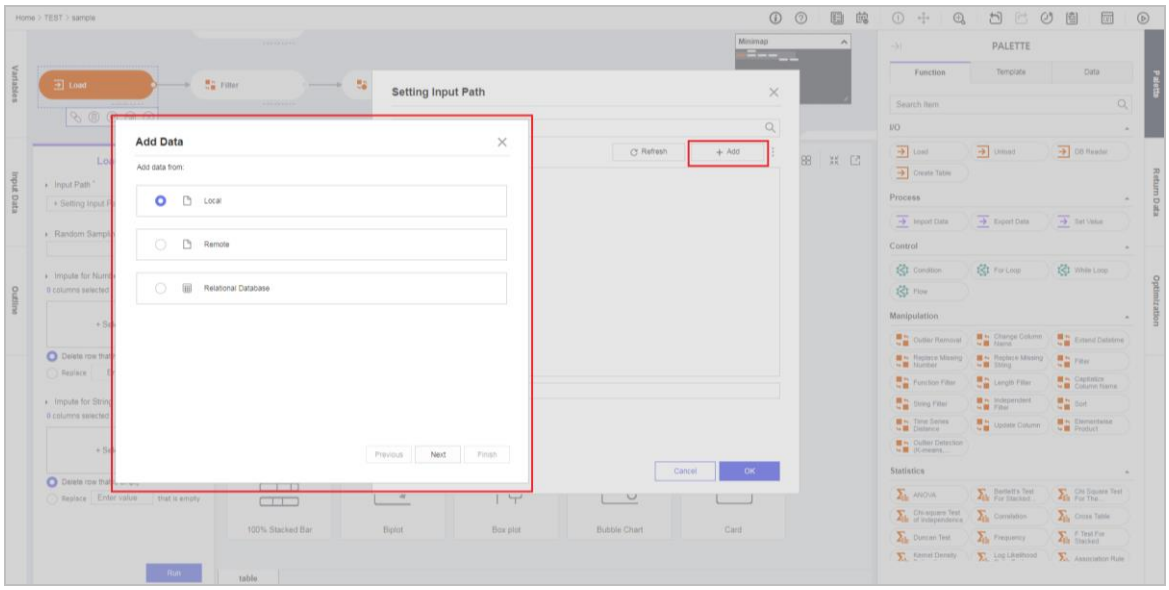


Figure 4-7 Data Upload Wizard

D. Select **Local** and click **Next** button. If you click **Local** button at [Select Data] phase and select a CSV file from user's PC, the preview of the selected data will appear. [Upload To] is set to User by default.

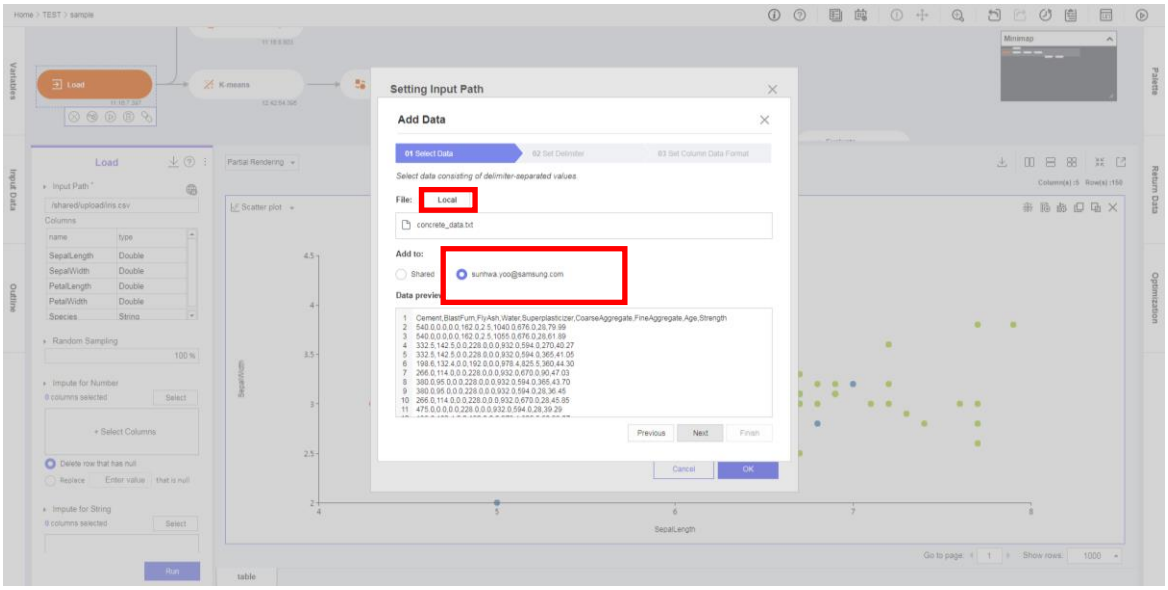


Figure 4-8 Select Data

E. Click **Next** button to move to [Set Delimiter] phase. Select a proper delimiter to change the Preview.

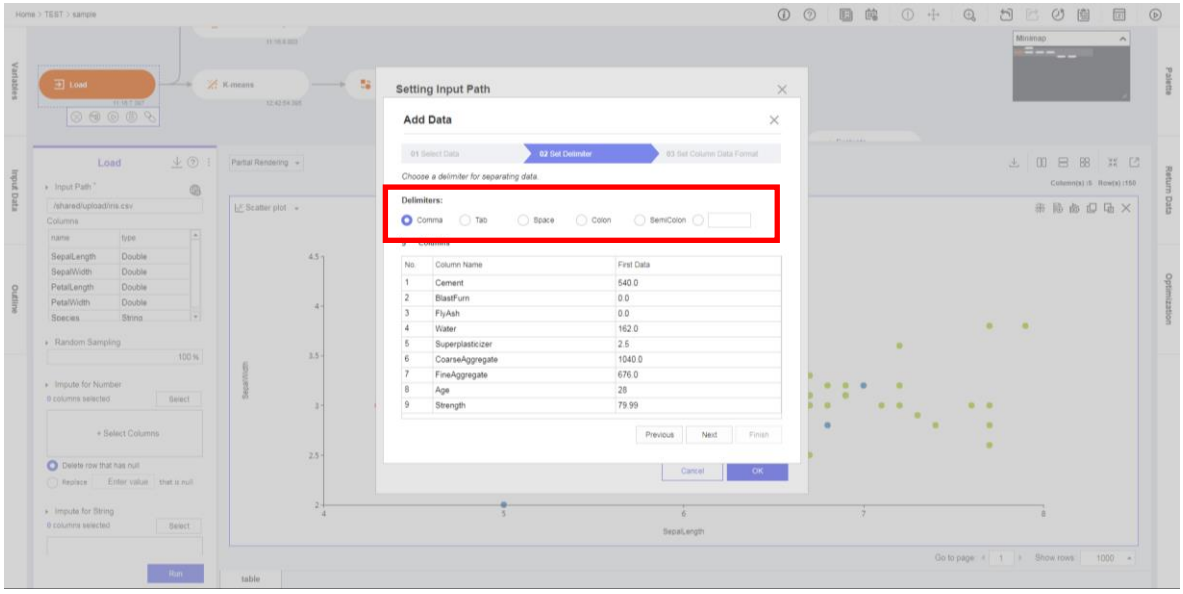


Figure 4-9 Set Delimiter

F. Click **Next** button and move to [Set Column Data Format] phase. You can change column type at [Set Column Data Format] phase.

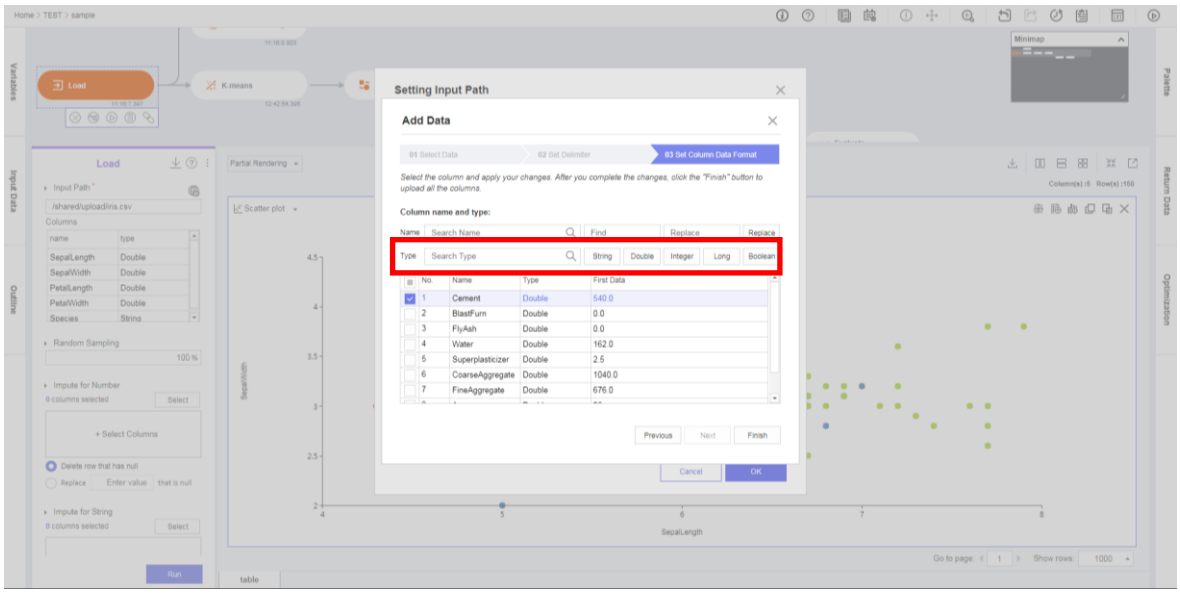


Figure 4-10 Set Column Data Format

G. If you click **Finish** button upon completion of the configuration, data is uploaded.

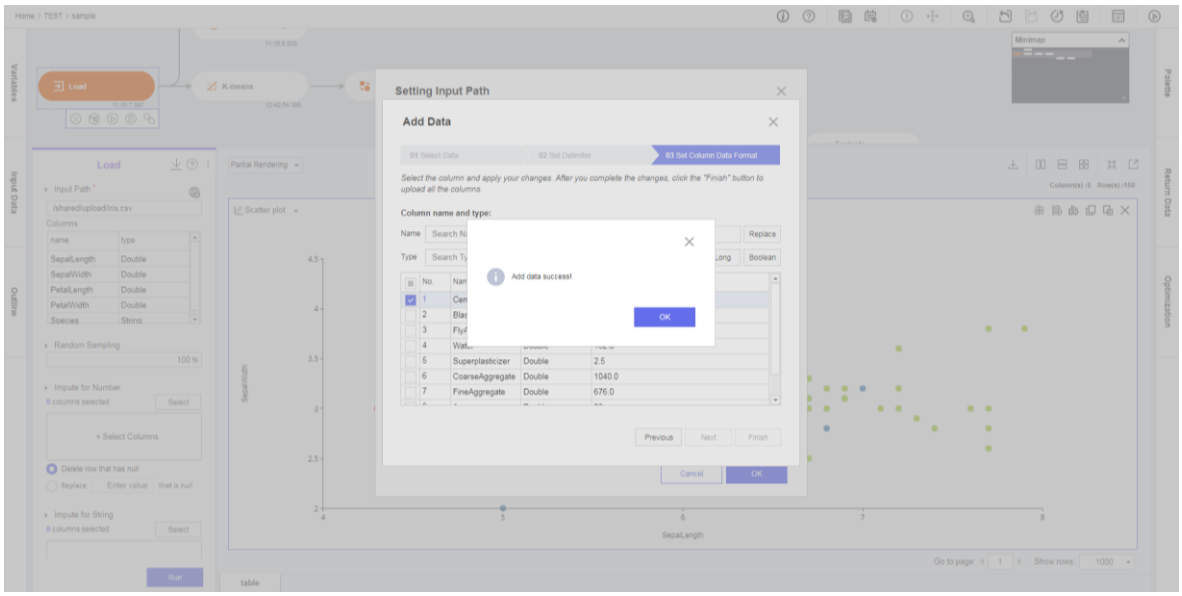


Figure 4-11 Data Upload Success

H. If you return to [Browse Repository] and view folders under Users, you will see the list of uploaded data. Click the data and **OK** button.

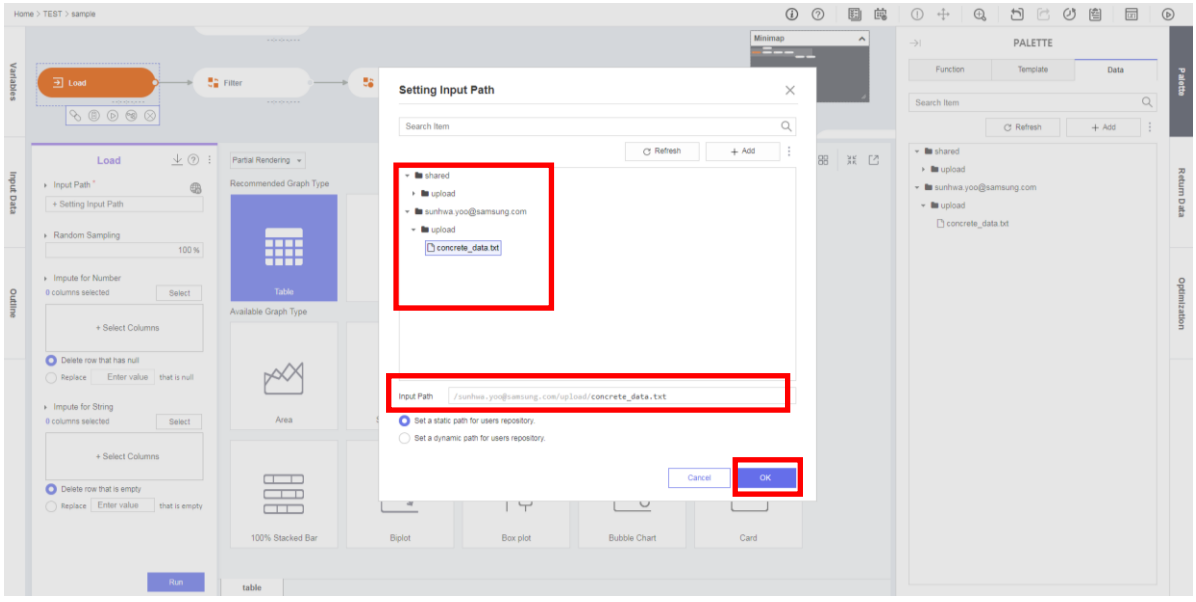


Figure 4-12 Select Data

I. If Column is properly represented, Click **Run** button to load data. If properly run, corresponding data will be shown at the right-side Out Data Panel.

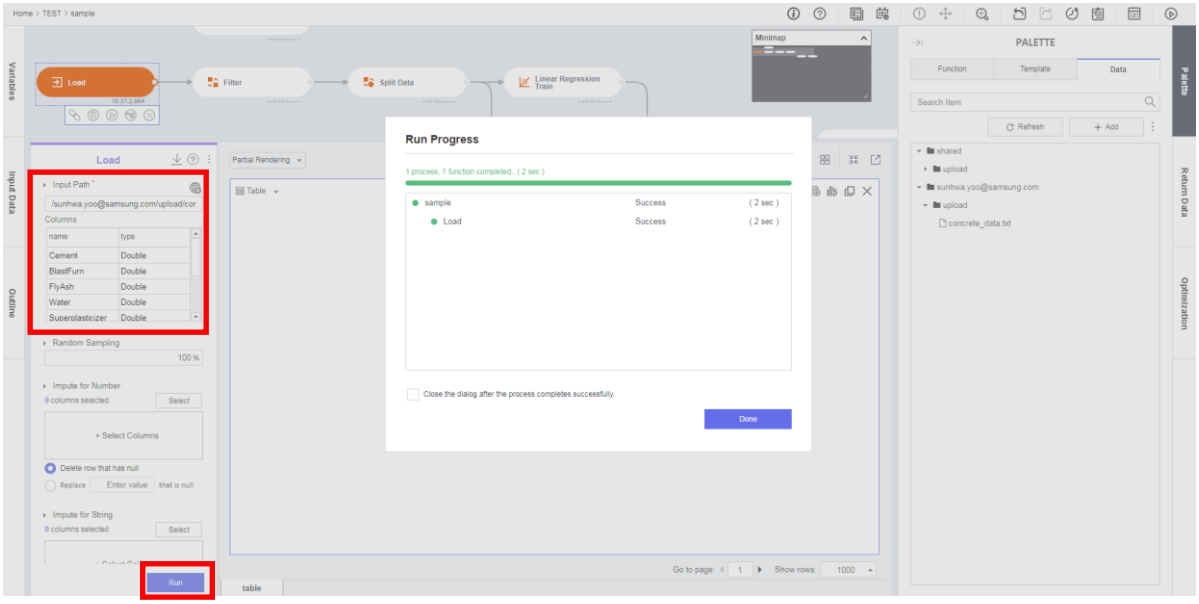


Figure 4-13 Run Load Function

4.4 Create and Execute Manipulation Function

A. Open right-sided [Palette View] and create Sort Function using Drag & Drop. If the function is created right behind Load Function, the two will be connected automatically. And if you select Sort Function, the output of the previous function will be shown as In(put) Data.

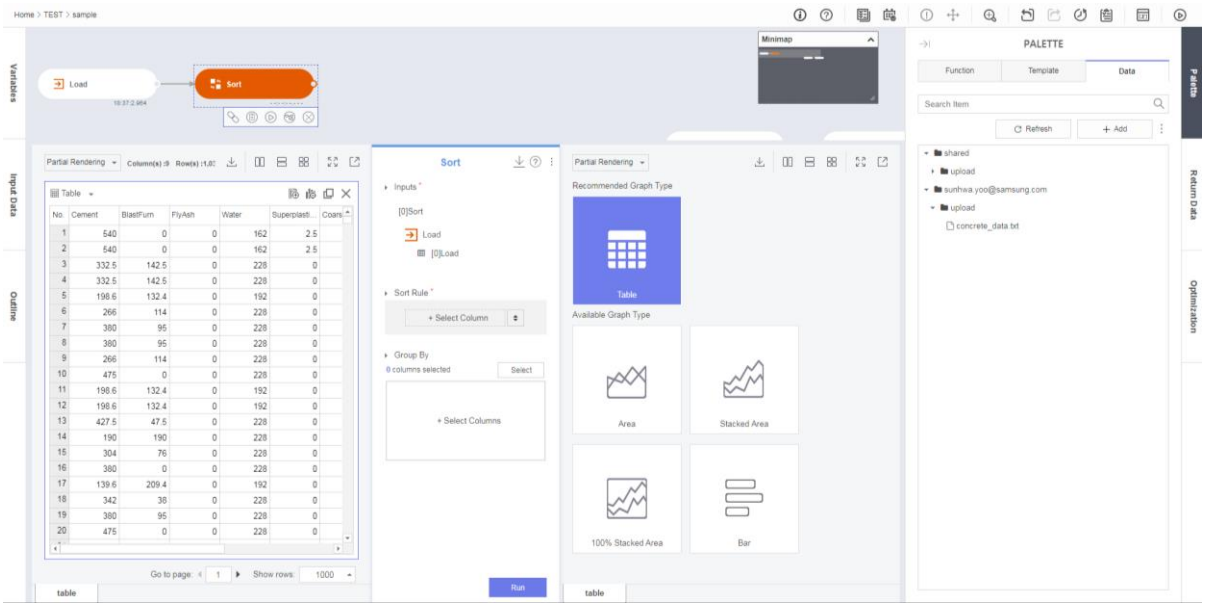


Figure 4-14 Create Sort Function

B. Click [**Select Column**] and select a column to align from Column list.

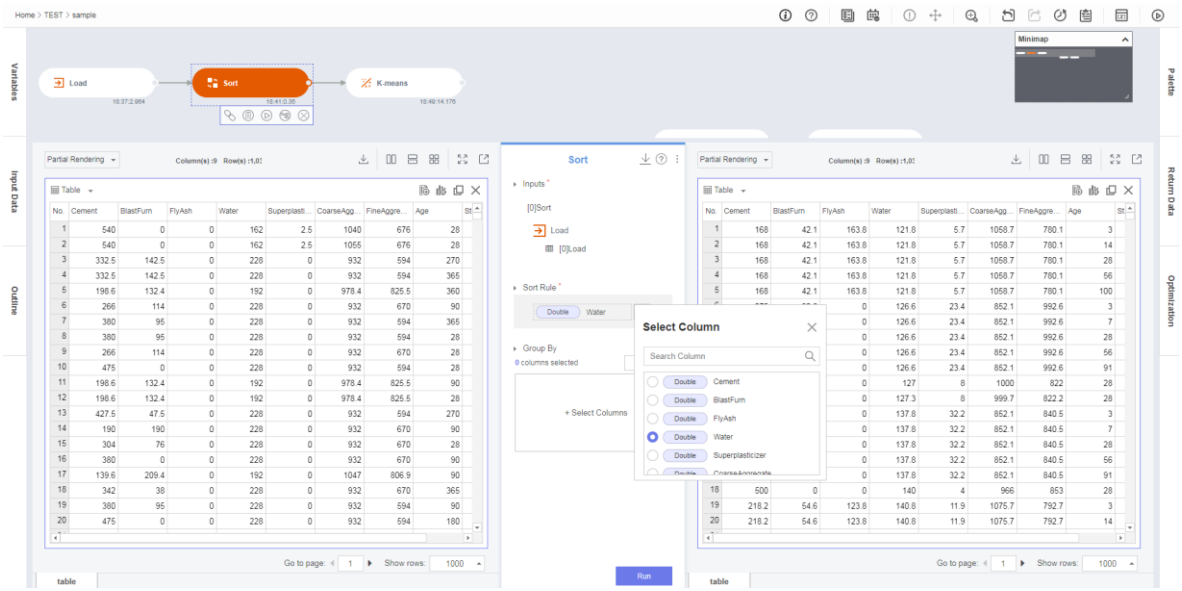


Figure 4-15 Select a Column to Align

C. Click **Run** button to run a function.

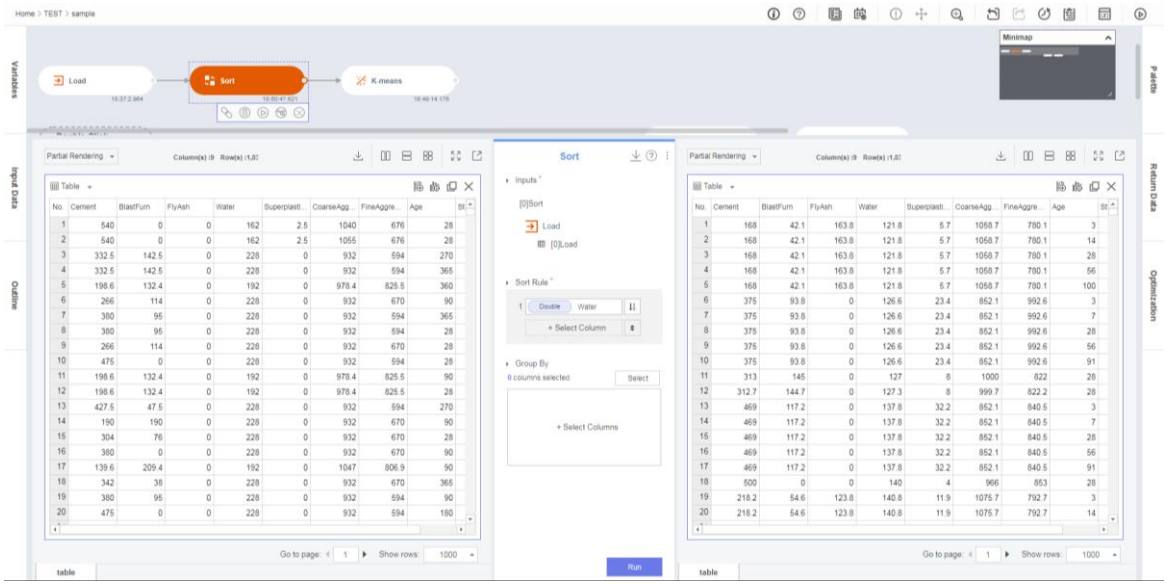


Figure 4-16 Alignment Result

4.5 Create an Analytics Function and Display a Result

A. Create K-means Function from [Palette] and select ‘Cement’ and ’Water’ for *Columns* Parameter. Define *Clusters* Parameter as ‘3’and click **Run** button.

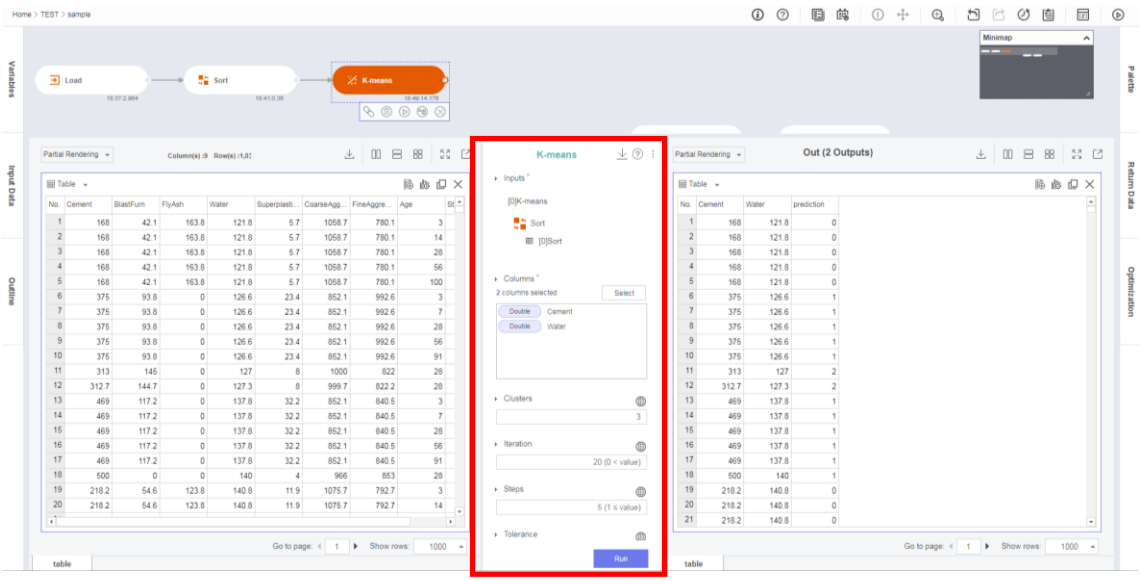


Figure 4-17 K-means Parameter Definition and Execution Result

B. Click button in [Out Data Panel] to enable Options widnow. If you select *Chart Type* and 'Scatter Plot' afterwards, Table will be changed into Chart.

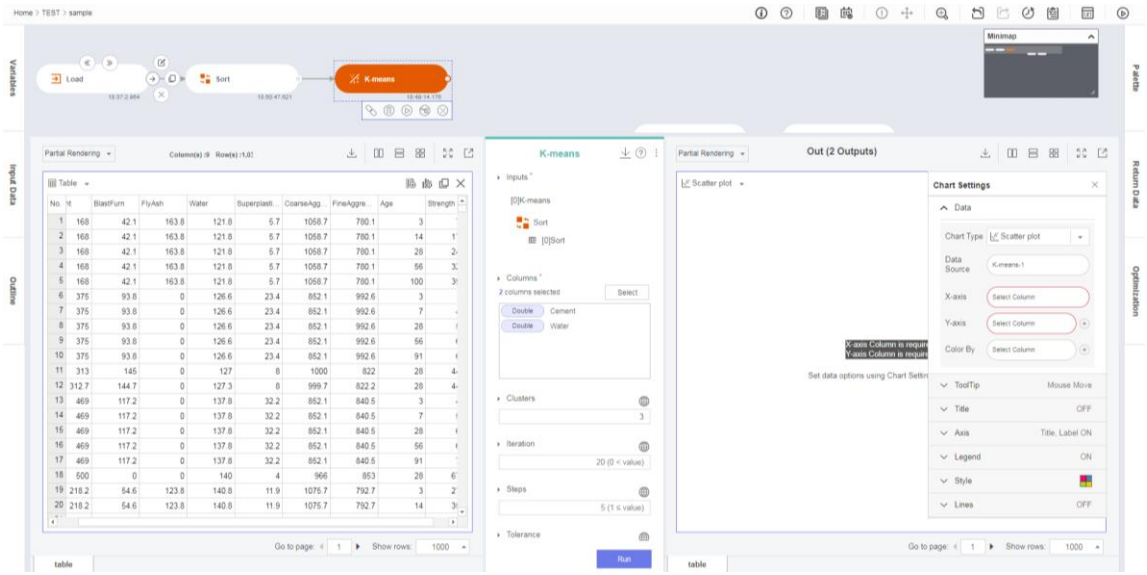


Figure 4-18 Change Chart Type

C. If you set *X-axis*, *Y-axis and Color By* as 'Cement','Water', and 'Prediction', respectively, you can see the clustering results in Scatter Chart.

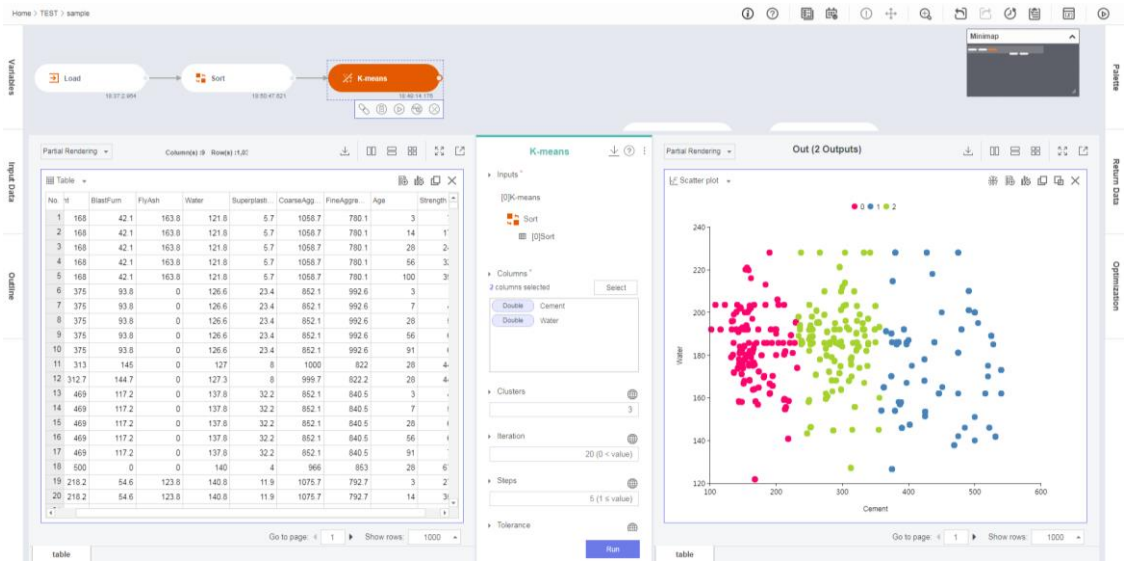


Figure 4-19 K-means Result

5 Tasks

This chapter describes how to use Brightics AI features.

- Section 5.1 Use Project View
- Section 5.2 Use Data Flow Model Editor
- Section 5.3 Use Script Model Editor
- Section 5.4 Use Deep Learning Model Editor
- Section 5.5 Use Report Editor
- Section 5.6 Use Management

5.1 Use Project View

Project View consists of [List] to see Project/Model list and [Menu] buttons to create, modify and remove a Project/Model.

5.1.1 Create a Project

A. Click + from Project View.

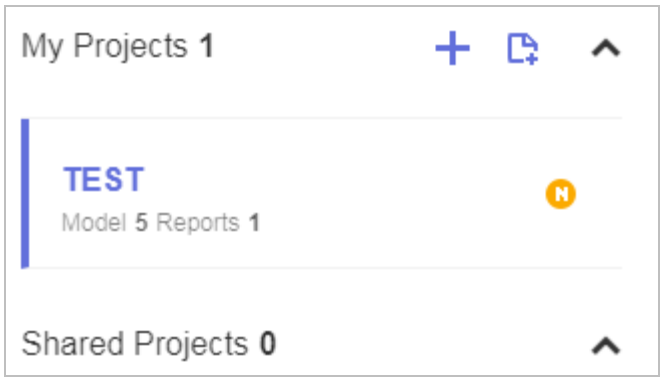


Figure 5-1 Project

B. Enter a *Name* in [Create Project] window and click the **OK** button.

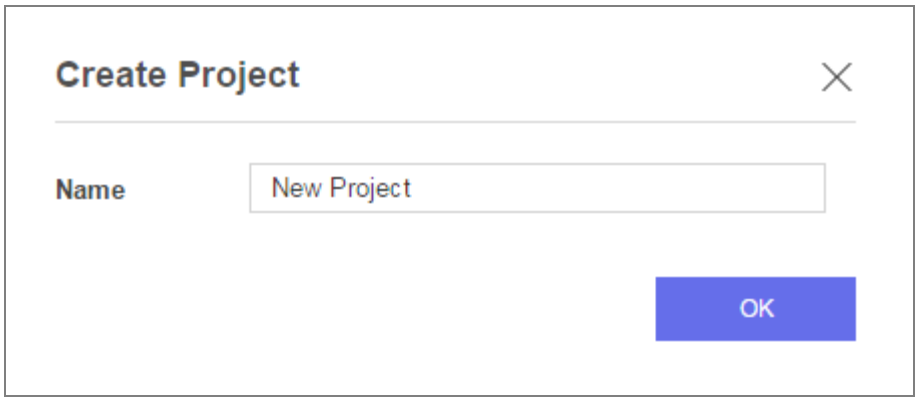


Figure 5-2 Create Project

C. Project List shows the project that you have entered.

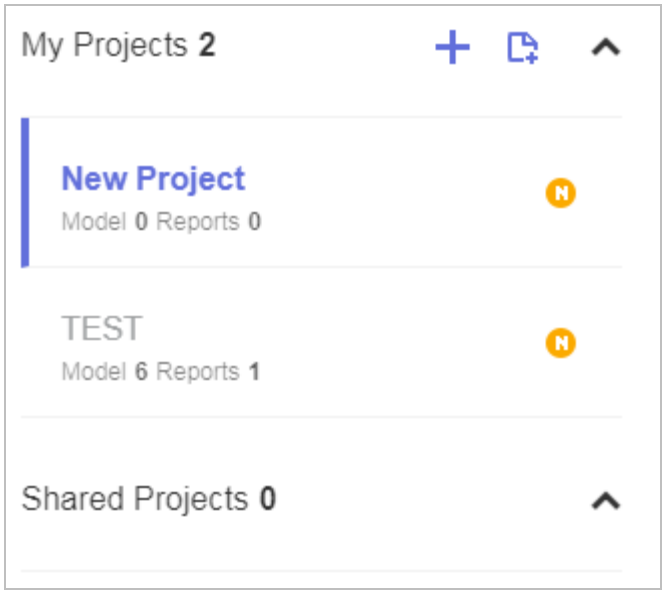


Figure 5-3 Project List after Creation

5.1.2 Modify a Project Name

A. Click button at the top right-hand side of [Project] window, select **Edit** button to enter a new *Name* for modification, and click the **OK** button.

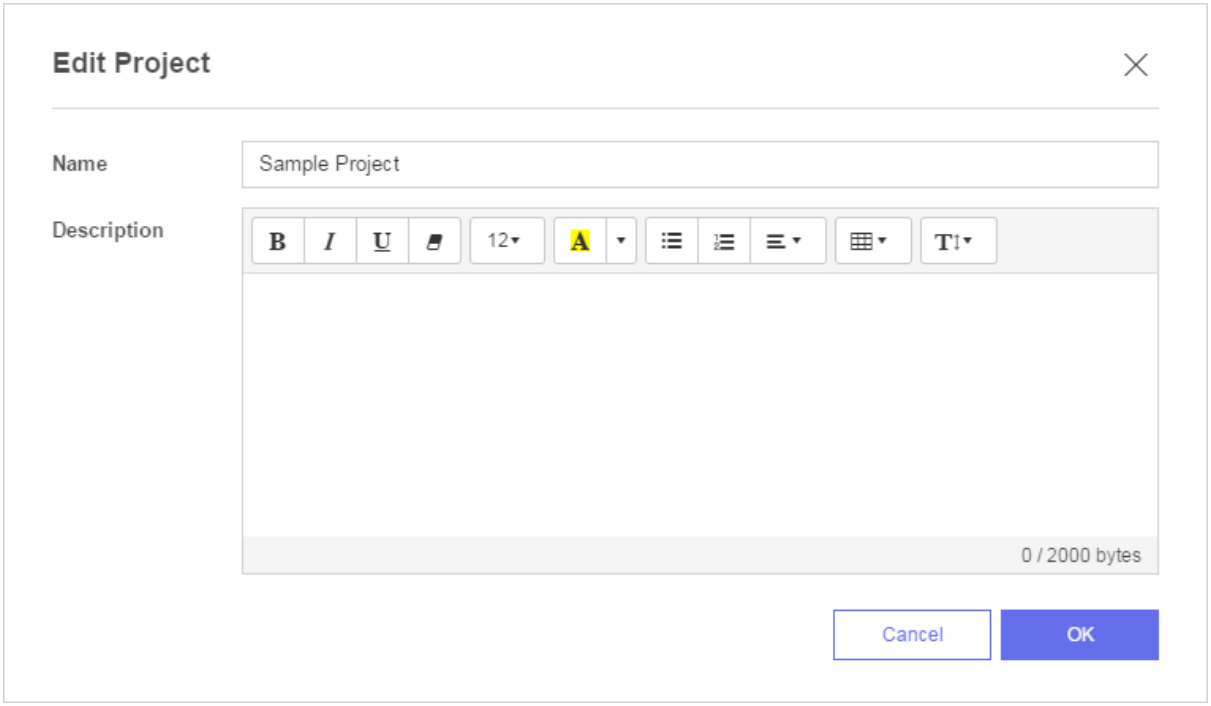


Figure 5-4 Edit Project

B. Project List shows a modified project name.

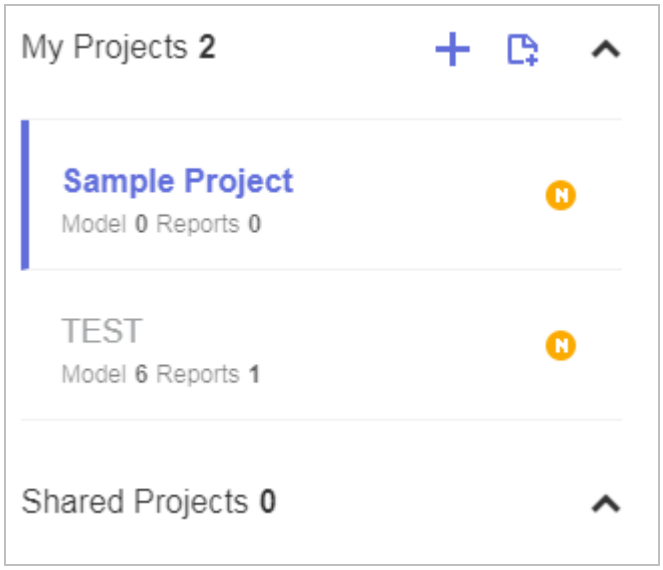


Figure 5-5 Project List after Modification

5.1.3 Delete a Project

A. Click button at the top right-hand side of [Project] window and select **Delete.**

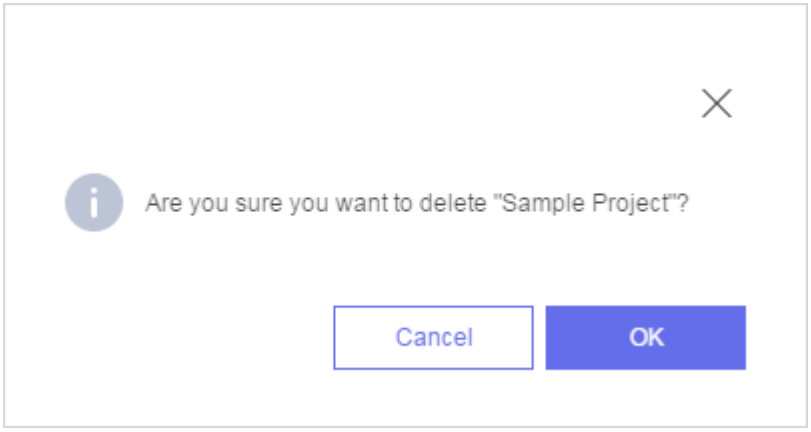


Figure 5-6 Delete Project

B. Click the **OK** button to delete the Project.

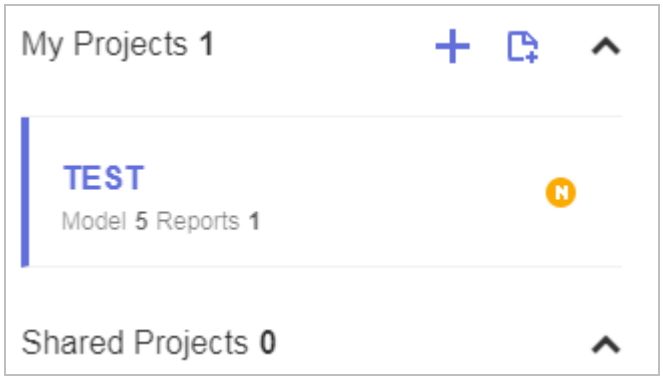


Figure 5-7 Project List after Deletion

5.1.4 Create an Analytics Model

A. Click button from Project View.

B. Select a model type, enter a *Name,* and click the **OK** button.

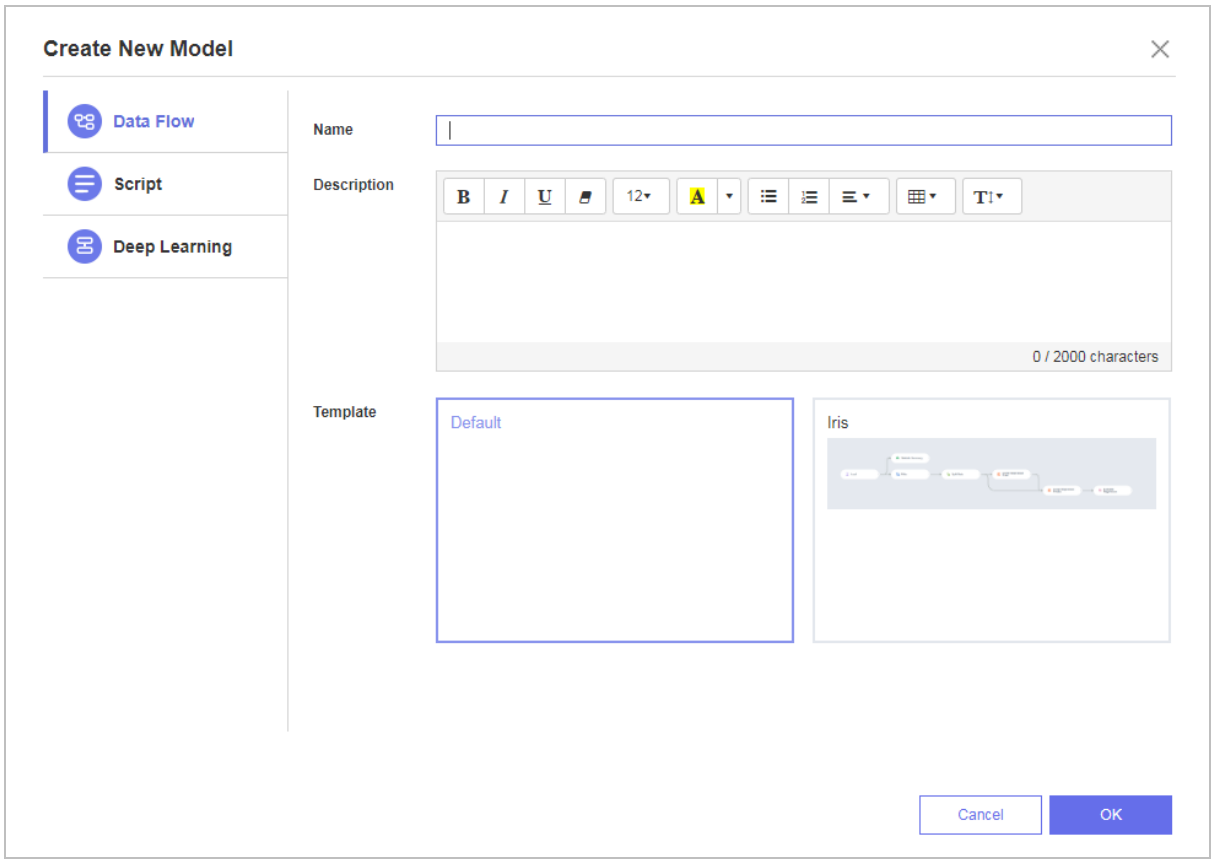


Figure 5-8 Create New Model

C. An analytics model is created based on the data you've entered, and the window is changed to Model Editor.

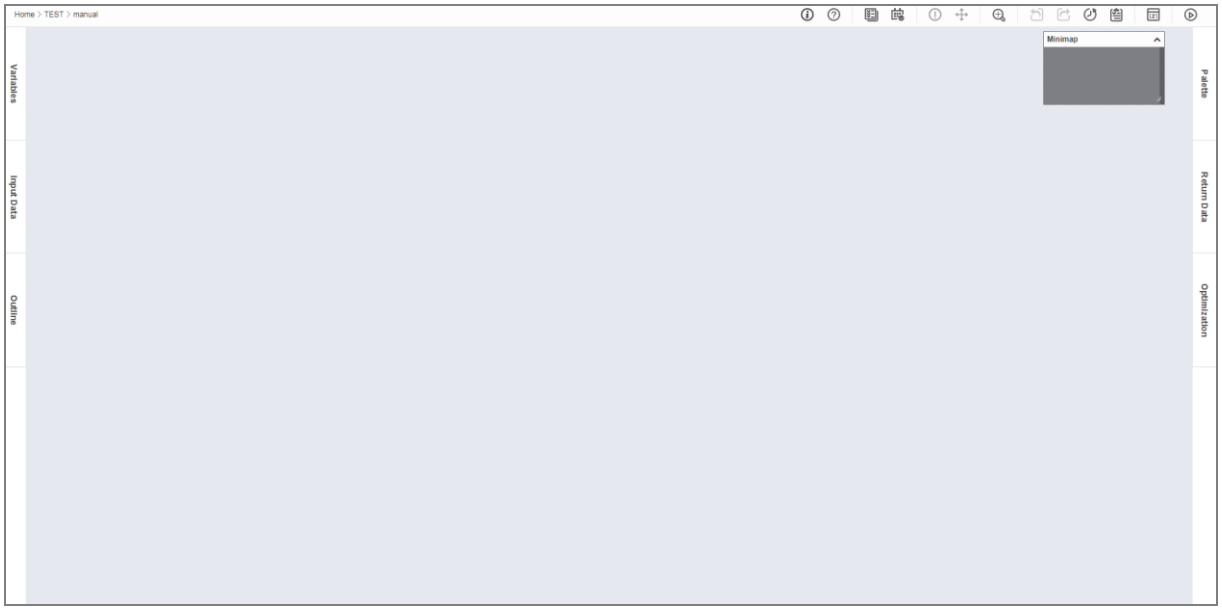


Figure 5-9 Screen after Model Creation

5.1.5 Modify an Analytics Model

A. Among analytics models displayed in [Project], click Menu at the top right-hand side of the model you want to modify, and select **Edit.**

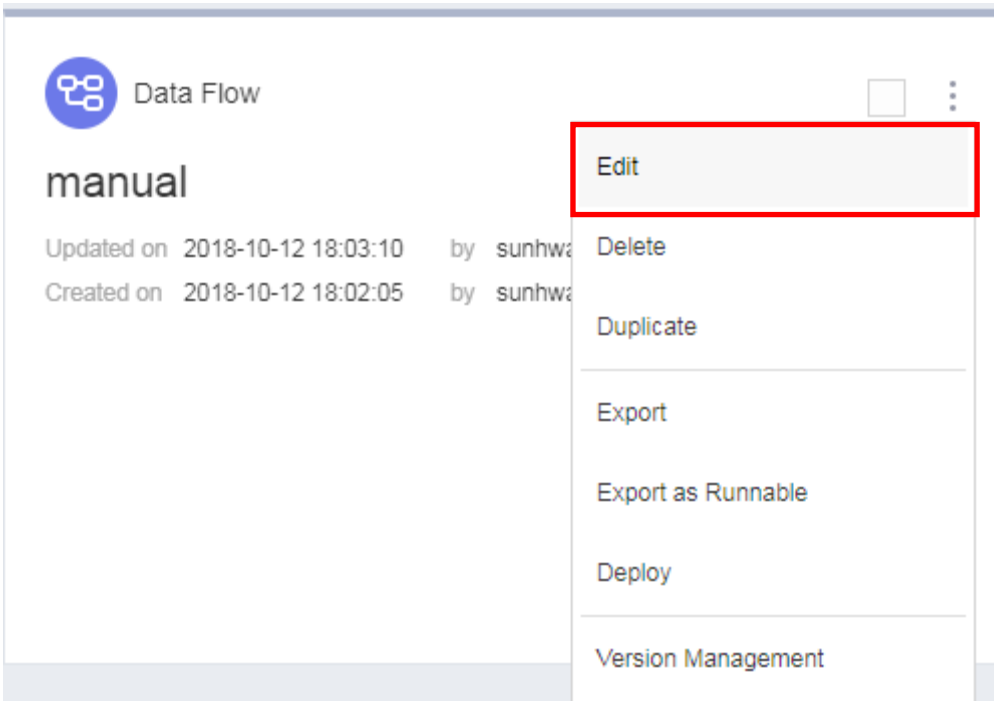


Figure 5-10 Menu at the Top Right-hand Side of an Analytics Model – Edit

B. Enter a new *Name* for modification and click the **OK**.

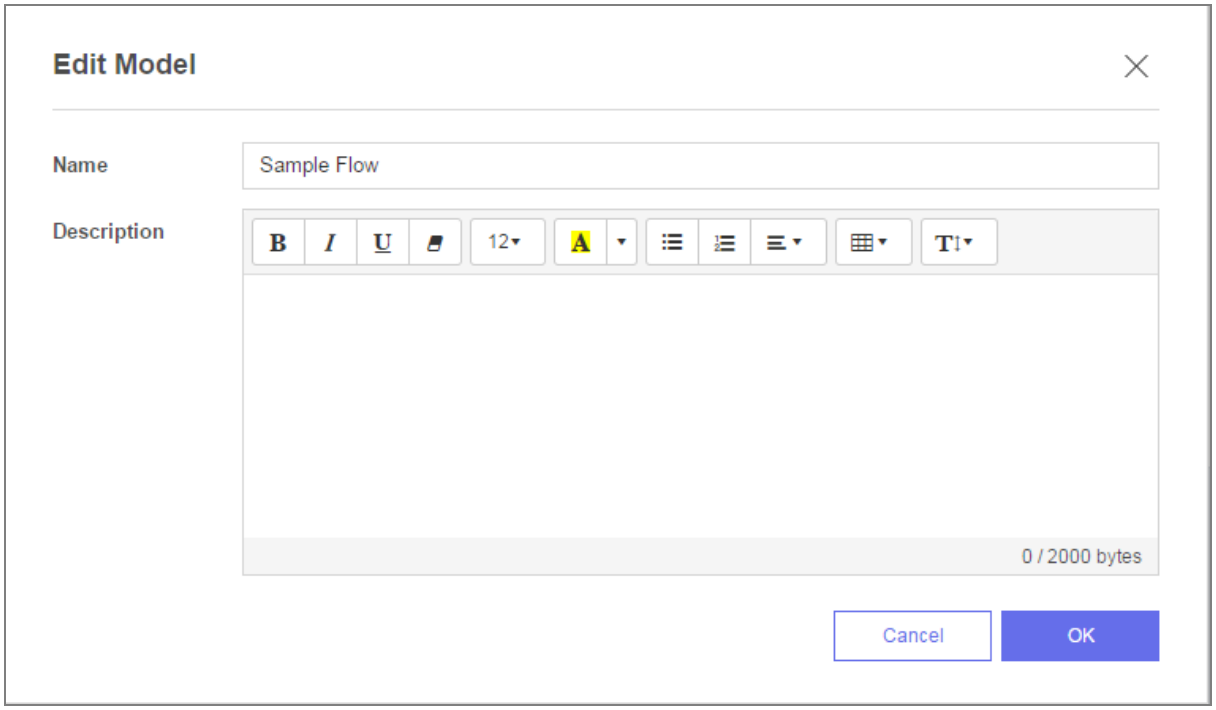


Figure 5-11 Edit Model

C. [Project] window shows the Model Name has changed.

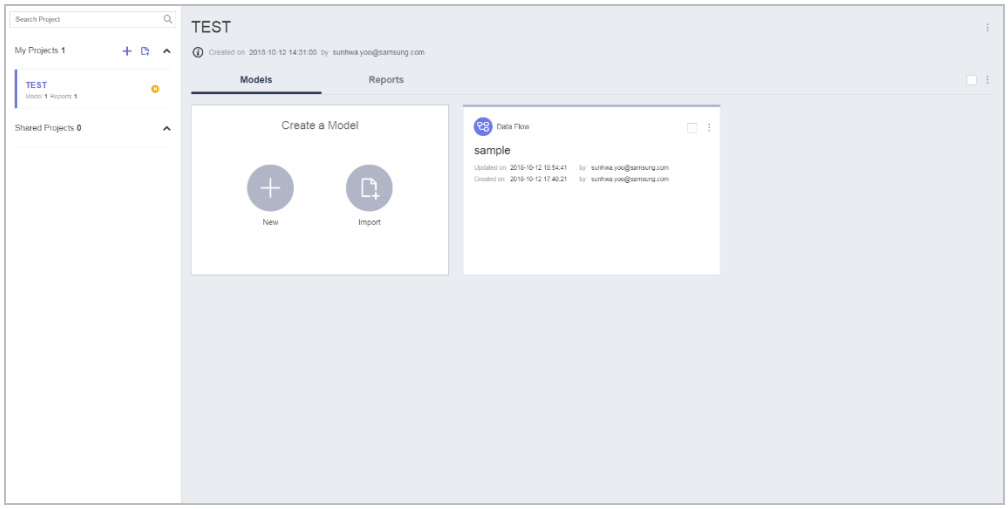


Figure 5-12 Model Name has Changed

5.1.6 Delete an Analytics Model

A. Among the analytics models displayed in [Project], click Menu at the top right-hand side of the model you want to delete and select **Delete.**

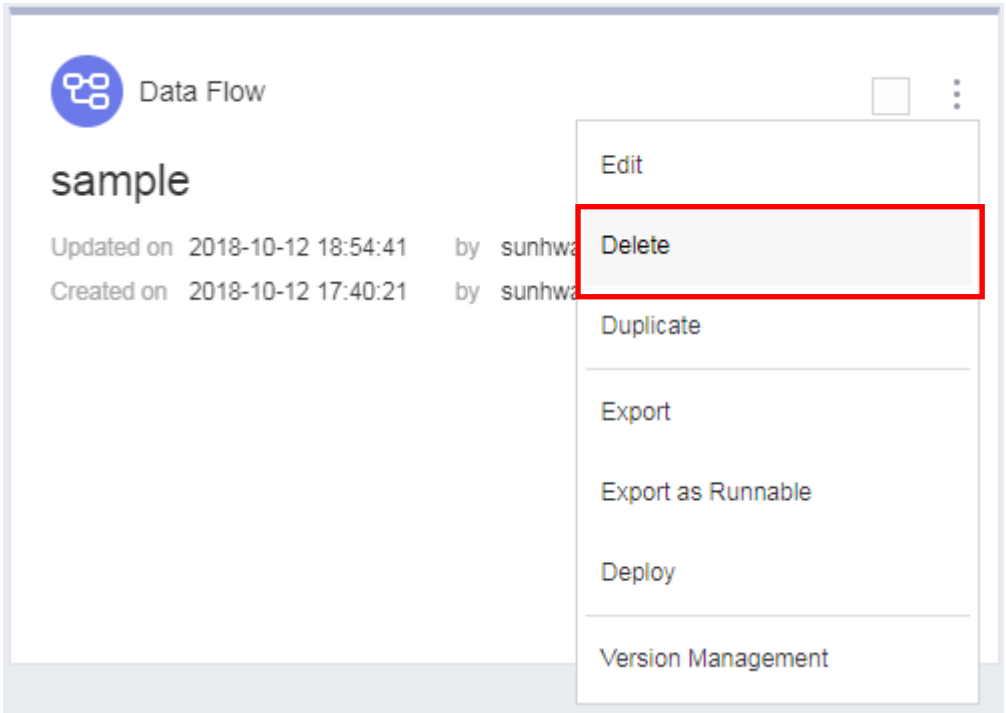


Figure 5-13 Menu at the Top Right-hand Side of an Analytics Model – Delete

B. Click the **OK** button when [Confirm Delete] window appears.

C. View [Project] to check the analytics model has been deleted.

5.1.7 Export Report

A. Edit icon at the top right hand side of Report window – Click Export.

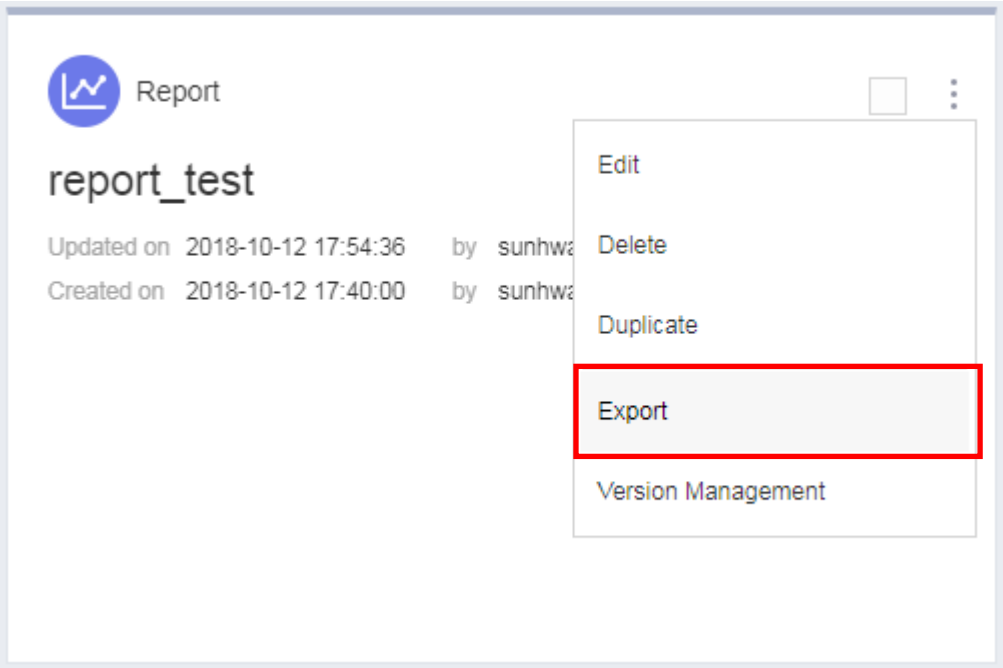


Figure 5-14 Menu at the Top Right of Report- Export

When you click Export, [Confirm] window appears asking you whether you wish to export even the model that contains the data used in the report. When it is checked, the report as well as the corresponding model is exported. When it is unchecked, only the report is exported. In that case, a message is displayed indicating that the column which corresponds to a chart drawn based on the data in the corresponding report cannot be found. Therefore if you wish to keep the chart of the report as it is, you should keep the report and model checked by default so that both the report and model can be exported.

B. Click the **OK** button in [Confirm] window.

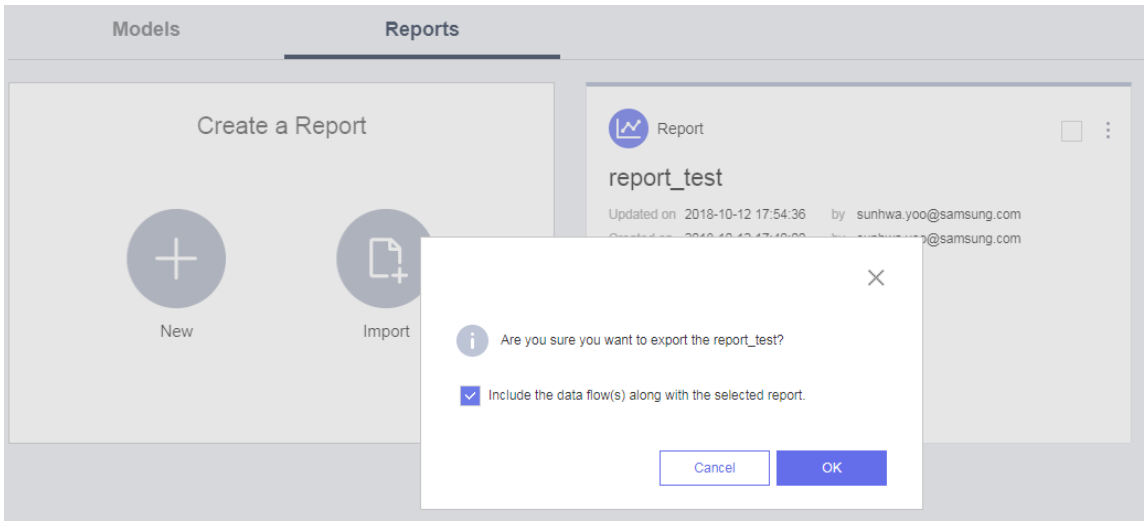


Figure 5-15 OK Button in [Confirm] Window

If you click the OK button, .json file which the corresponding report has been exported to is created in Local.

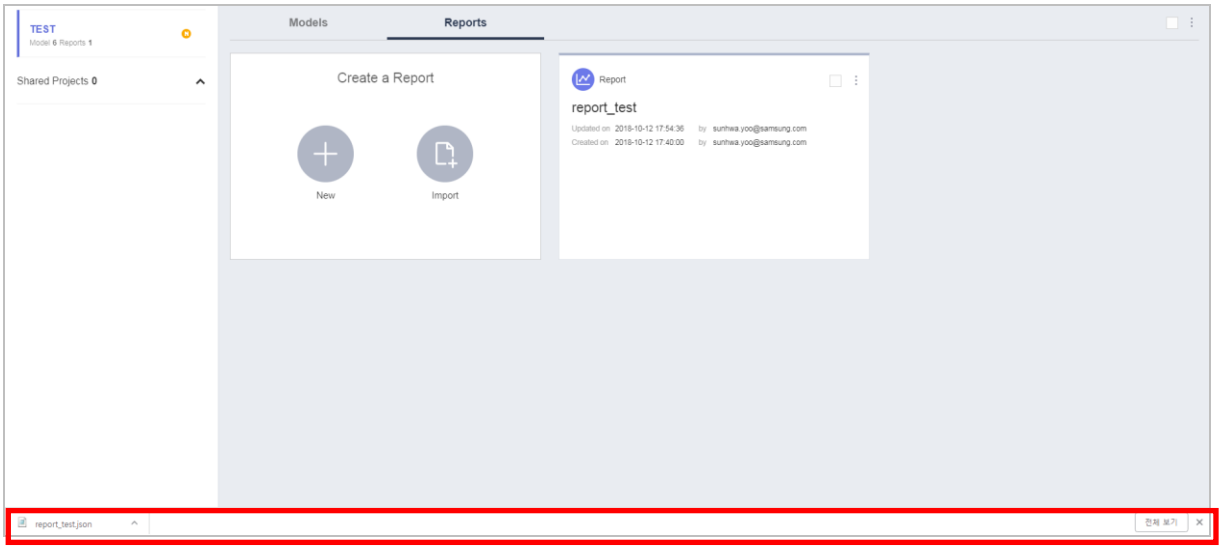


Figure 5-16 Export Report

5.1.8 Export an Analytics Model

A. Among the analytics models displayed in [Project], click Menu at the top right-hand side of the model you want to export and then select **Export.**

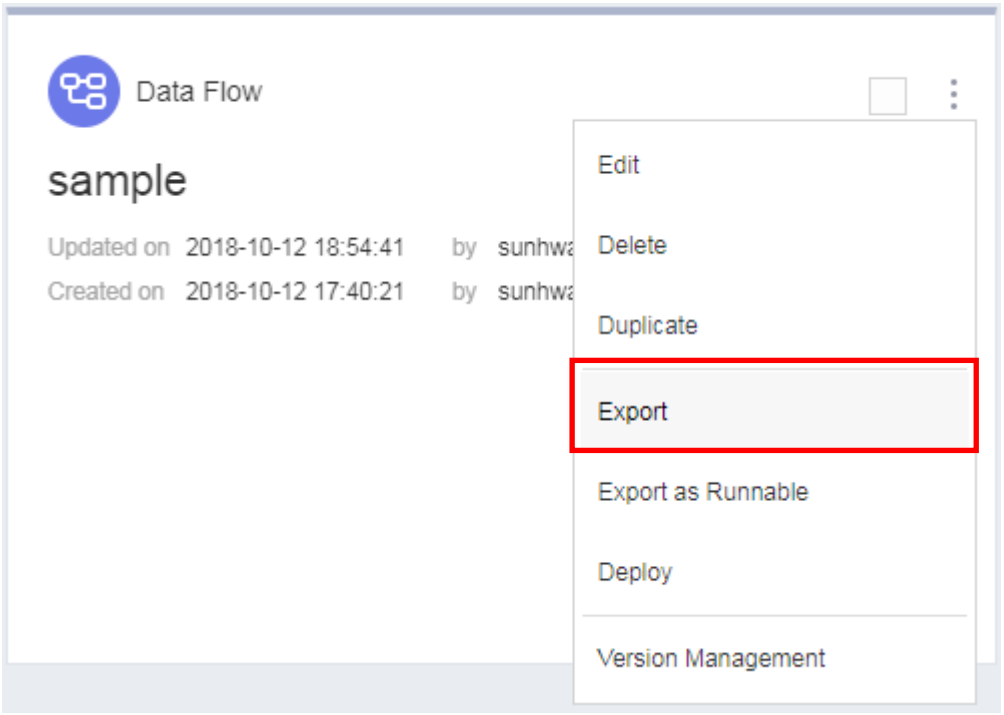


Figure 5-17 Menu at the Top Right of an Analytics Model – Export

B. Json file is created under the name of an analytics model and exported to Local.

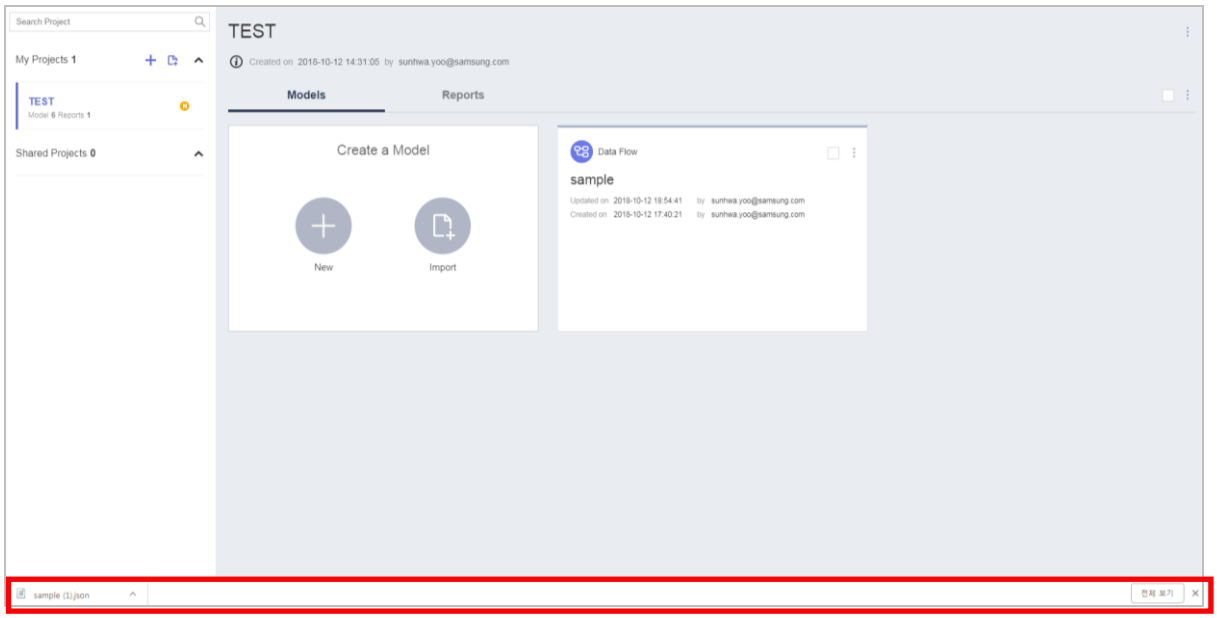


Figure 5-18 Json File has been Exported

5.1.9 Deploy an Analytics Model

A. Among the analytics models displayed in [Project], click Menu at the top right-hand side of the model you want to deploy and then select **Deploy**.

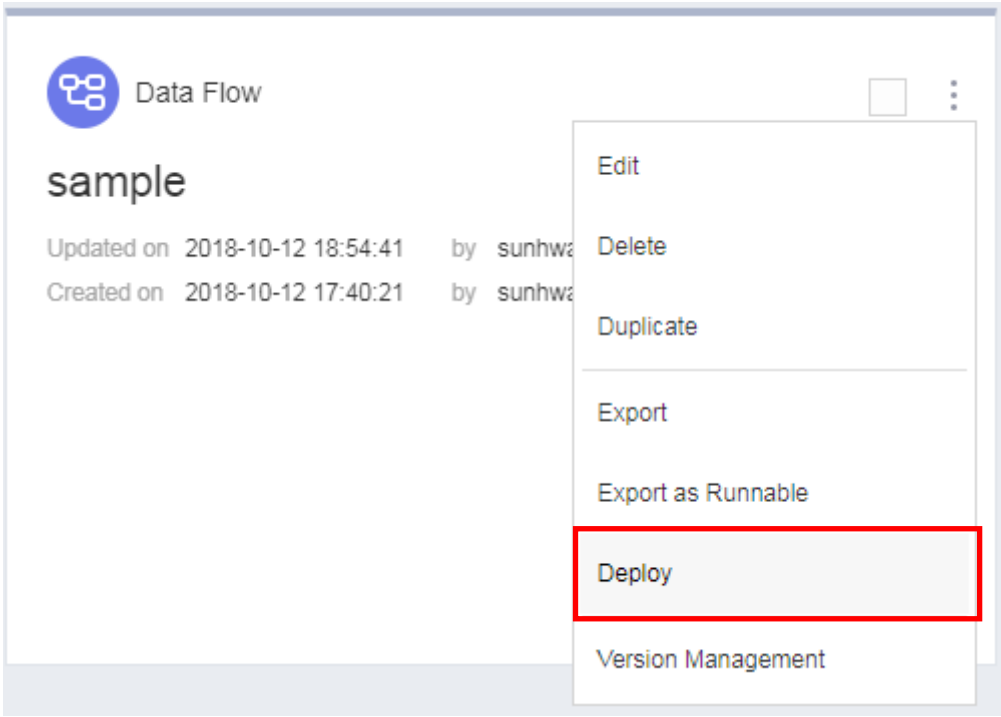


Figure 5-19 Menu at the Top Right of an Analytics Model – Deploy

B. Select Deploy Target Server, enter *Name* and *Description*, and click the **OK** button.

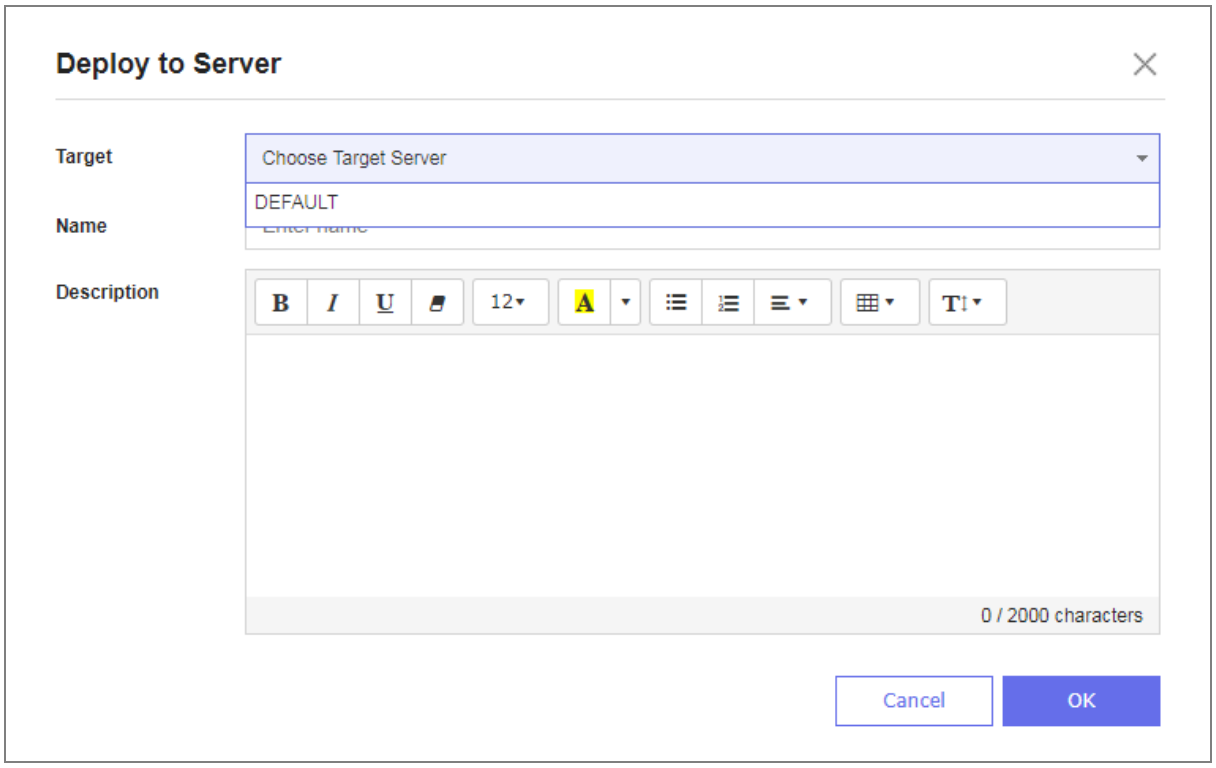


Figure 5-20 Deploy Target Server has been Selected

C. When Deploy runs normally, the content that was deployed is represented as Dialog. A user can use Deploy ID to run the analytics model that was deployed.

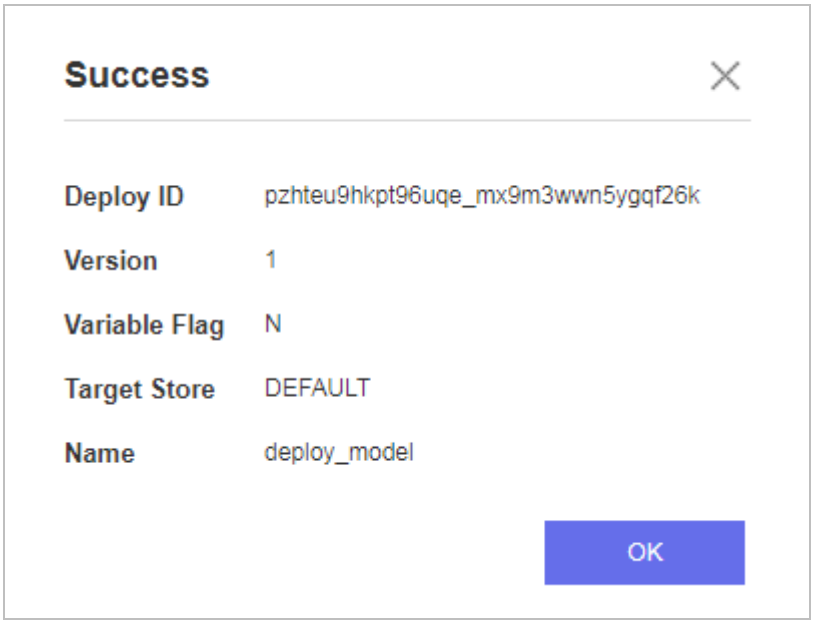


Figure 5-21 Deploy Success

5.1.10 Export an Analytics Model as Runnable

A. Among the analytics models displayed in [Project], click Menu at the top right-hand of the model you want to export and then select **Export as Runnable.**

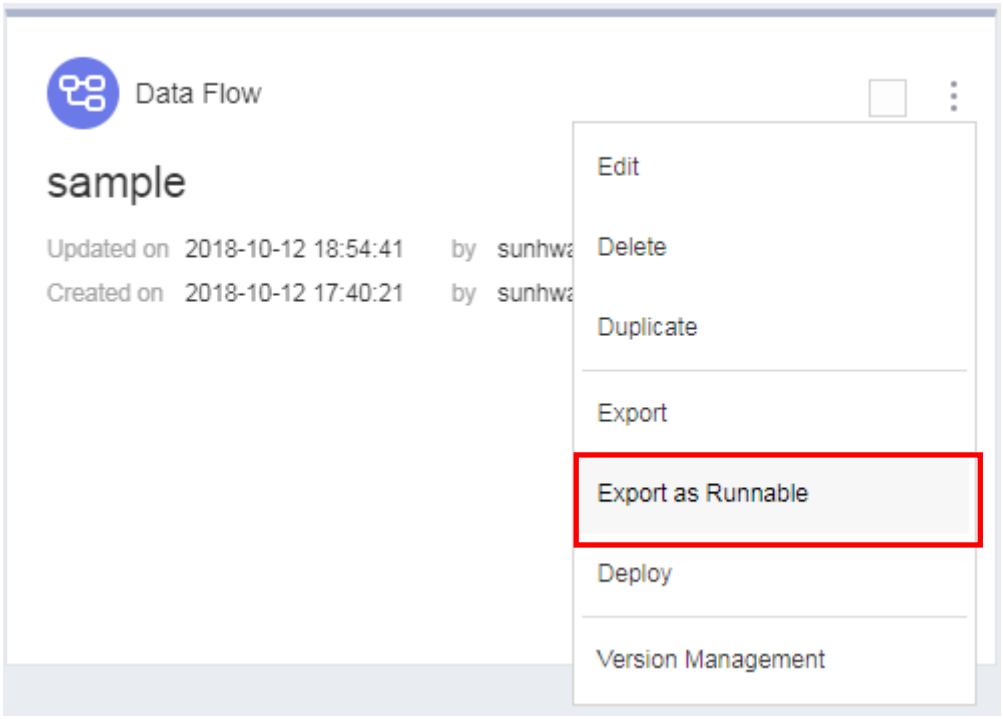


Figure 5-22 Menu at the Top Right of an Analytics Model –Export as Runnable

B. Json file is created under the name of an analytics model and exported to Local.

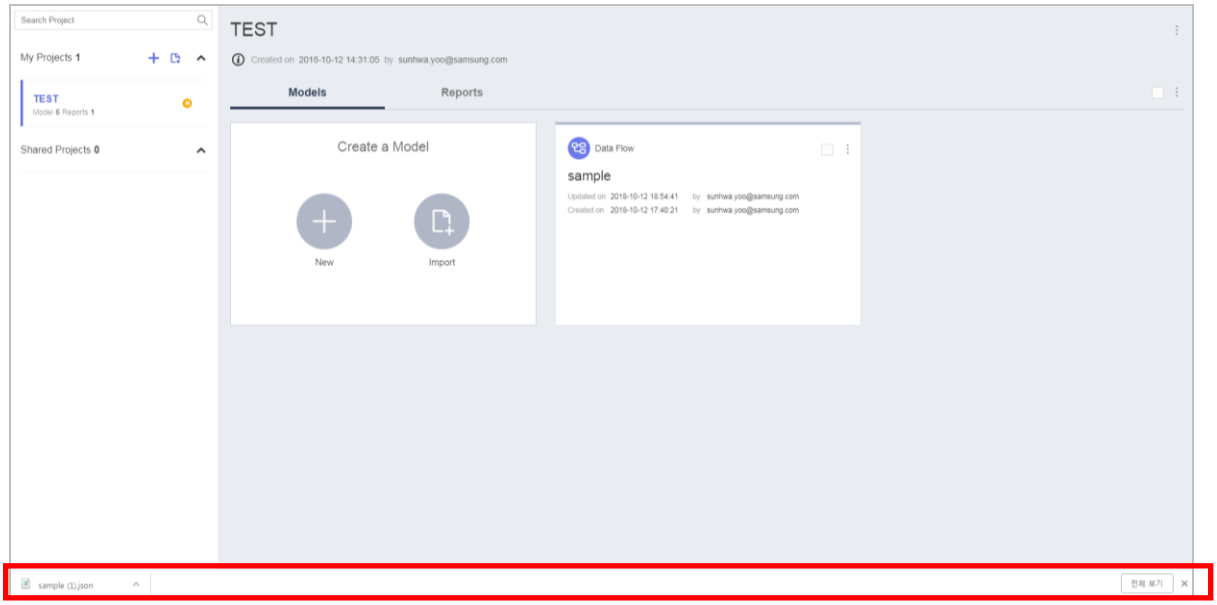


Figure 5-23 Json File has been Exported

Note	Export/Export as Runnable/Deploy menu are availably ONLY for particular analytics model types, and may be invisible depending on the user's privilege.

5.1.11 Open an Analytics Model

A. Mouse over an analytics model in [Project] you want to open and click **Open** button when it appears.

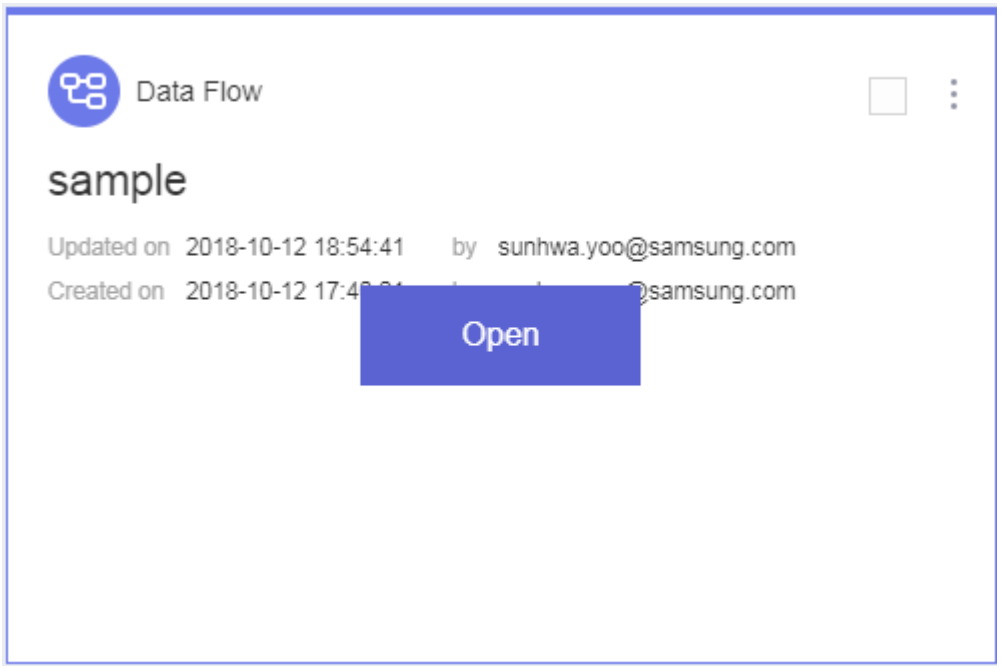


Figure 5-24 Open Model

B. The selected analytics model is opened, and the screen is switched to Model Editor.

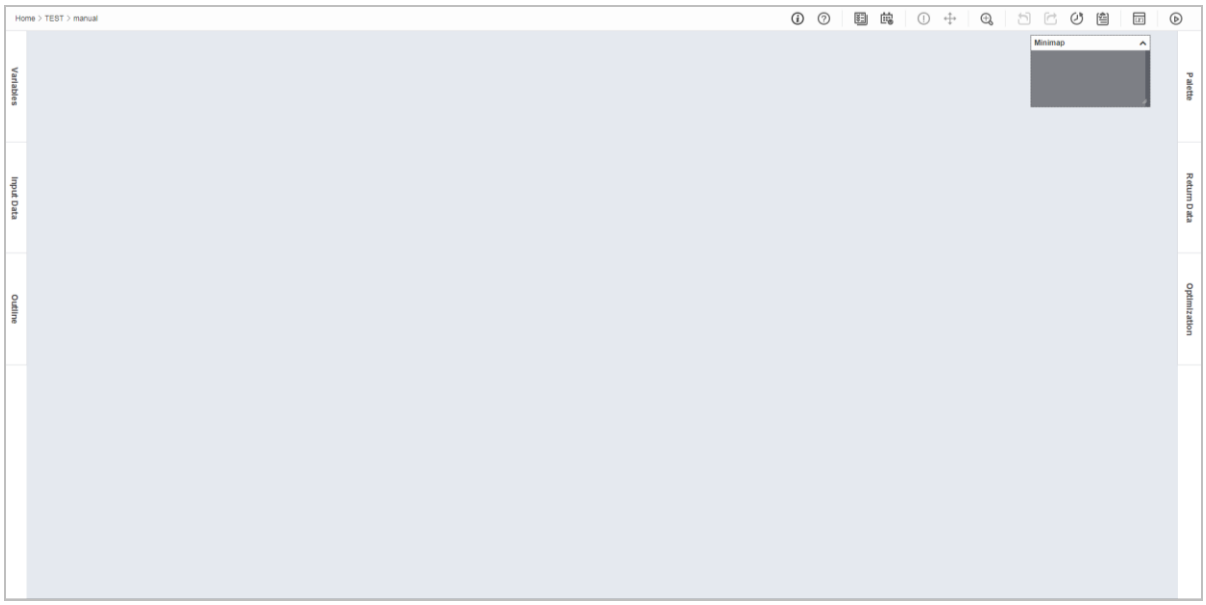


Figure 5-25 Analytics Model has been Opened

5.1.12 Select Multiple Analytics Models

A. Select the desired analytics model from Model List, or select all analytics models using the button at the top right-hand side of the Model List.

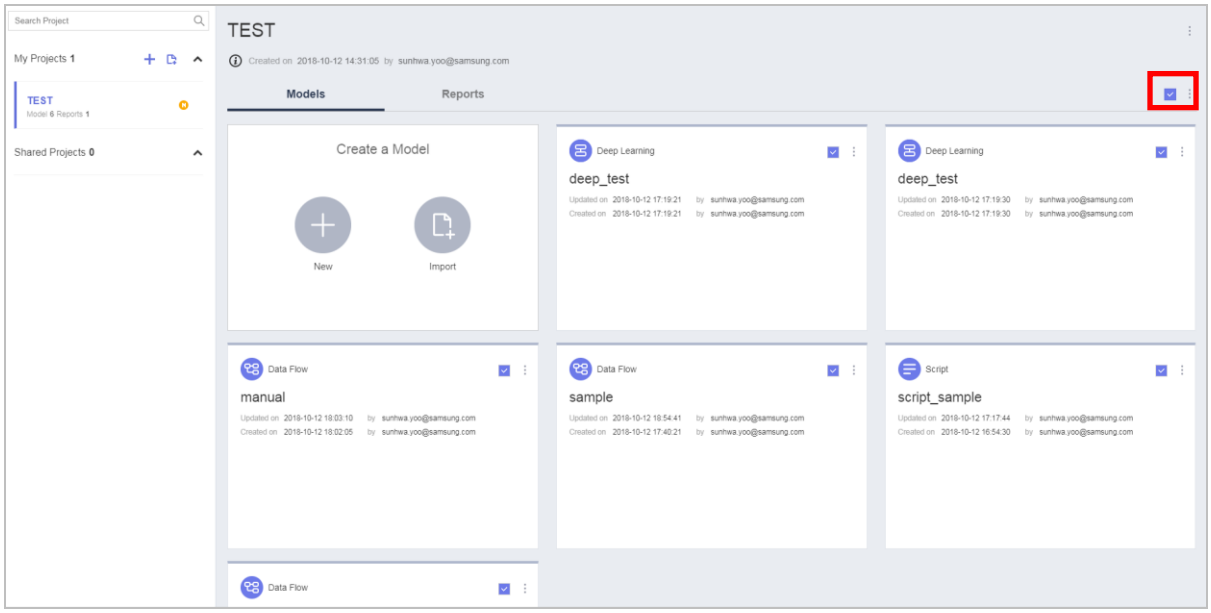


Figure 5-26 Multiple Analytics Model Selection

B. You can either delete or export the selected models using the menu at the top right-hand side of the Model List.

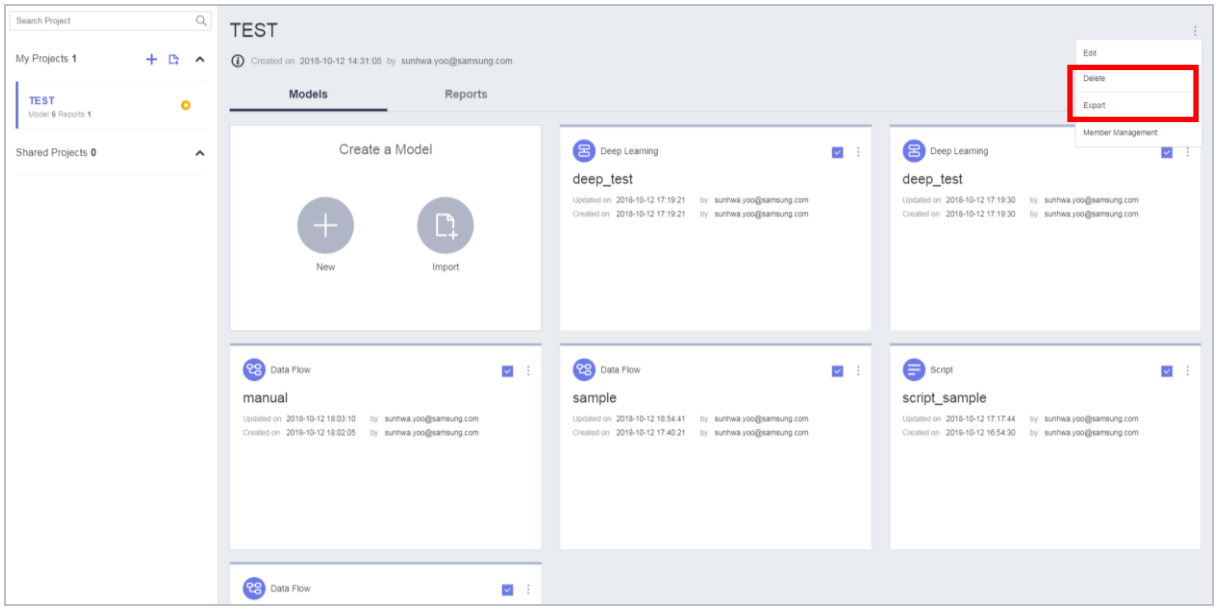


Figure 5-27 Analytics Model Multiple Selection – Delete/Export

5.1.13 Analytics Model Detail Dialog

If you create a model and click Model Information icon at the top right-hand side of the screen, detailed information on the current model is displayed.

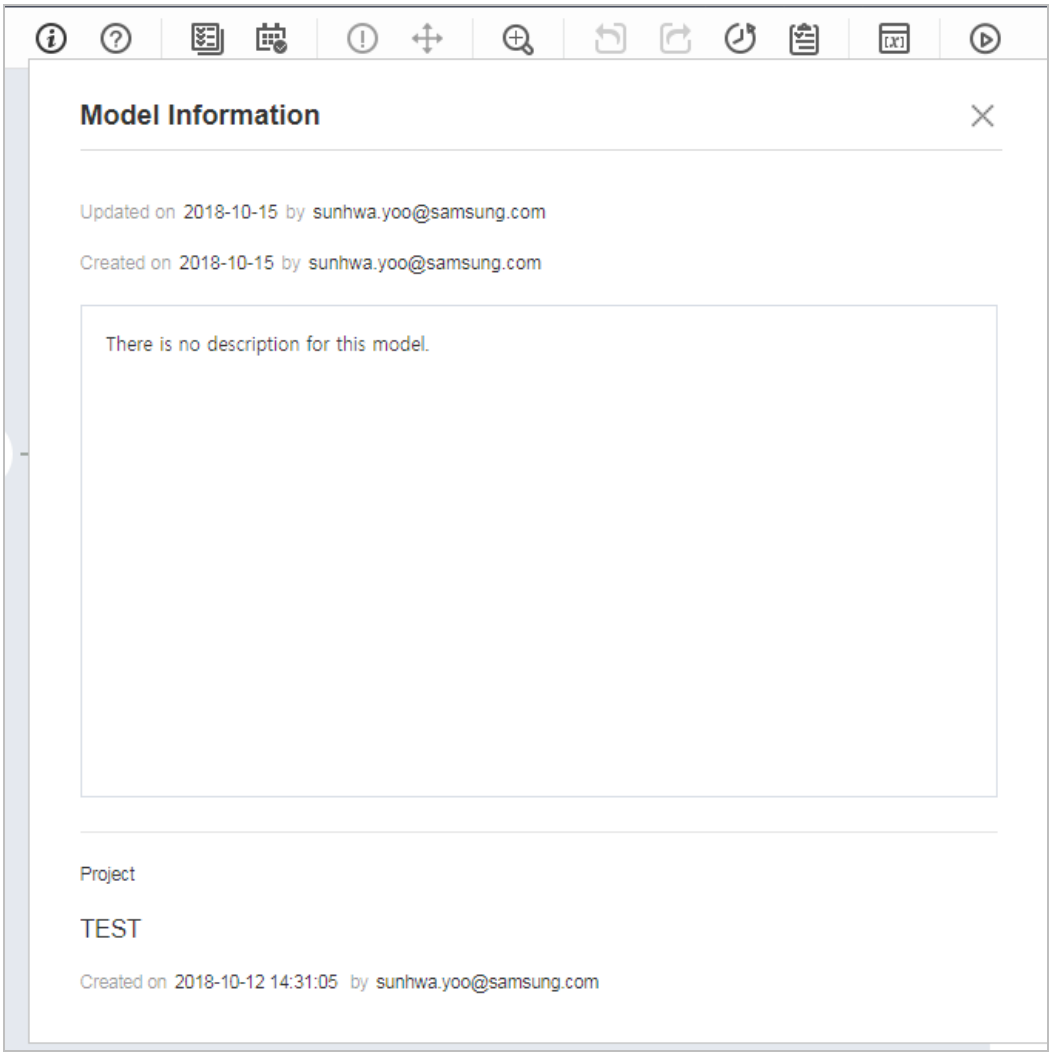


Figure 5-28 Analytics Model Detail Dialog

5.1.14 Manage Analytics Model Version

This is a feature to store interim models created through modeling in analytics model as history (or backup). The version, once created, cannot be directly modified, but it can be indirectly modified by way of loading the version for modification, or re-registering the version. The model registered here is used in Schedule feature/flow function.

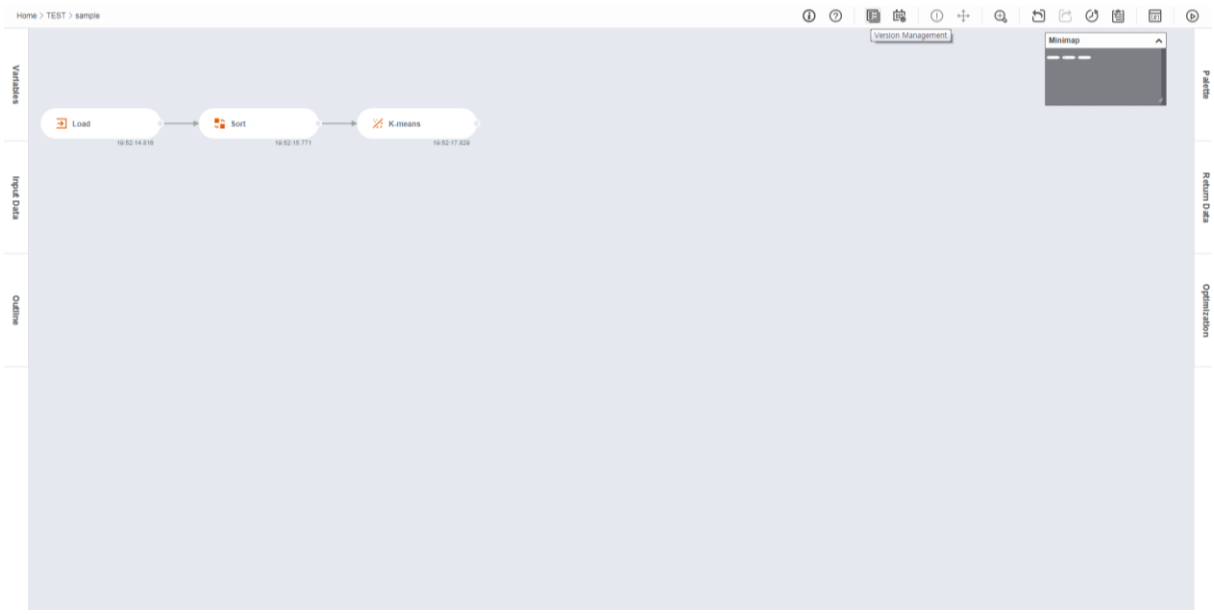


Figure 5-29 Analytics Model Toolbar – Version Management

If you click Version Management icon in Toolbar, a list of current model versions is displayed. For a model whose version has not been created, the following screen is shown, and for a model whose version has been created, a list of registered versions is shown.

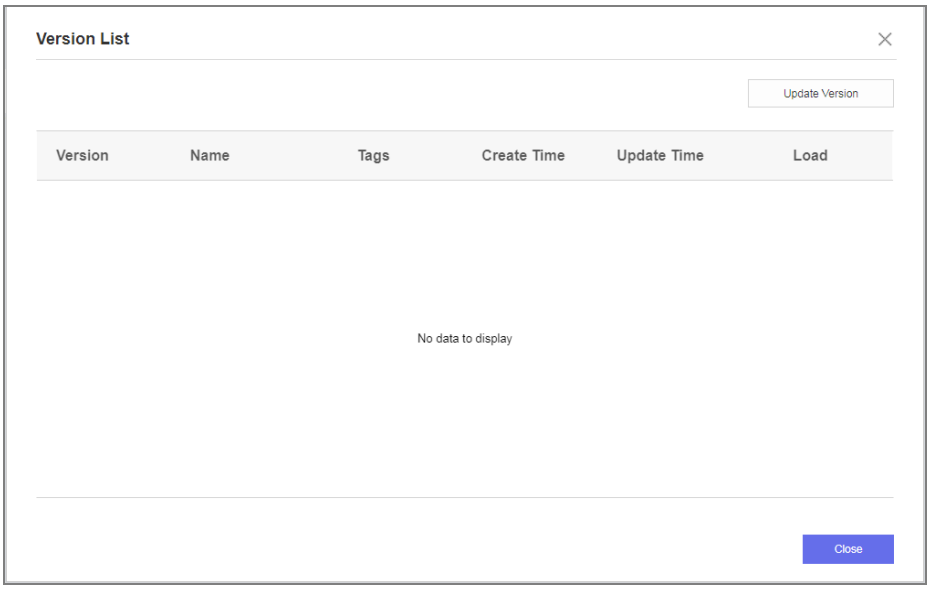


Figure 5-30 Analytics Model Version List

If you click Update Version button from Version List window, Update Version window is created as below. In this window, current model is registered under the categories of Major/Minor version up. When
the model is Major, it is registered as x.y -> x+1.0, and when the model is Minor, it is registered as x.y -> x.y+1. You can register version name, description, tag, etc. (model whose version has not been registered before is 0.0 version)

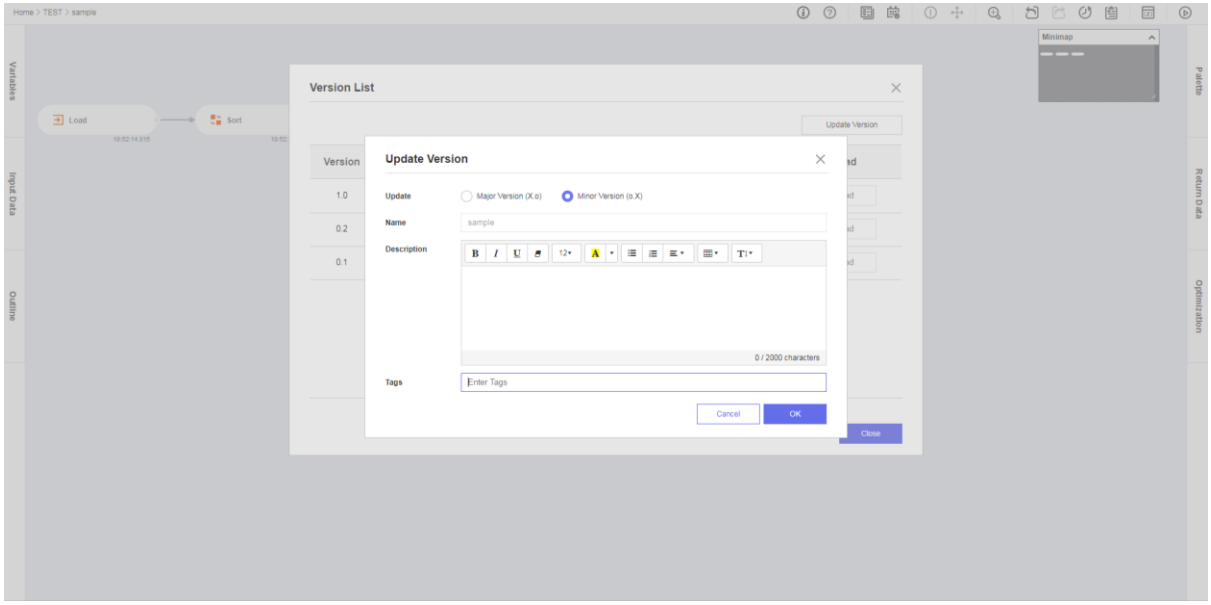


Figure 5-31 Analytics Model Update Version Window

You can import the model created in this way by clicking Load button from [Version List] window. Delete function for each version of model is not available. The following screen is displayed when there is diverse version information on the corresponding model.

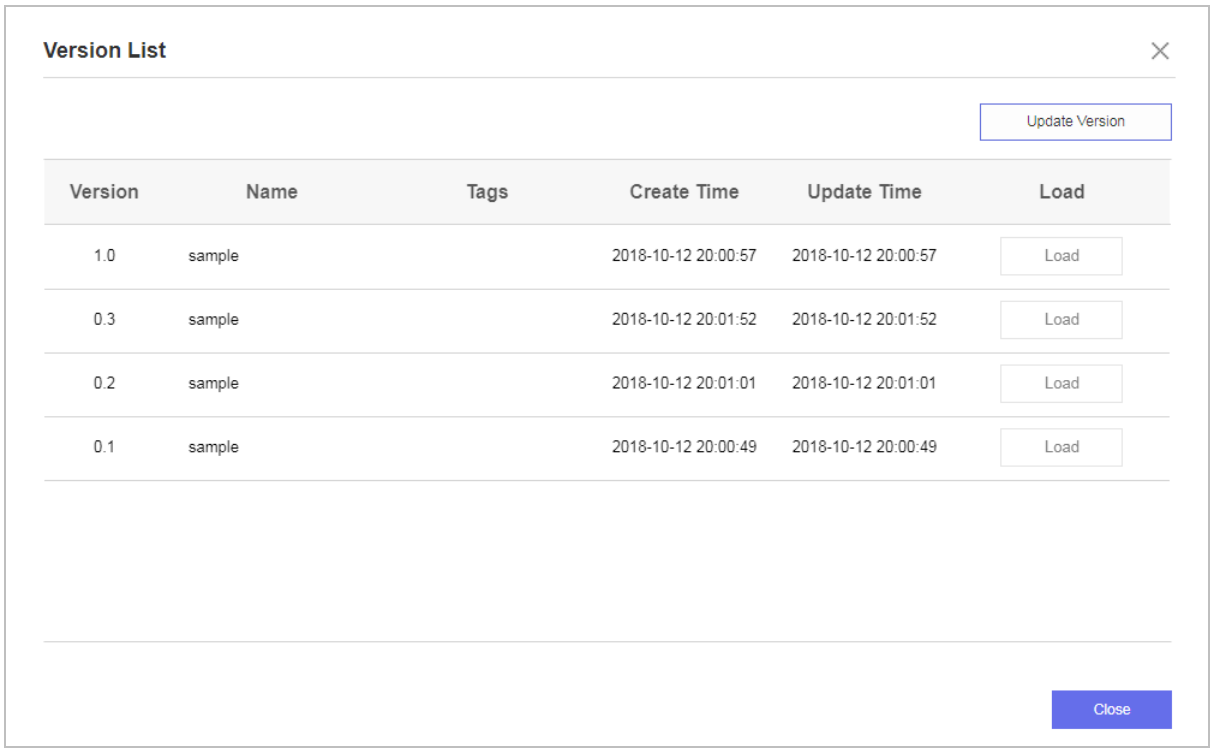


Figure 5-32 Analytics Model Version List Window has been Loaded

5.2 Use Data Flow Model Editor

Diagram Editor allows a user to write a function to use for analytics model and connection between each function. Toolbar Menu consists of Zoom feature, a feature to verify job history, feature to Undo/Redo, feature to make report, and Run feature to run all functions of analytics model.

5.2.1 Create a Function

There are three ways to create a function.

5.2.1.1 Create a New Function in Diagram Editor

A. Mouse over a location where you want to create a function in Diagram Editor. Once the 

or 

button is enabled, click it and open a popup window to create a function.

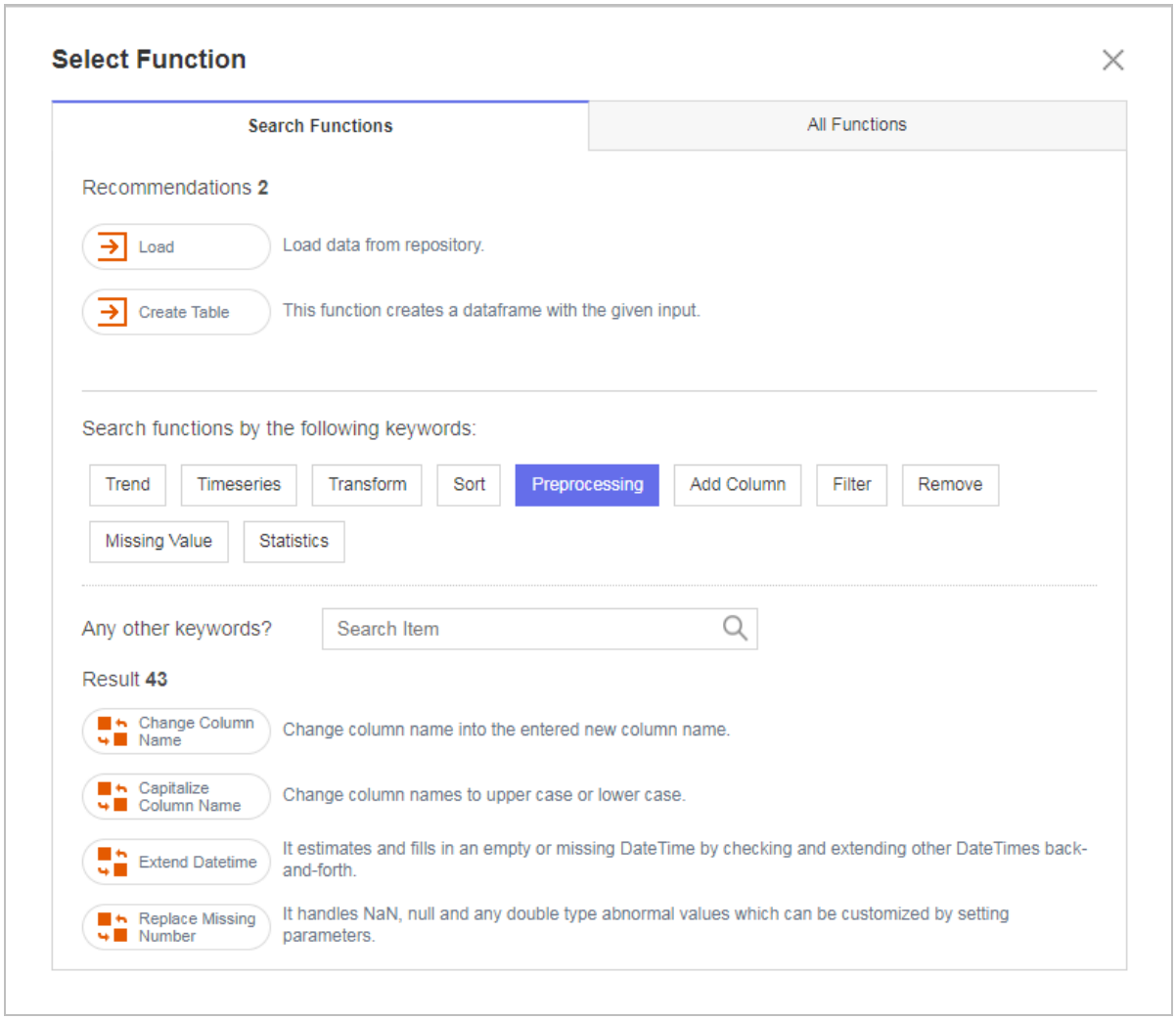


Figure 5-33 Select Function Window

B. Click the desired function to create. The function created in Diagram Editor is displayed.

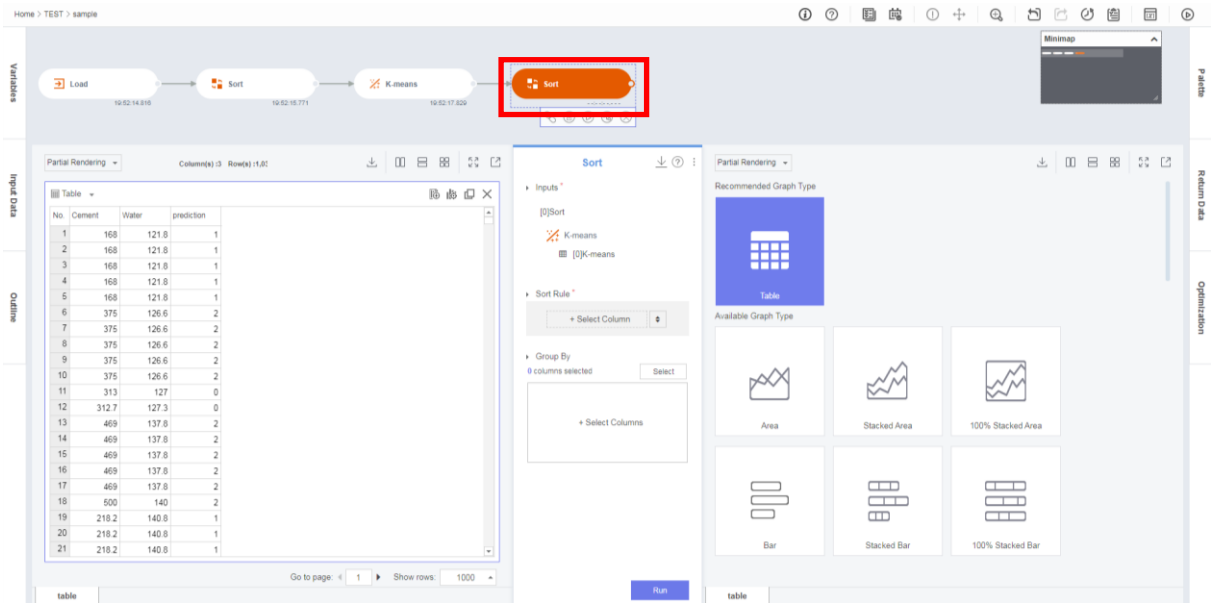


Figure 5-34 Function Created in Diagram Editor

5.2.1.2 Create a New Function by Selecting in Palette

A. Click Side Bar Expand button to use Palette Viewer on the right side.

B. Drag the desired function and drop it to the desired location in Diagram Editor.

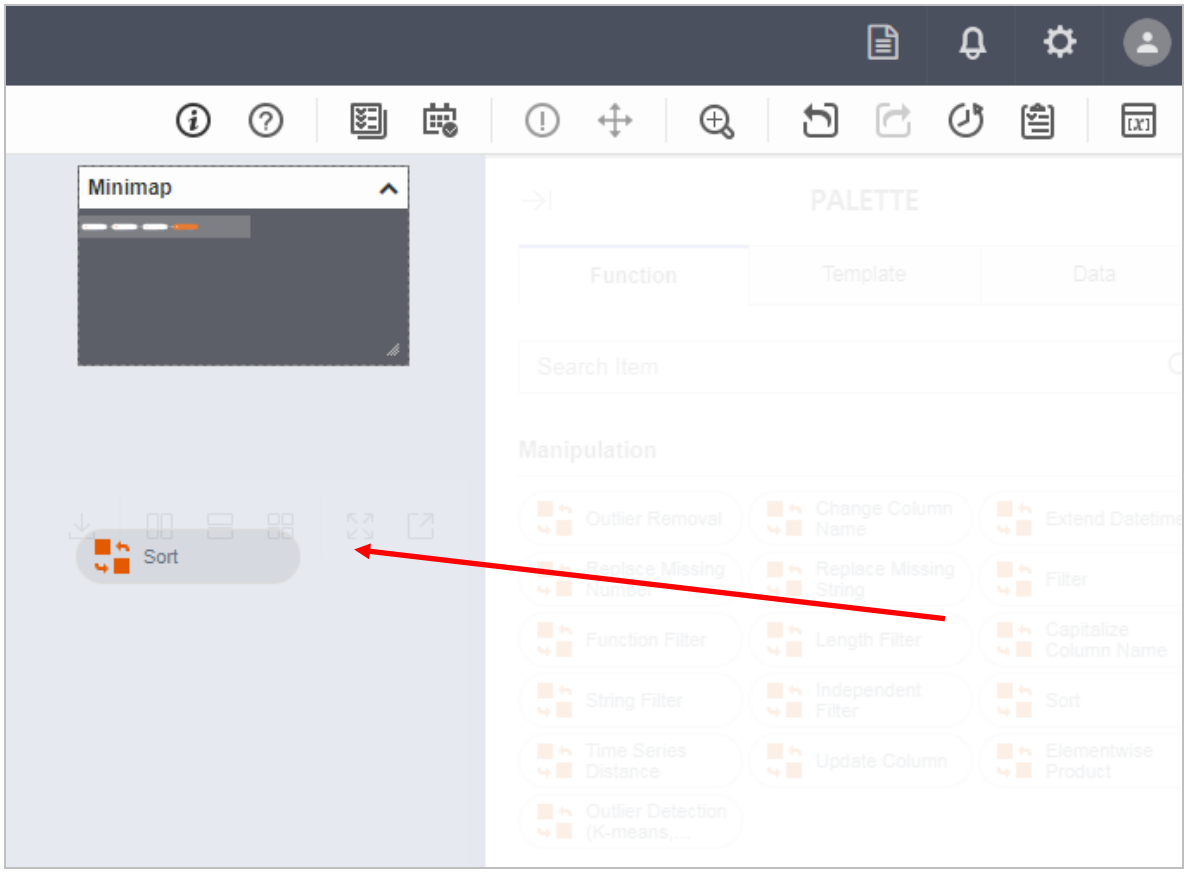


Figure 5-35 Drag the Function from Palette and Drop it to Diagram Editor

C. The function created in Diagram Editor is displayed.

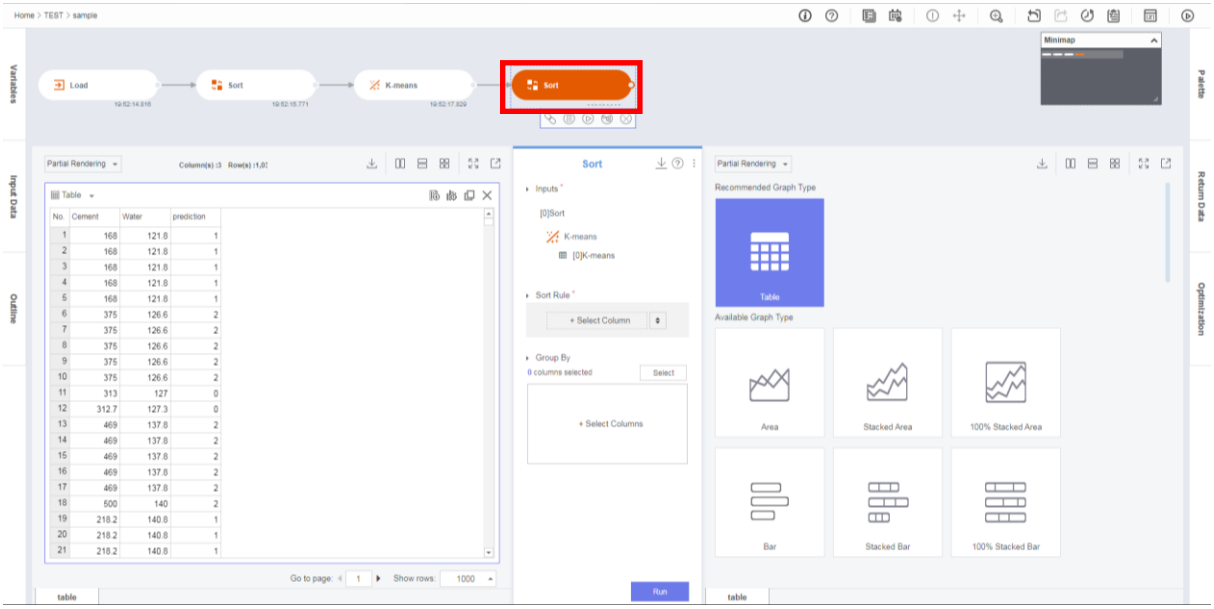


Figure 5-36 The Function Created in Diagram Editor

5.2.1.3 Create a Function by Cloning the Selected Function

A. Mouse over the function to clone.

Figure 5-37 Function Moused Over

B. Drag  button and drop it to the desired location in Diagram Editor.

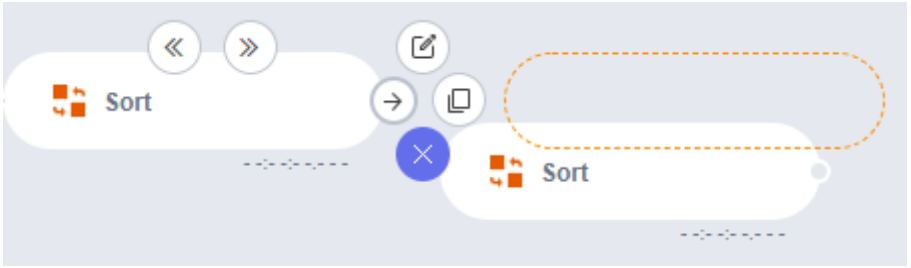


Figure 5-38 Drag and Drop the Function to Diagram Editor

C. The Function created in Diagram Editor is displayed.

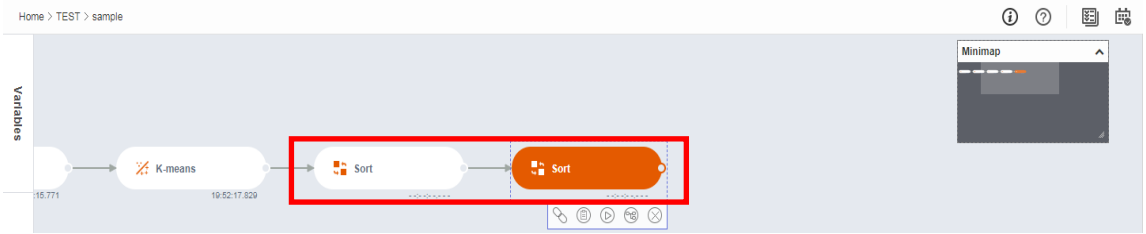


Figure 5-39 Function Created in Diagram Editor

5.2.2 Change a Function

A. Mouse over the function to modify

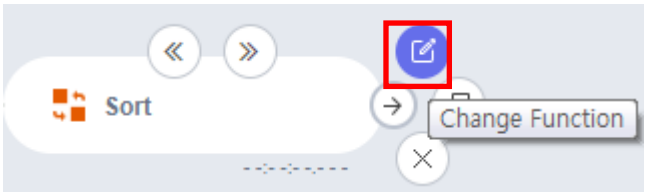


Figure 5-40 Function Moused Over

A. Call Select Function window to select the function by clicking  button.

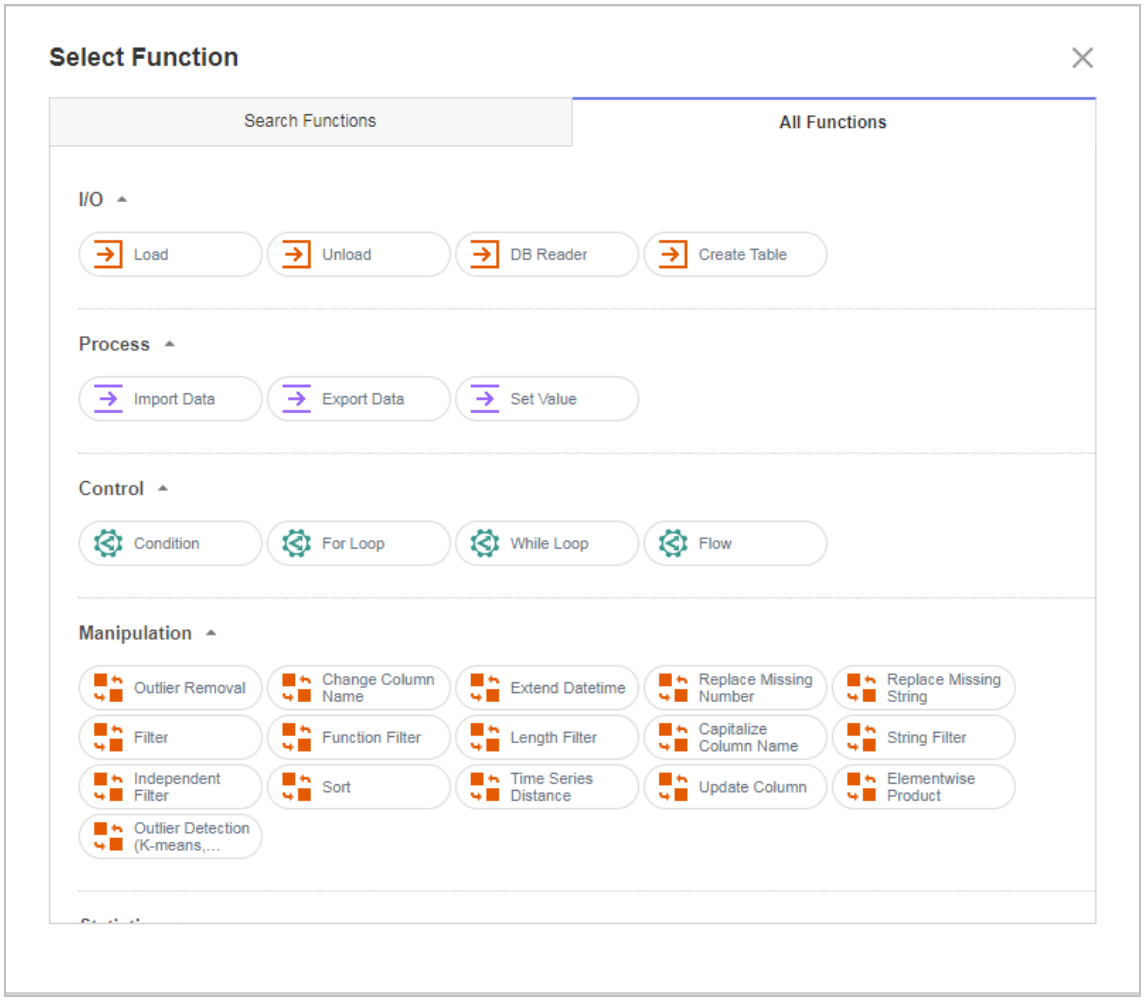


Figure 5-41 Select Function

Select the function to modify. Modified function is displayed in Diagram Editor.

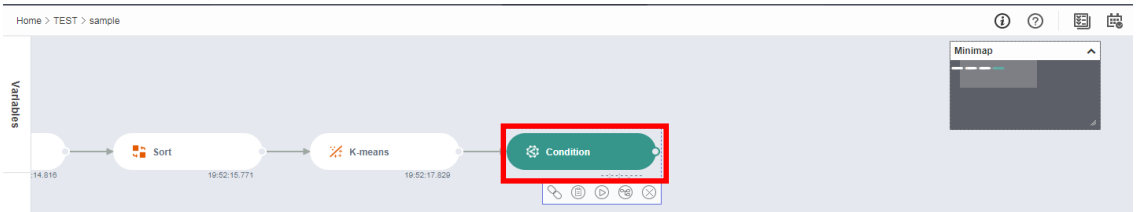


Figure 5-42 Modified Function Displayed in Diagram Editor

5.2.3 Delete a Function

A. Mouse over the function to delete and click button to delete the function concerned.

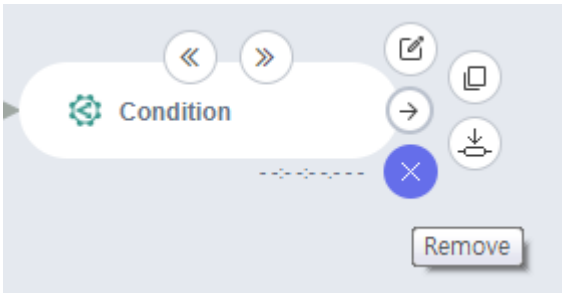


Figure 5-43 Function Moused Over

B. You can also delete multiple functions. Mouse drag the function to delete and click button to delete the function concerned.

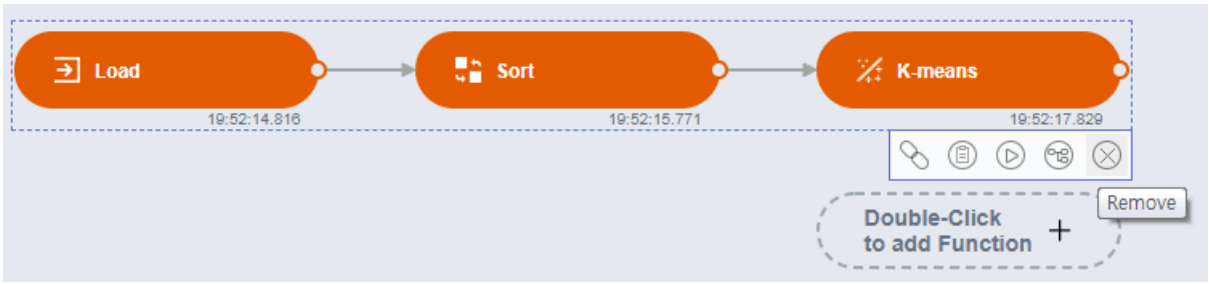


Figure 5-44 Function Moused Over

5.2.4 Use a Connection

5.2.4.1 Create a Connection

Connect the functions so that the output data of the preceding function can be used as the input data of the next function.

A. Mouse over the preceding function to which you want to create a connection. Click and drag button, and drop the connection to the next function to which you want to create a connection.

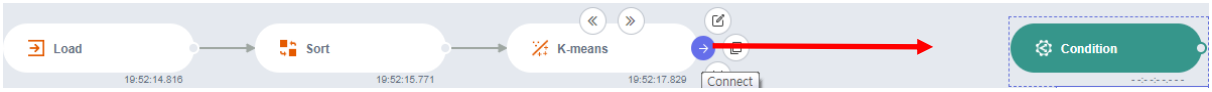


Figure 5-45 Function Moused Over

5.2.4.2 Modify a Connection

A. Mouse over the connection you want to modify. Click and drag button, and drop the connection to the to-be-modified function.

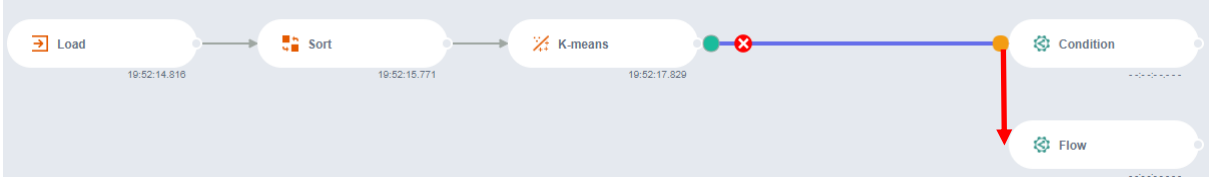


Figure 5-46 Connection Moused Over

5.2.4.3 Delete a Connection

A. Mouse over the connection you want to delete. Click button to delete the connection concerned.

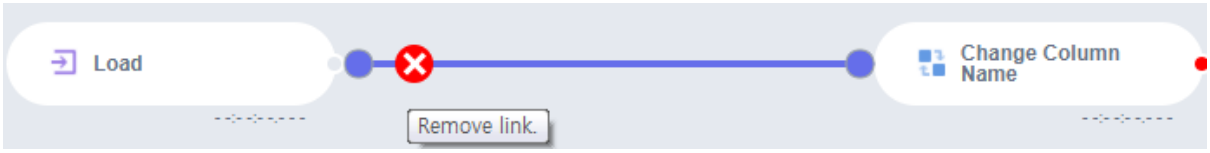


Figure 5-47 Connection Moused Over

5.2.5 Use Variables

5.2.5.1 Create Variables

A. If you click Add Variable button in Variables View, variable is added at the bottom.

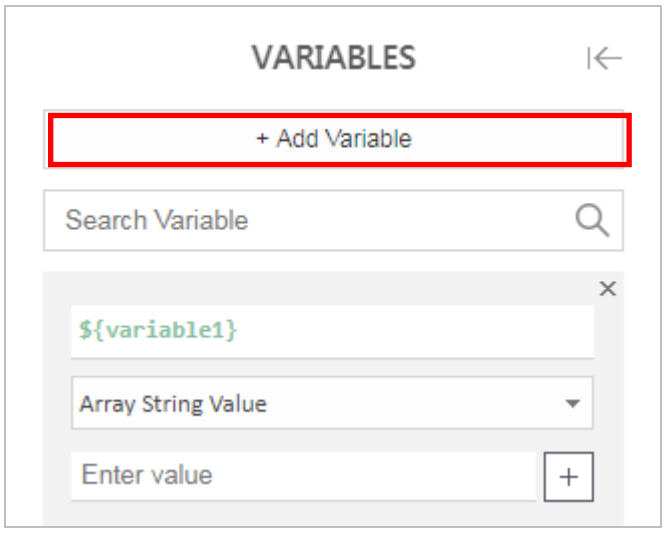


Figure 5-48 Before Button Click

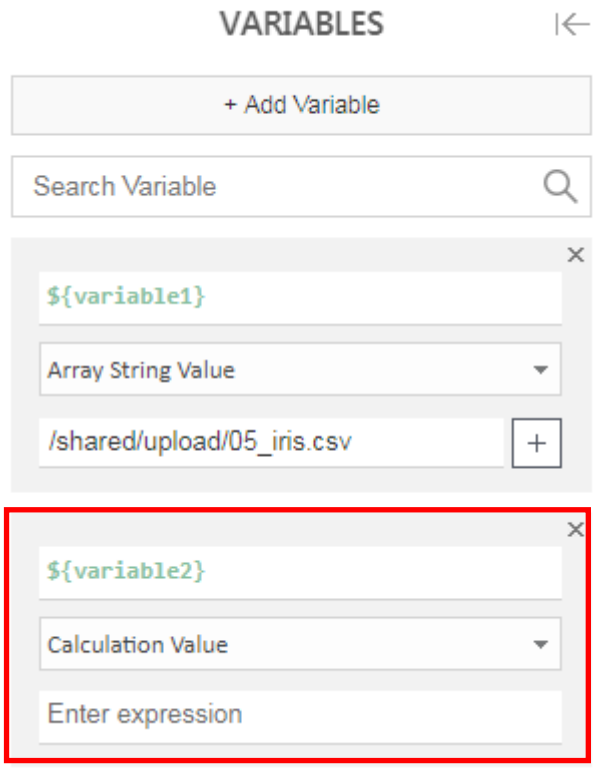


Figure 5-49 After Button Click

5.2.5.2 Modify Variables

A. You can enter Name and Value as input, and you can choose among String, Number, Array String Value, Array Number Value and Calculation Value for modification.

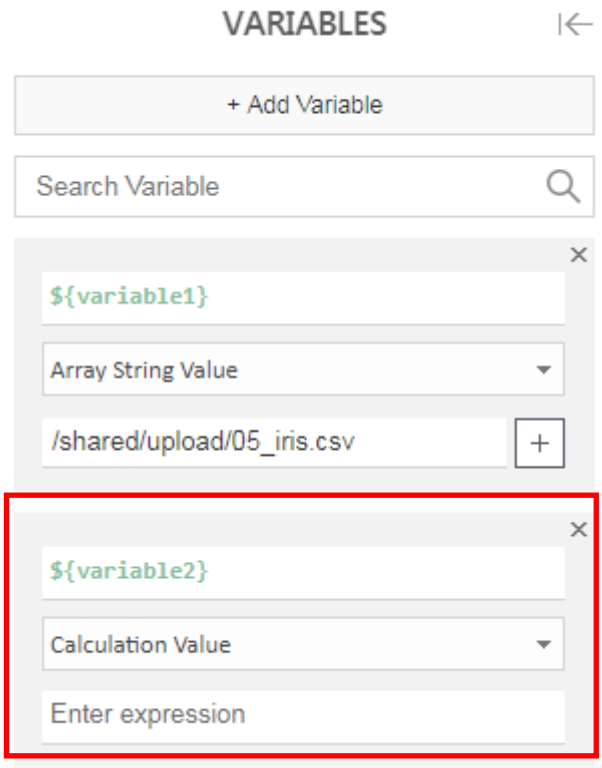


Figure 5-50 Modified Variable

5.2.5.3 Delete Variables

A. Delete variable using the button at the top right-hand side of each variable.

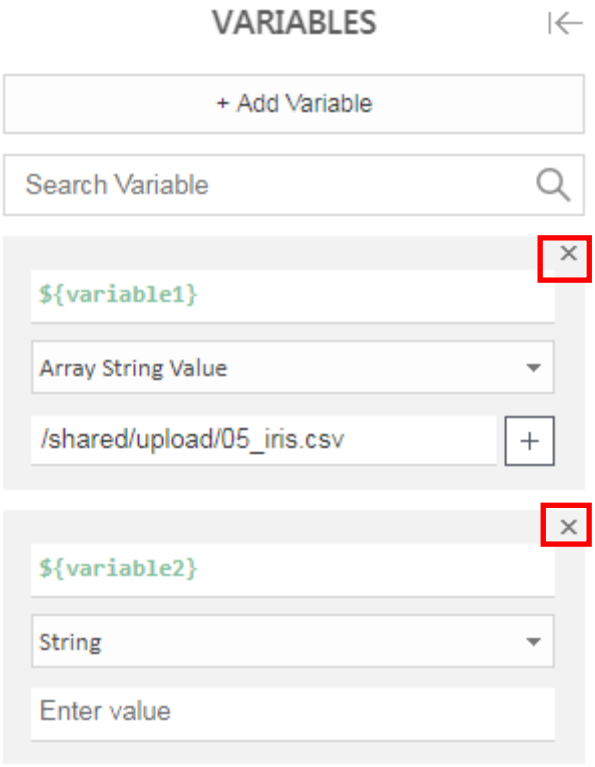


Figure 5-51 Delete Variable

5.2.6 Use History

It records and shows the job history that the user worked on. If you select a certain job history, you can be directed to the timing when the concerned job was being worked on. All the job history that was worked on is recorded in Diagram Editor and Sheet Editor. You can either click button in Diagram Editor to directly select the timing of the job that you want to be directed to, or click , button to Redo or Undo.

A. Click button in Diagram Editor.

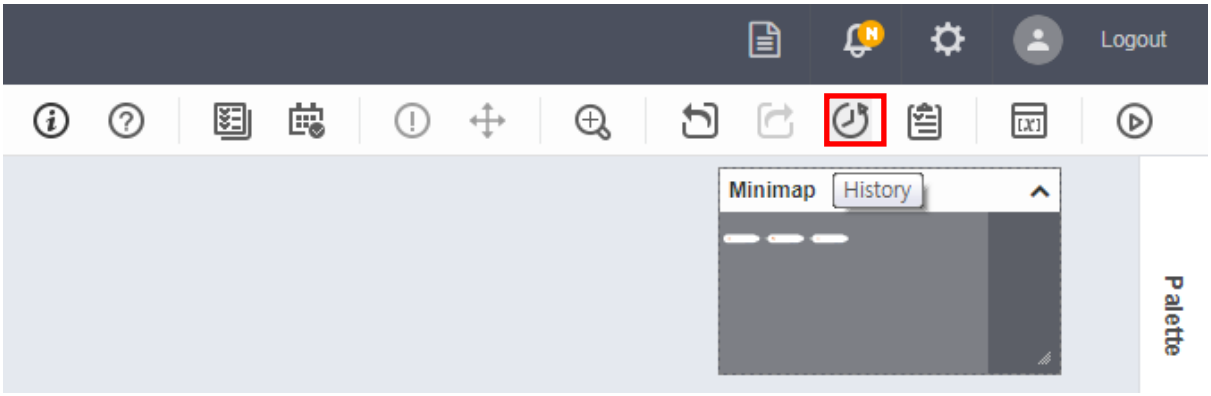


Figure 5-52 Click History Button in Diagram Editor

B. You can check the job history after History window pops up. If you select the job history that you want to move to from History window, you are directed to the desired page.

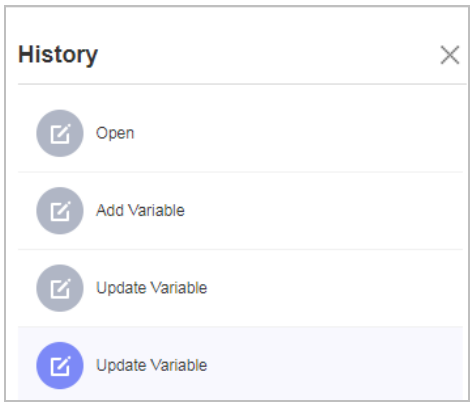


Figure 5-53 History

5.2.7 Use Schedule

You can add, or modify/delete a schedule of model opened in Diagram Editor.

A. Click button in Diagram Editor.

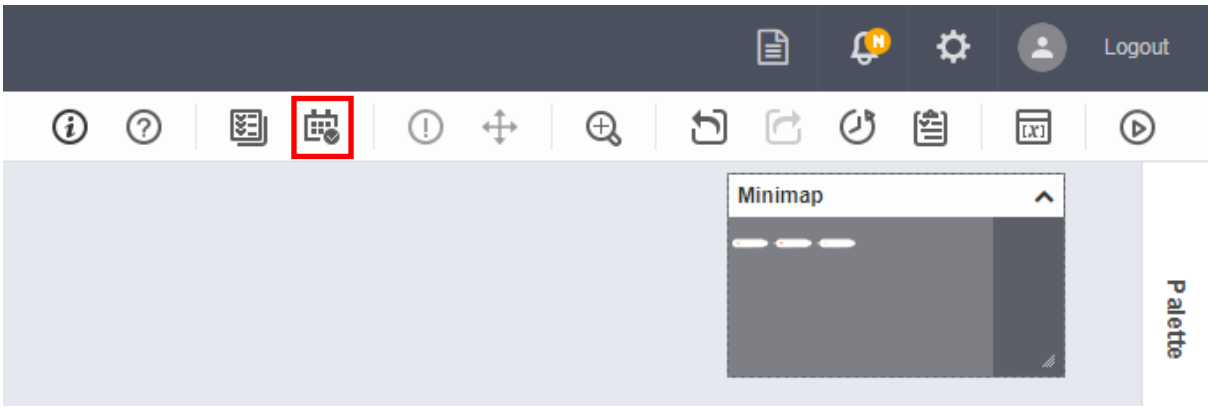


Figure 5-54 Click Schedule Button in Diagram Editor

B. Schedule list window pops up where you can check the schedule list.

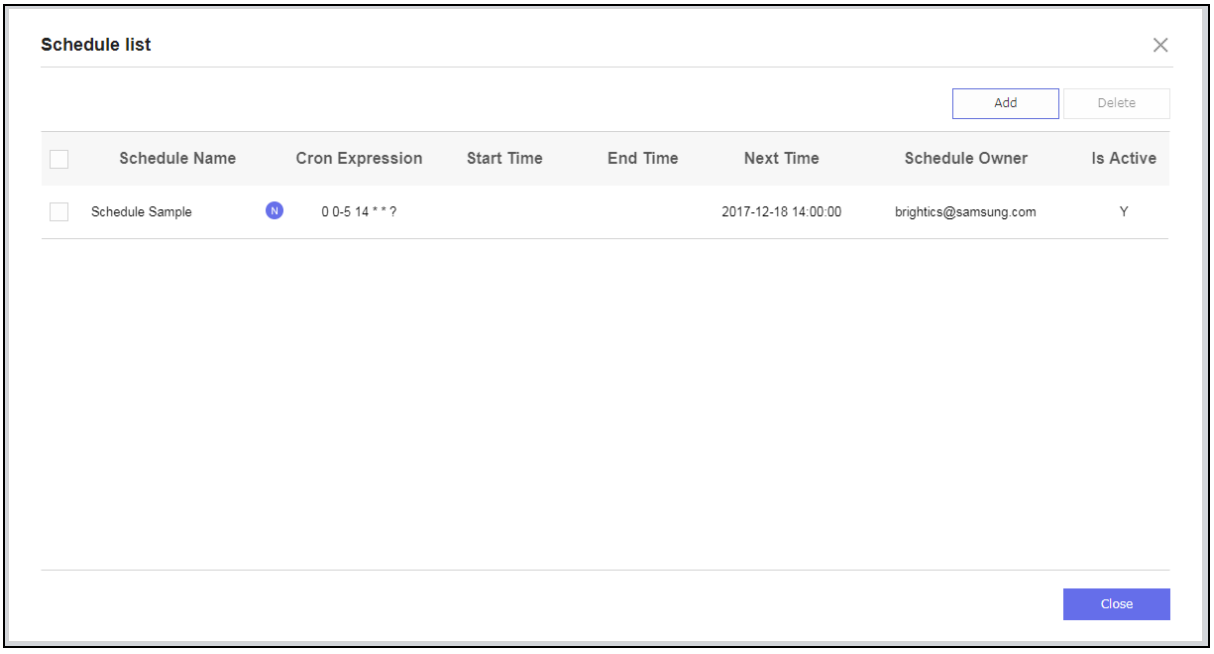


Figure 5-55 Schedule List

5.2.7.1 Register Schedule

Register a schedule to run the corresponding model.

A. Click Add button in Schedule list.

Figure 5-56 Schedule Register Button

B. Enter *Schedule Name, Cron Expression, Is Active, and Dependency Id*, and click **OK** button.

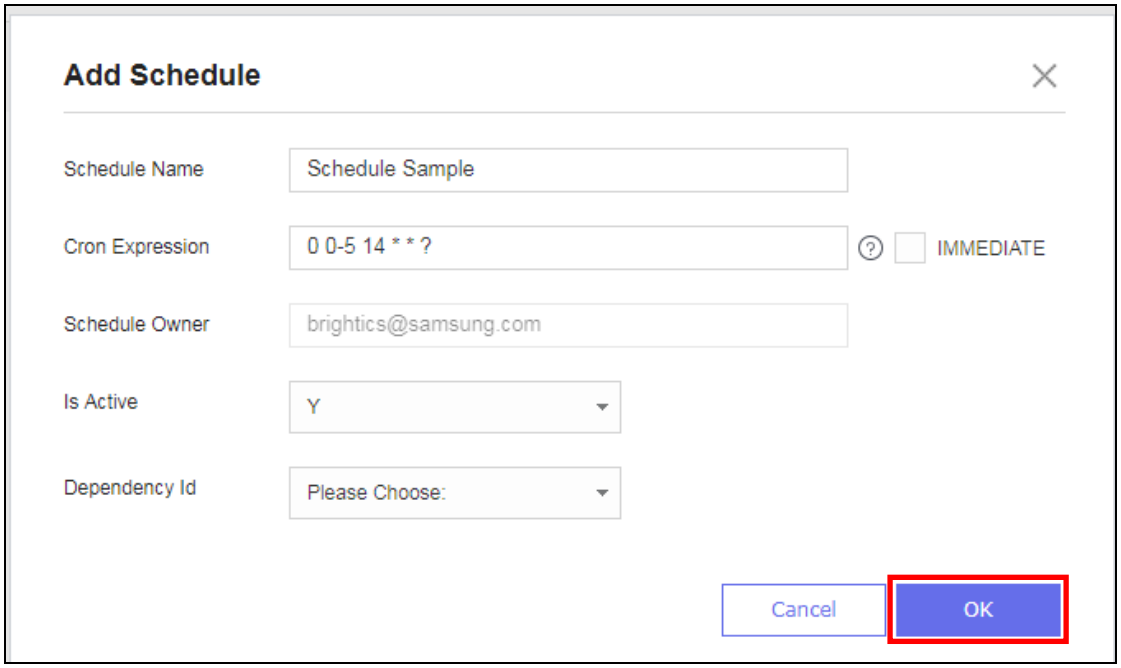


Figure 5-57 Schedule Register Screen

5.2.7.2 Modify Schedule

Modify *Cron Expression, Is Active, and Dependency Id* of the schedule registered in the corresponding model.

A. Select one schedule from the Schedule list.

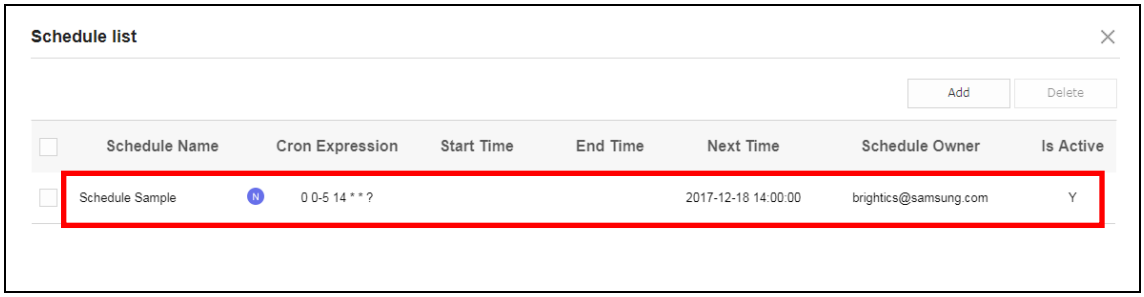


Figure 5-58 Schedule List Screen

B. Click Edit button in Schedule detail screen.

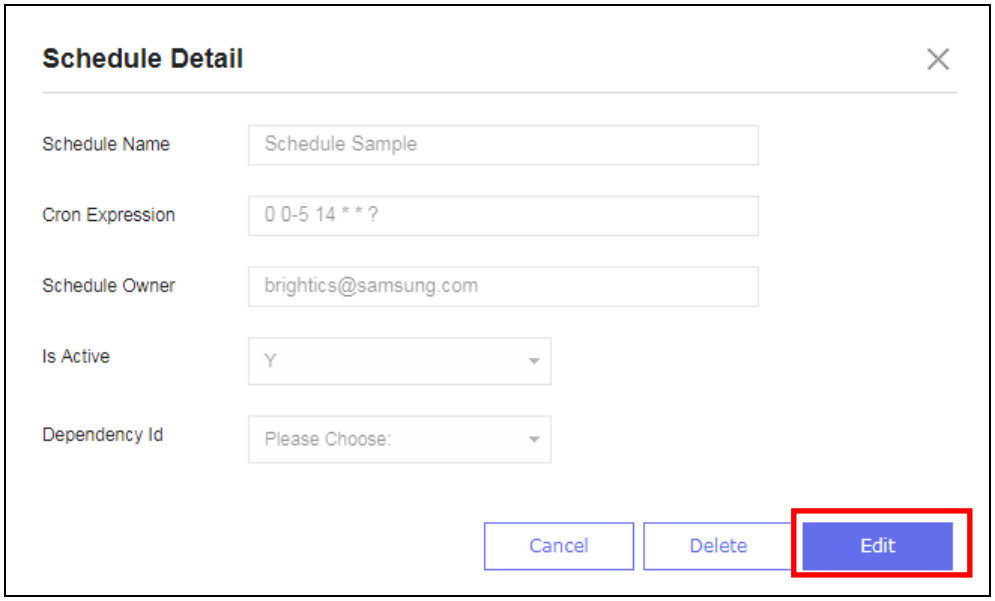


Figure 5-59 Schedule Detail Screen

C. Modify the schedule and click the **OK** Button.

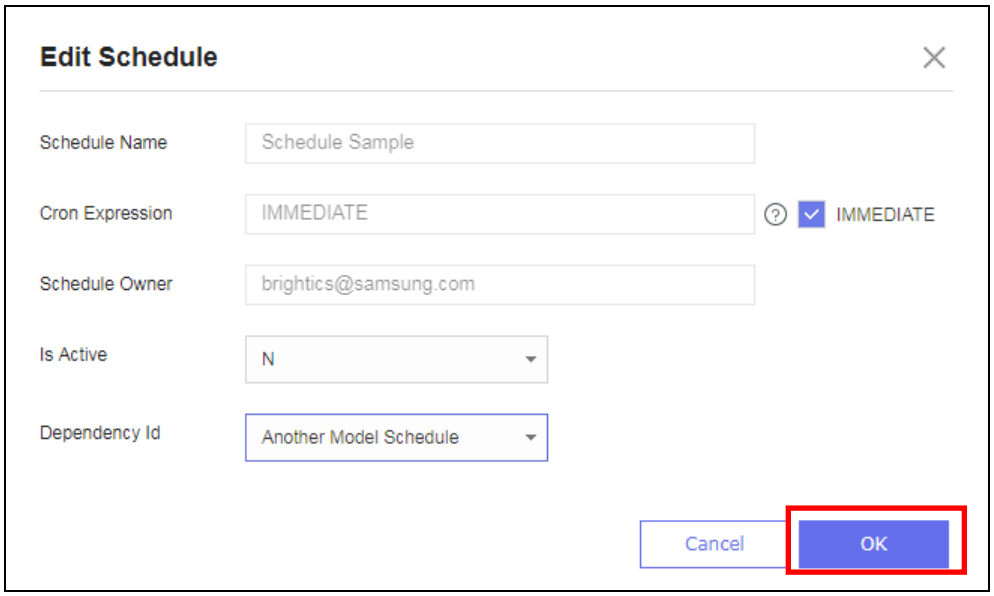


Figure 5-60 Modify Schedule Screen

5.2.7.3 Delete Schedule

Delete one or multiple schedules registered in the corresponding model.

A. Select one schedule from the Schedule list.

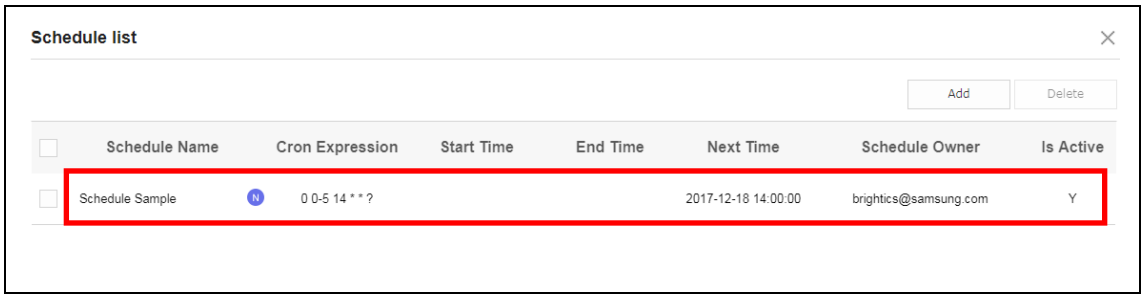


Figure 5-61 Schedule List Screen

B. Click Delete button in the Schedule detail screen.

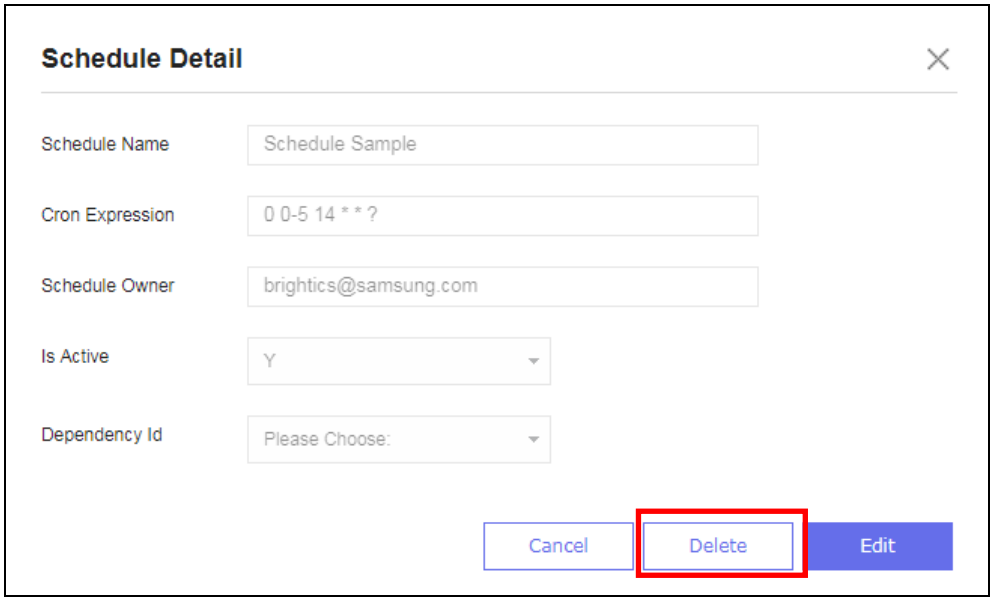


Figure 5-62 Schedule Detail Screen

C. Select multiple schedules from the Schedule list and click the enabled Delete button.

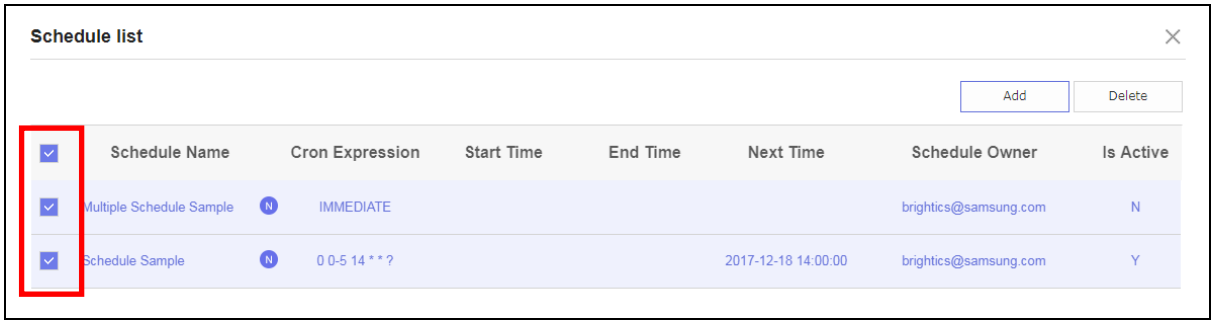


Figure 5-63 Delete Multiple Schedules

5.2.8 Use Zoom

Zoom in and out of Diagram Editor using Zoom button.

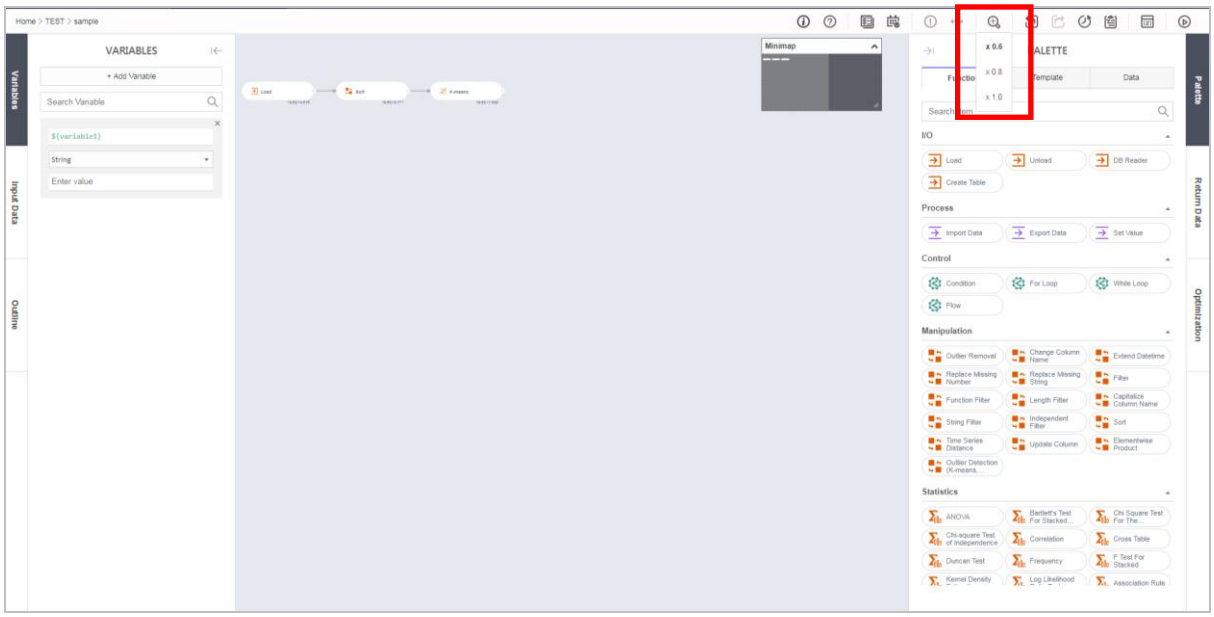


Figure 5-64 Click Zoom x0.6

5.2.9 Use Tooltip

Enter memo in Diagram Editor function. If the function is moused over in Diagram, it is displayed as tooltip. You can enable/disable it using Tooltip button at the top right of the screen.

A. Click enable Tooltip button.

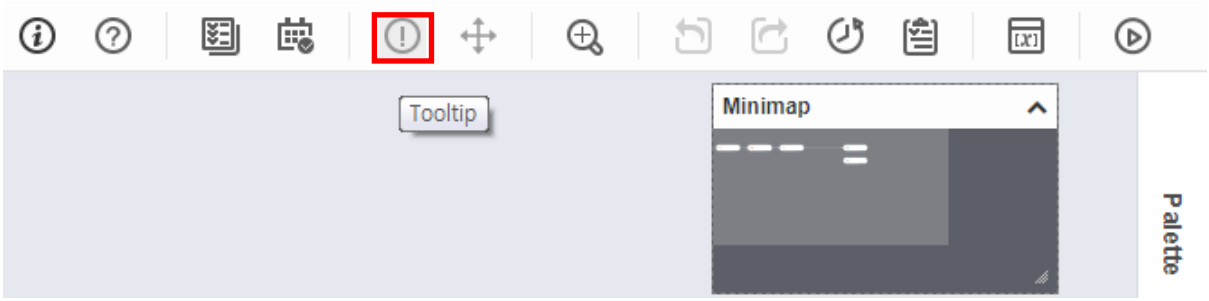


Figure 5-65 Click Tooltip Button

B. Click Edit button and enter memo.

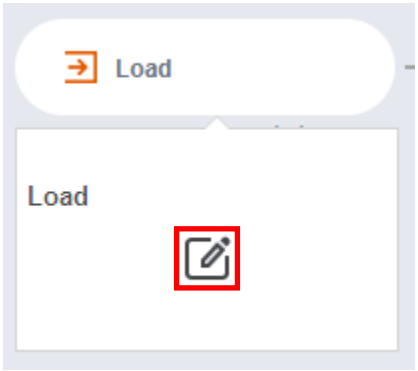


Figure 5-66 Click Edit Button

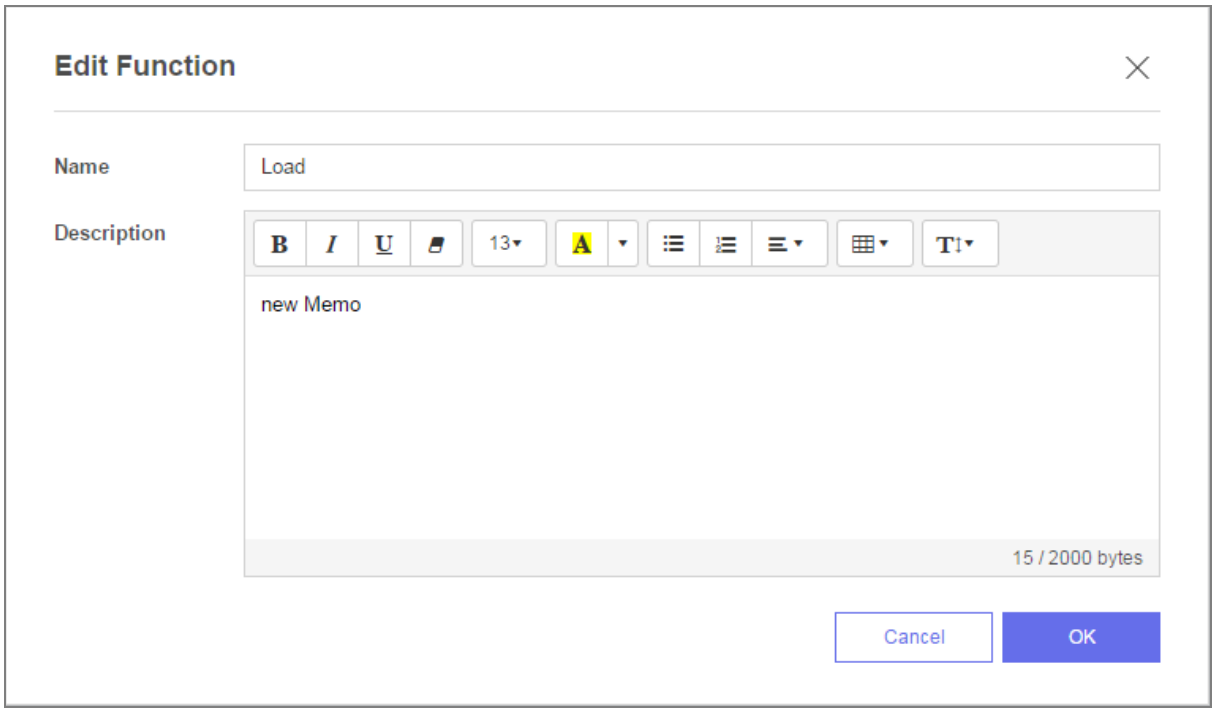


Figure 5-67 Enter Tooltip Memo

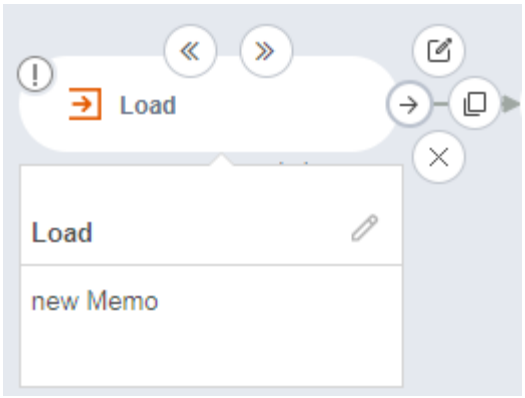


Figure 5-68 Verify Tooltip

5.2.10 Use Minimap

It is a thumbnail of Diagram Editor that shows all the functions that a user has written in Diagram Editor. This feature is aimed at helping the user understand the model easily, rapidly, and at a glance in case that the number of functions used increases and Diagram Editor becomes complex in the future.

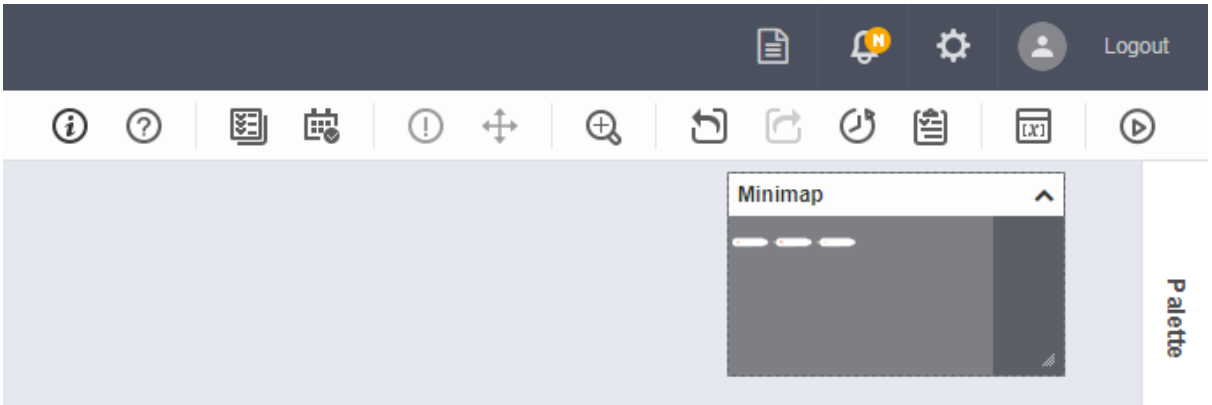


Figure 5-69 Minimap Window

You can mouse drag a Minimap window to a new location. If you click ^ button, Minimap is folded, and if you mouse drag ◢ area, the size of the Minimap is adjusted.

5.2.11 Execute Entire Functions

A user executes all functions written in Diagram Editor in the order of connection. When there is a registered Global Variable, change parameter value to a new one and execute so that the function is executed based on the changed value.

A. Click ▷ button in Diagram Editor.

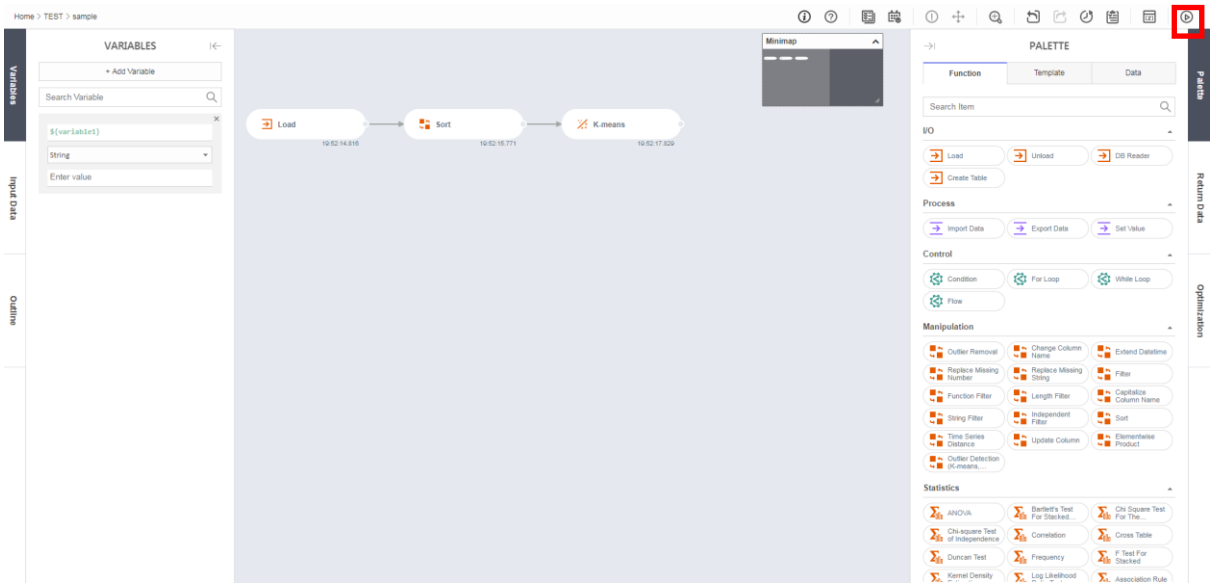


Figure 5-70 Run Button in Diagram Editor

B. Enter Variable value to use for Run and click **OK** button. (Input dialog appears only when parameter is registered in Variables)

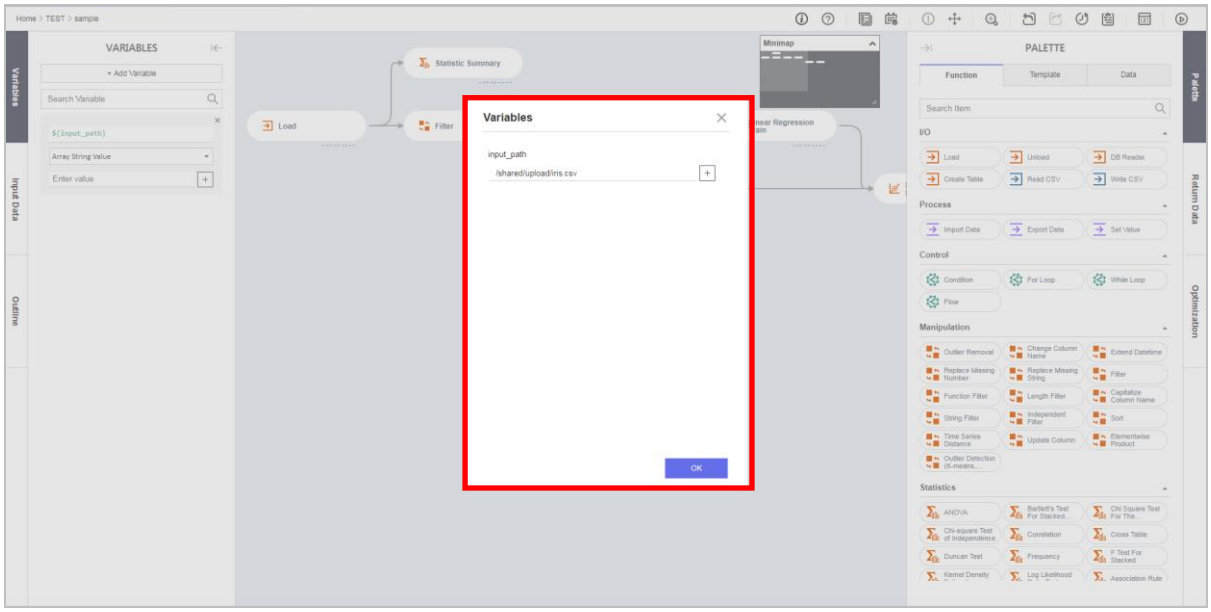


Figure 5-71 Variable to be used for Run Entered

C. When Run is executed, the list of currently running function is displayed which allows you to know which function is running.

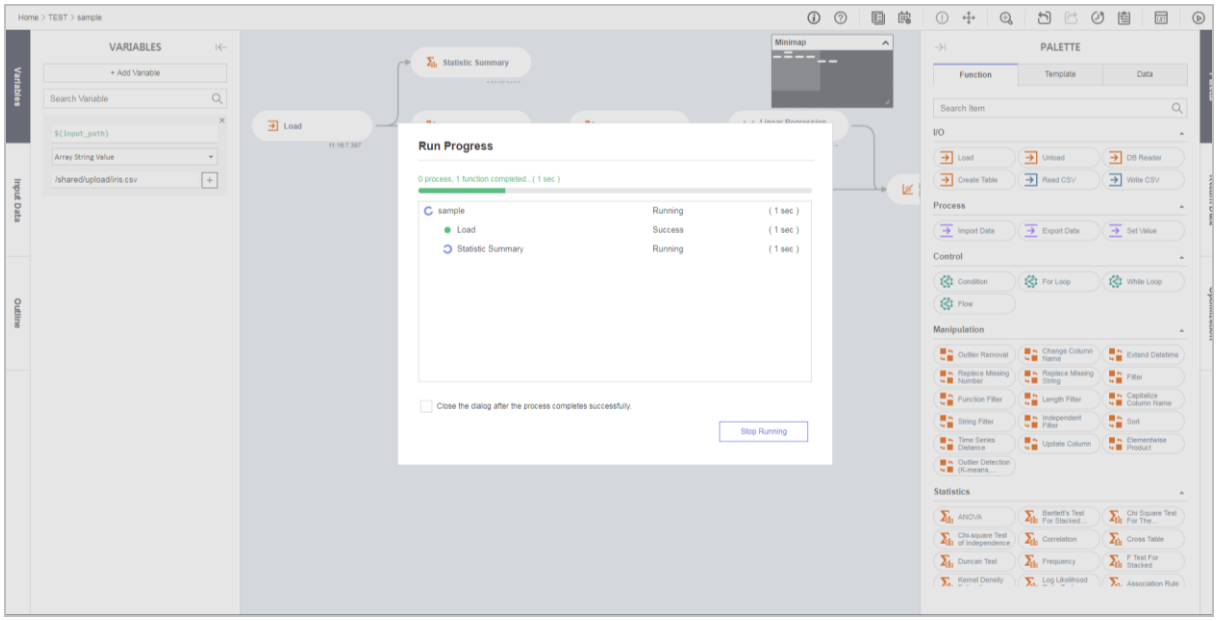


Figure 5-72 Run being Executed

D. When the execution is completed, **Done** button is displayed. When you click the button, window is closed.

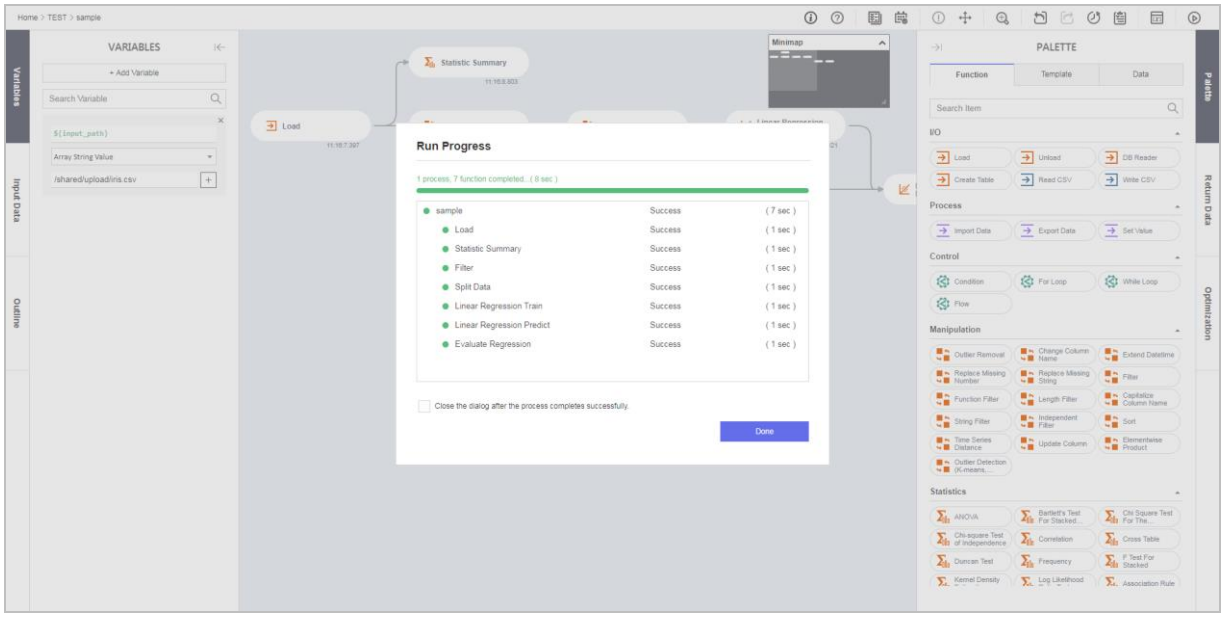


Figure 5-73 Run Execution Completed

E. Click one of the functions and check IN/OUT Data Panel to verify whether or not Run has been executed normally.

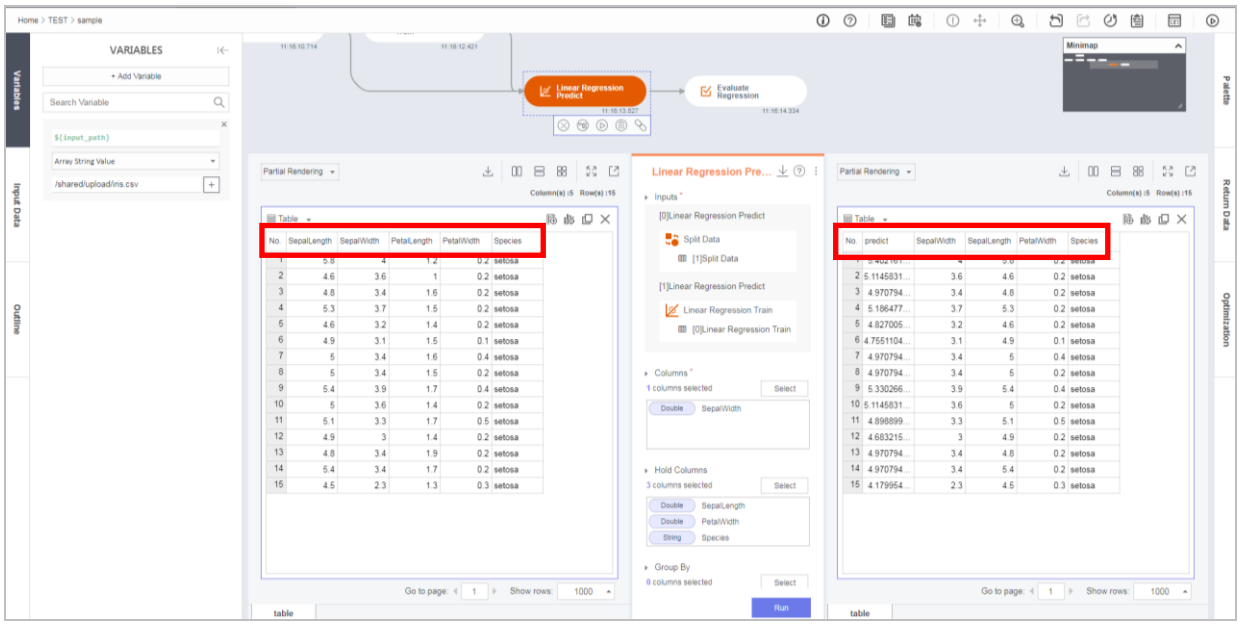


Figure 5-74 Run Normally Executed and Displayed in Data Panel

5.2.12 Use Clipboard and Template

You can store frequently-used functions to Clipboard or Template for use. And you can also drag and drop the stored functions to add them to Diagram Editor.

5.2.12.1 Clipboard

You can store one or multiple functions temporarily to Clipboard and add them to another model. What is stored disappears when it is logged out or a new browser window opens.

B. Click  button that becomes visible when a function is dragged and selected.

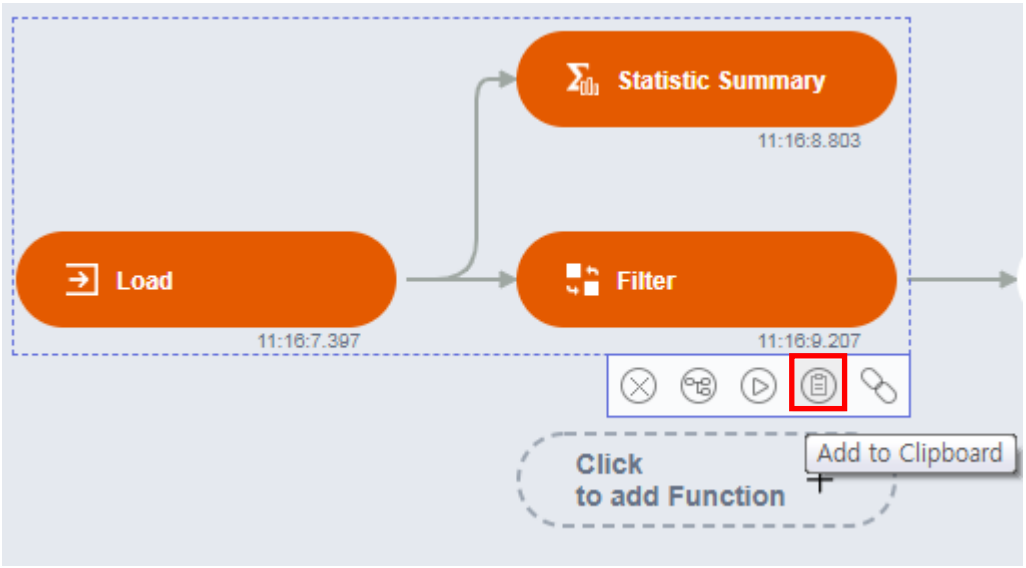


Figure 5-75 Clipboard Button

B. You can verify a list of functions selected in Function Clipboard window.

(You can open Function Clipboard using  button in Toolbar)

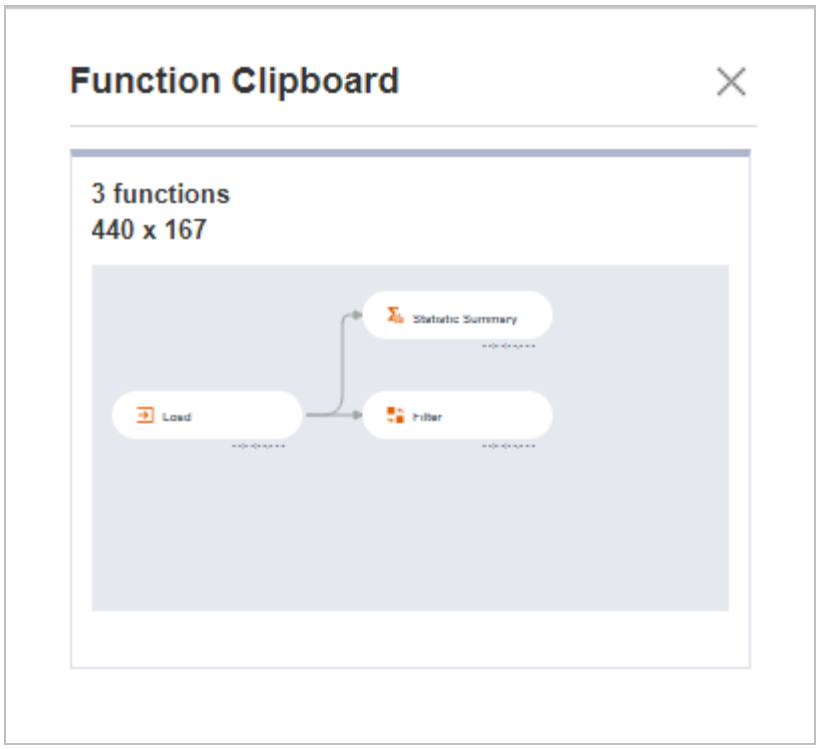


Figure 5-76 Function Clipboard

C. Drag and add Clipboard content to the corresponding model or another model.

5.2.12.2 Template

You can store one or multiple functions to Template and add them to another model. They can be used permanently unless they are removed from account.

A. Click  button that becomes visible when a function is dragged and selected.

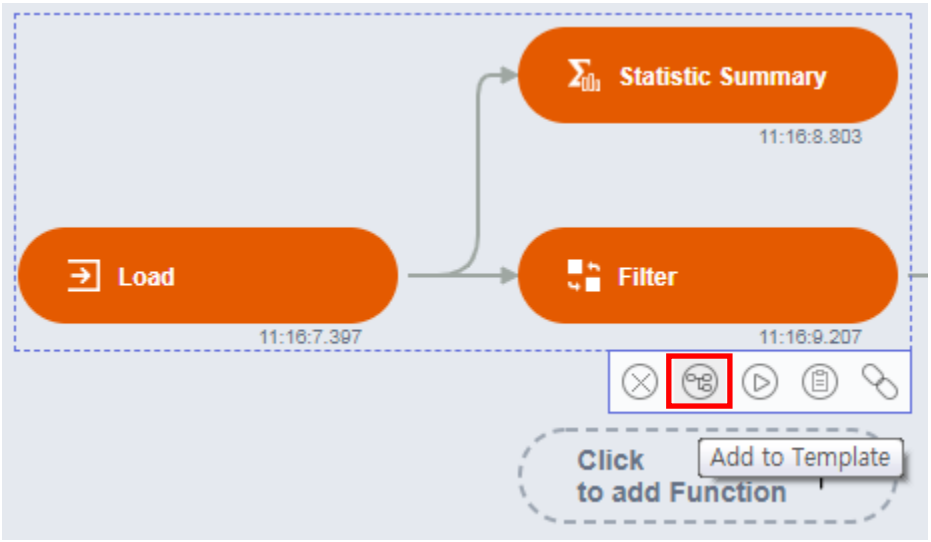


Figure 5-77 Template Button

B. Enter Template name and click **OK** button.

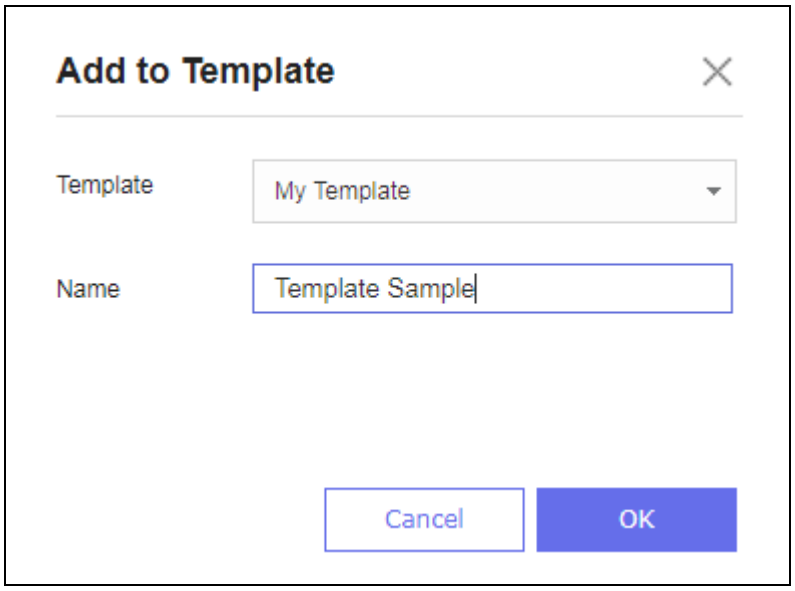


Figure 5-78 Add to Template Screen

C. You can verify what item has been added at Template in Palette View.

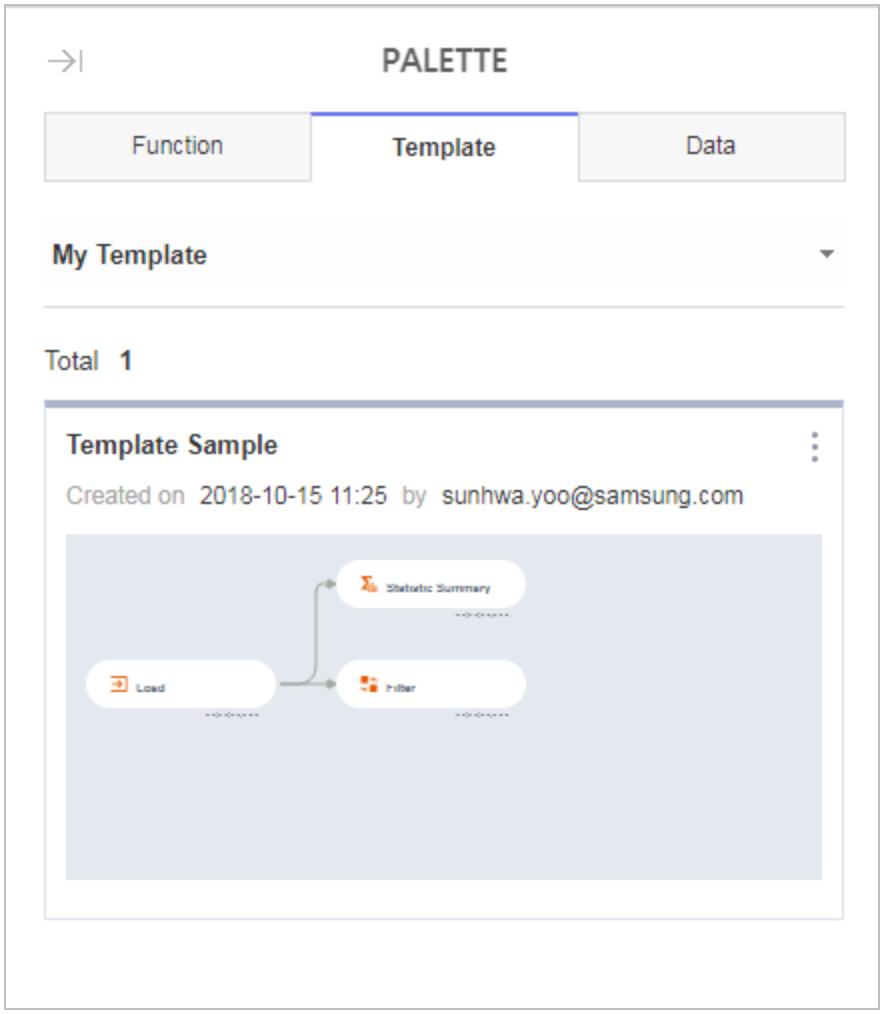


Figure 5-79 Item Added to Template

5.2.13 Use Properties Panel

In Properties Panel, you can define the parameters of each function and execute Run. And you can also change the name of the function, change the function, and register variable.

5.2.13.1 Change Function Name

A. Click ⋮ button on the top right side of the Properties Panel, select **Edit**, enter the new *Name* of the function, and click **OK** button.

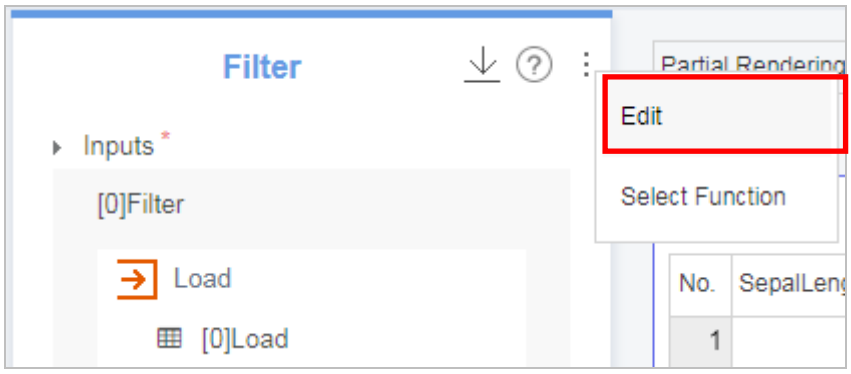


Figure 5-80 Function Edit Button

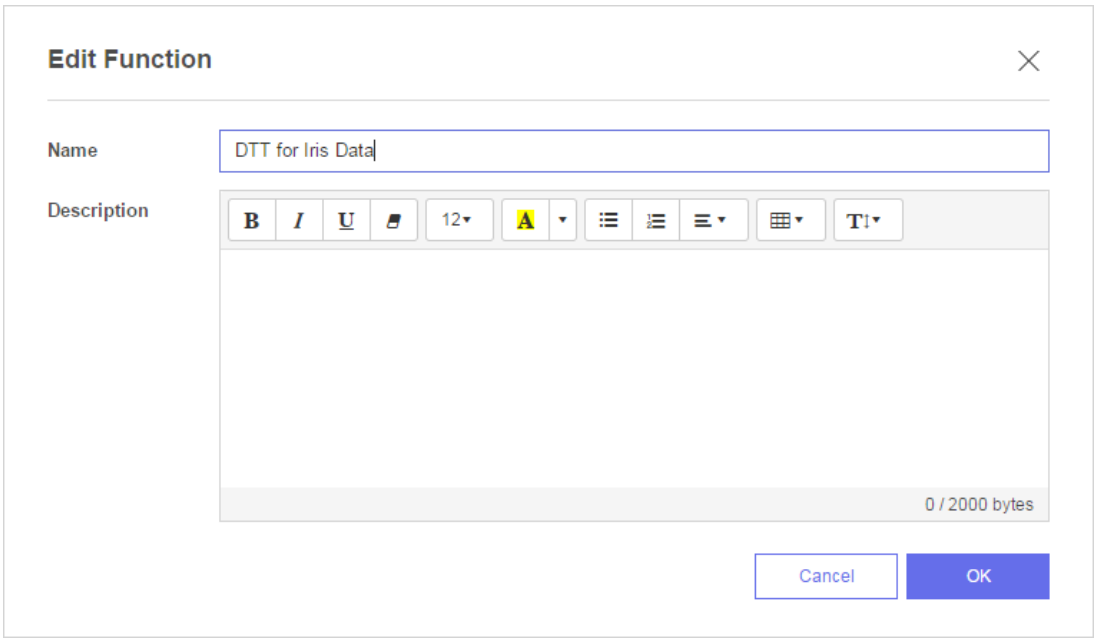


Figure 5-81 Edit Function

B. Function name in Properties Panel is changed.

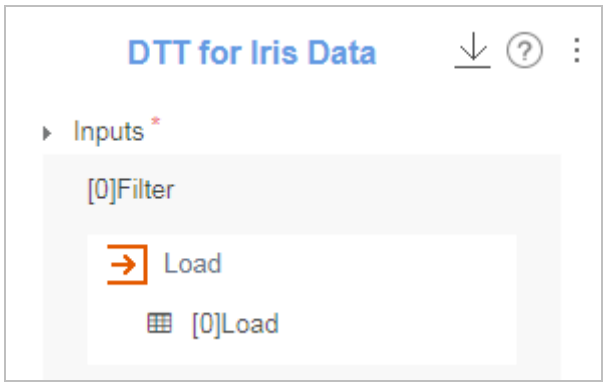


Figure 5-82 Changed Function Name

5.2.13.2 Change Function

A. Click ⋮ button on the top right side of Properties Panel, choose **Select Function**, select to-be-changed *function,* and click **OK** button.

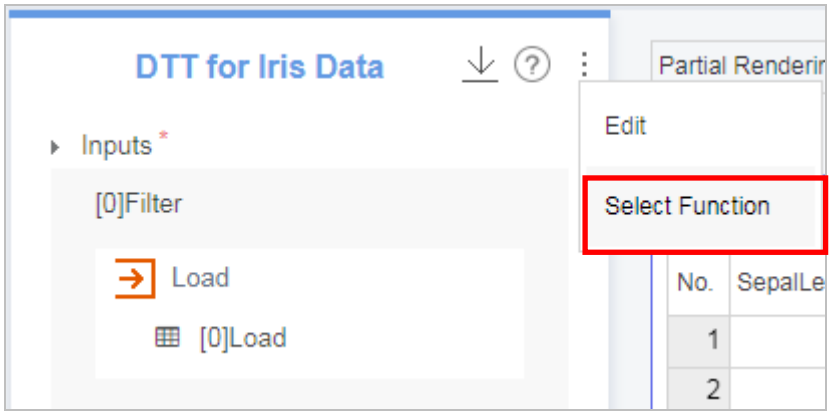


Figure 5-83 Select Function Button

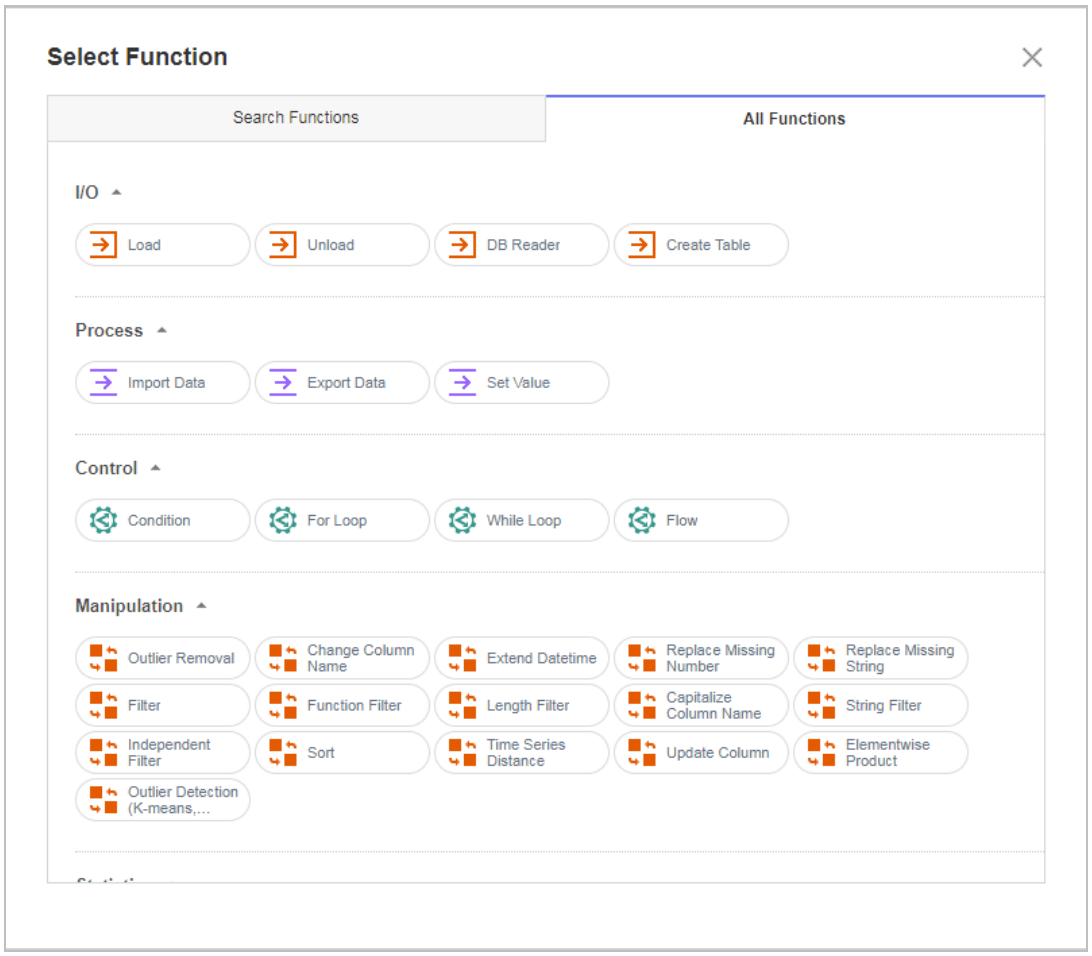


Figure 5-84 Select Function

B. You can verify the changed function in Properties Panel.

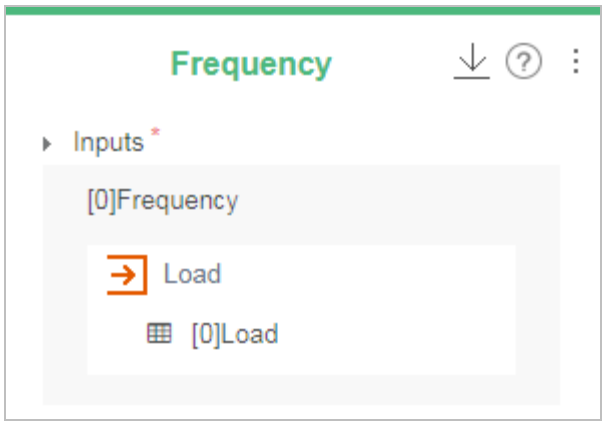


Figure 5-85 Changed to the Selected Function

5.2.13.3 Define Parameter

You can define the parameter of each function in Properties Panel. In Table, you can set the input connected to the function concerned and also define the parameter using Controls such as Input Box, Select Box, and Combo Box. You can define the column using Column Selector when you have to select the column in the Table connected to the function as parameter. * Mark of the parameter which should be set as required value of function is located on the right-hand side of the Parameter Label and if it is not set, Validation Message is displayed.

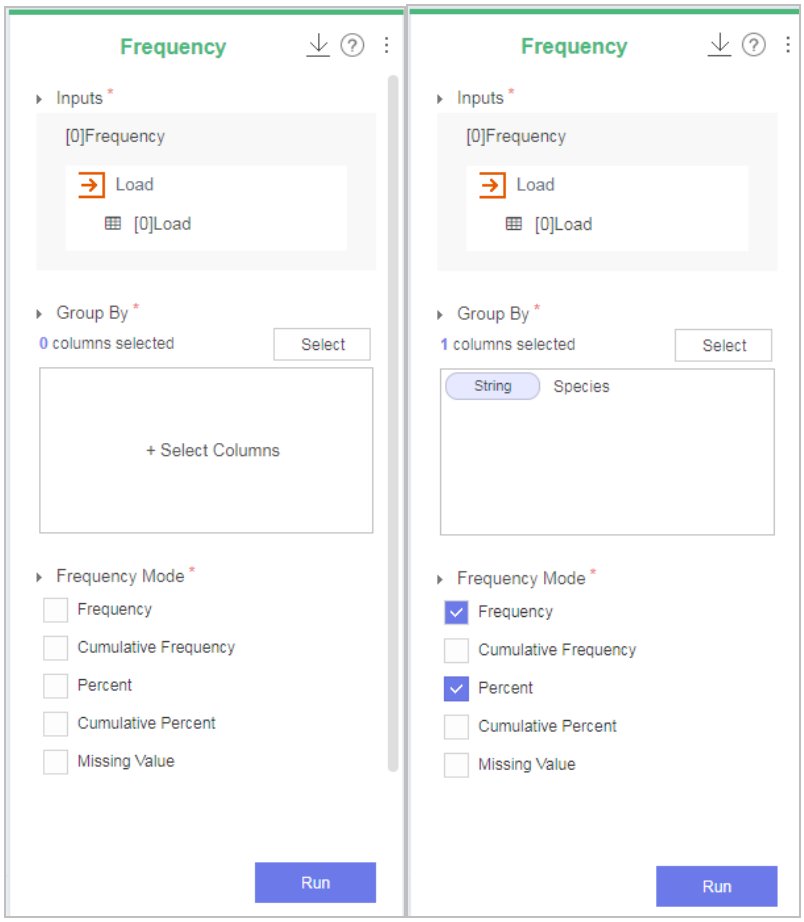


Figure 5-86 Before/After Defining Frequency Function's Parameter

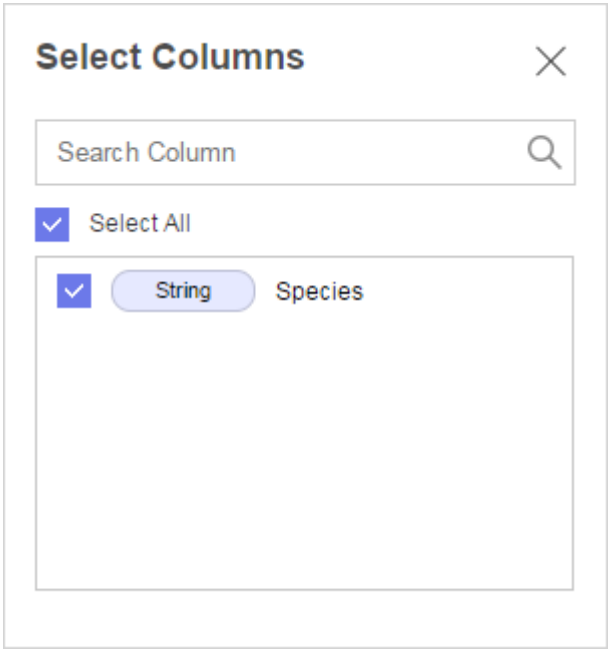


Figure 5-87 Column Selector to Select the Column in the Connected Table

5.2.13.4 Register Variables

A. You can register variable by clicking button in Properties Panel.

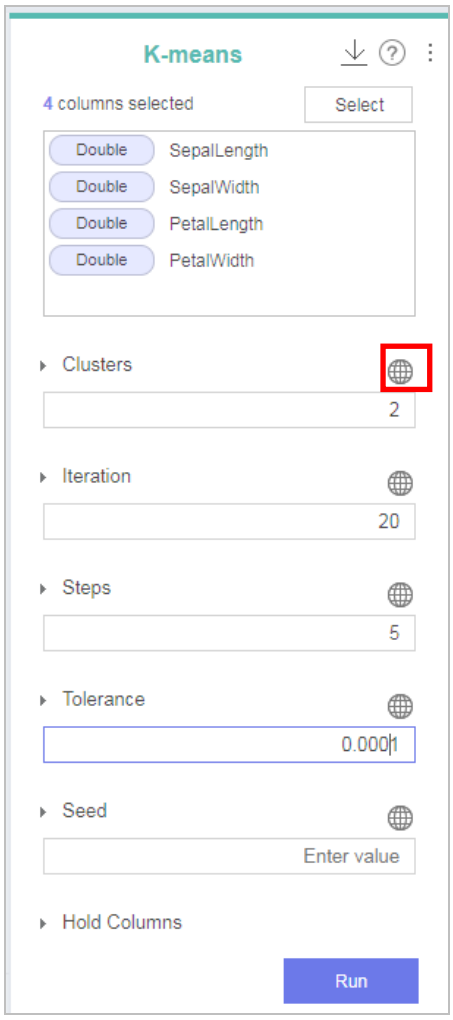


Figure 5-88 Click Variables Button in Properties Panel

B. Context menu is called and [Set as variable] and other current registered variables are displayed.

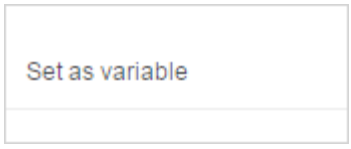


Figure 5-89 Context Menu

C. Click [Set as variable] to register variable. Once it is normally registered, the color of Variables icon is changed.

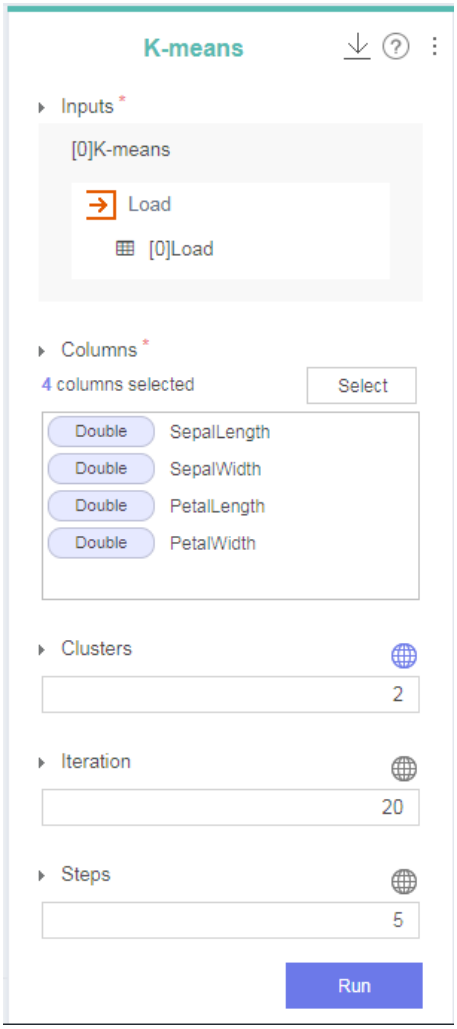


Figure 5-90 Properties Panel with Variables Registered

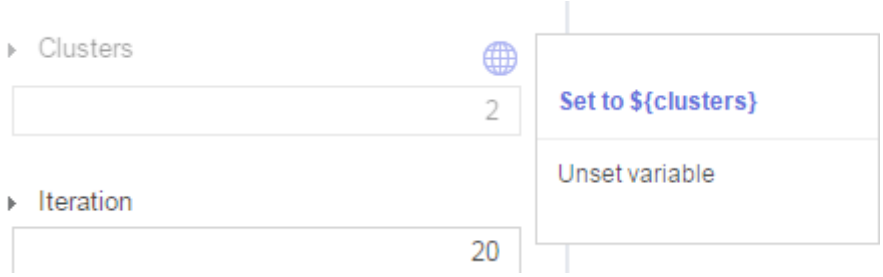


Figure 5-91 Context Menu with Variables Registered

D. You can verify the registered variable in Variables View.

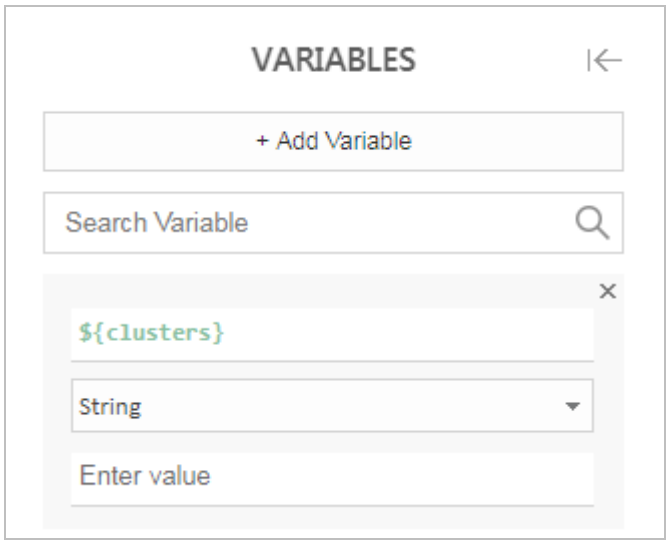


Figure 5-92 Variables Registered Normally

5.2.13.5 Execute Function

Click Run button on the bottom of Properties Panel to execute a function. If a variable is set, Variable window is displayed before execution, where you can set the variable. You can check the progress of the Run execution via Run Progress while the function is running. After the function execution is completed, function execution result is displayed in Out Data Panel.

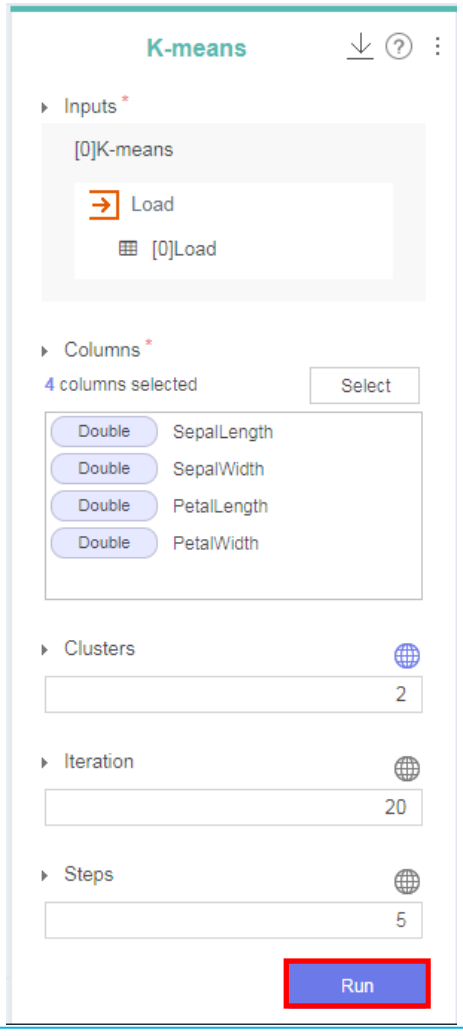


Figure 5-93 Properties Panel's Run Button

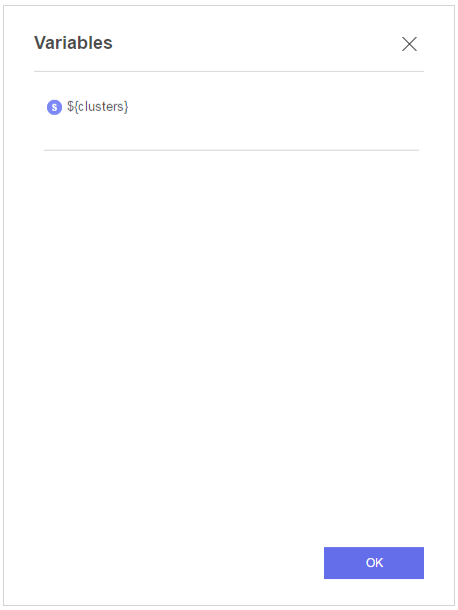


Figure 5-94 Variable Setting after Run Button Click

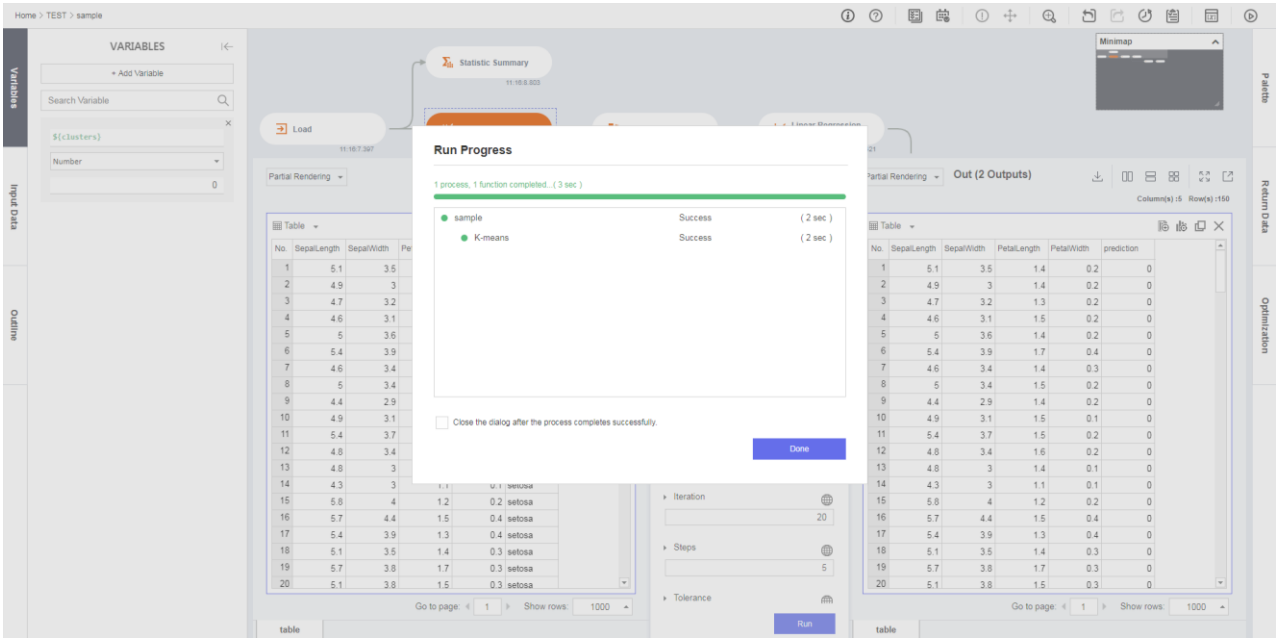


Figure 5-95 Run Progress Window and Function Result Screen

5.2.14 Use Data Panel

Data Panel is a panel that allows you to verify the data generated from the execution result of the function created in Diagram Editor and visualize them in various charts.

5.2.14.1 Change Rendering Mode

A. Partial Rendering is a panel that allows you to decide which row to look up among target data, confirm partial data and see them in various charts.

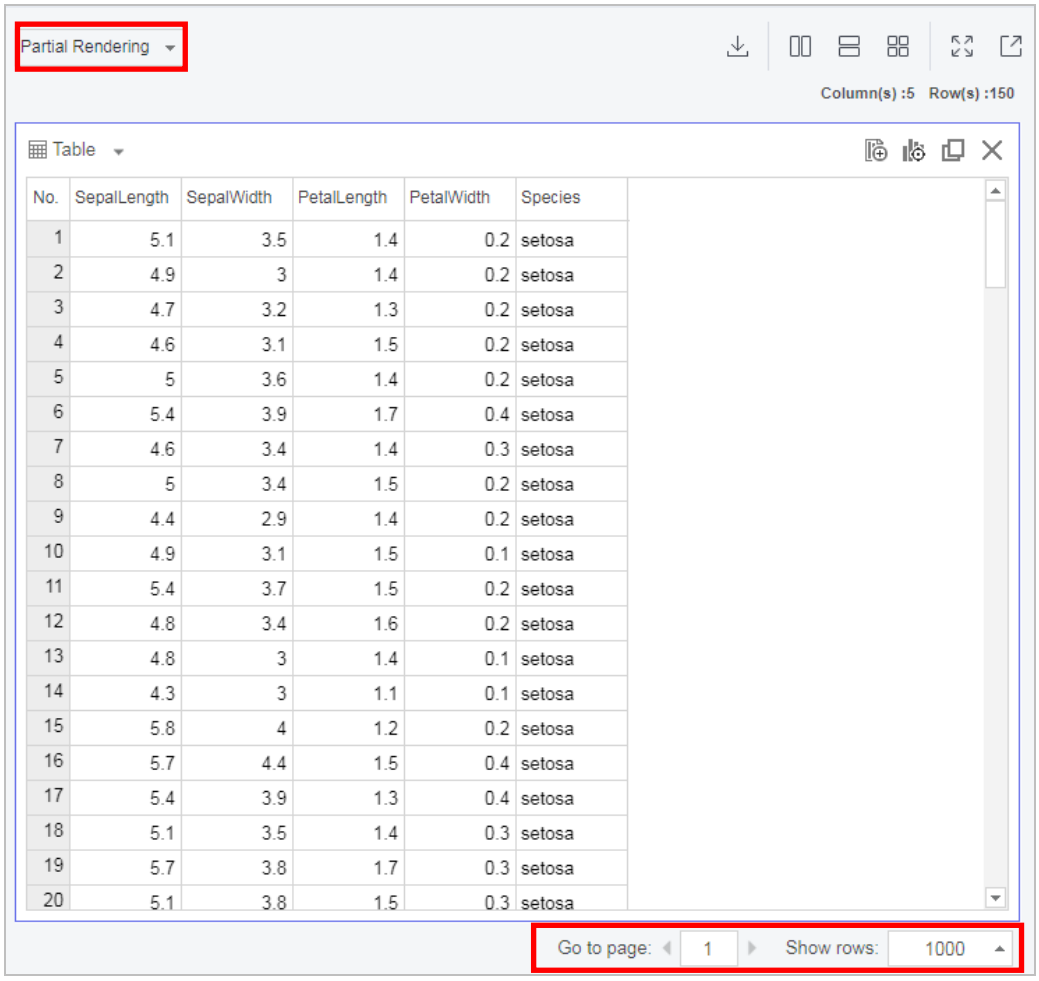


Figure 5-96 Partial Rendering Set as Rendering Mode

When the number of rows of data is over 1000, move page function is provided.

Name	Icon	Description
Go to page	Go to page: 2	Move to a desired page.
Show rows	Show rows: 1000	Select the number of rows that are displayed at a glance in the Table (1000~50,000)
	Column(s) :5 Row(s) :150	Show the number of entire columns and rows.

Table 5-1 Table Paging

B. Full Rendering offers a function that allows you to look up all the data by converting entire data into compressed data in a server. The chart is provided both in one chart and table at the same time.

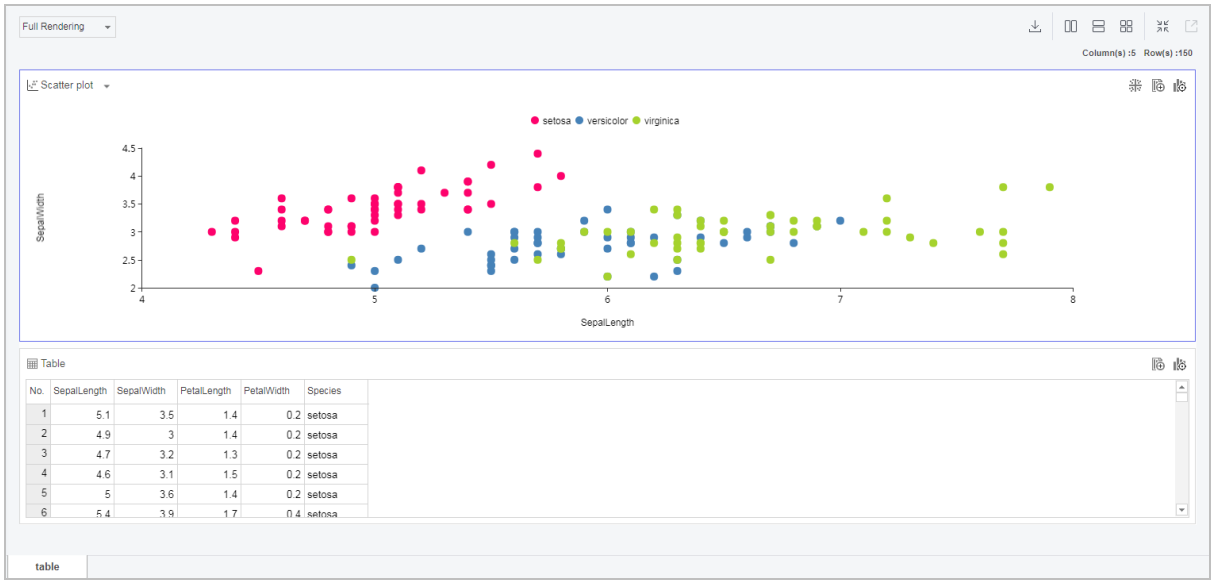


Figure 5-97 Full Rendering Set as Rendering Mode

5.2.14.2 Change Layout

A. Lay out each chart in a horizontal manner using Horizontal button located in the header of Data Panel.

Figure 5-98 Layout Set Horizontally

B. Lay out each chart on a grid pattern using Evenly button located in the header of Data Panel.

Figure 5-99 Layout Set on a Grid Pattern

C. A user directly drags & drops the header of a chart to change the layout of the chart.

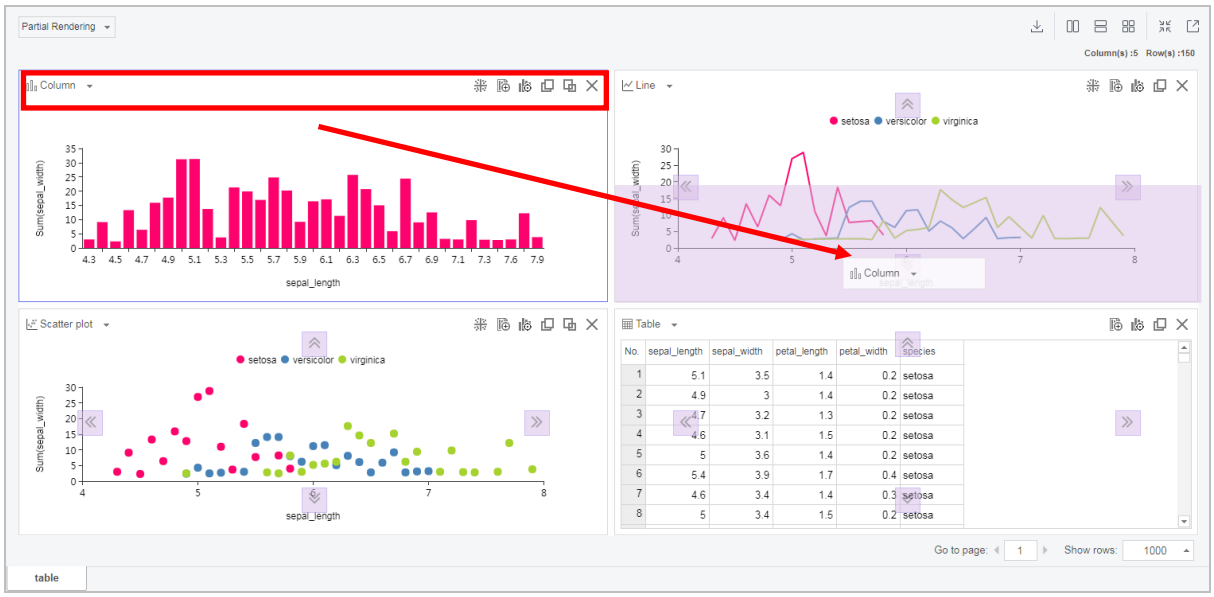


Figure 5-100 The Header of the Chart Dragged and Remaining Stationary at Target Location

Figure 5-101 Chart being Dragged and Dropped

5.2.14.3 Popup Chart

Popup Chart allows you to verify the chart that you worked on in Data Panel at a new window. You can modify chart option value of each chart using PROPERTIES, and you can also verify the chart of the data which was filtered through FILTERS. Note, however, the job that you worked on in Popup Chart is not stored.

A. Open a new window using  button located in the header of Data Panel.

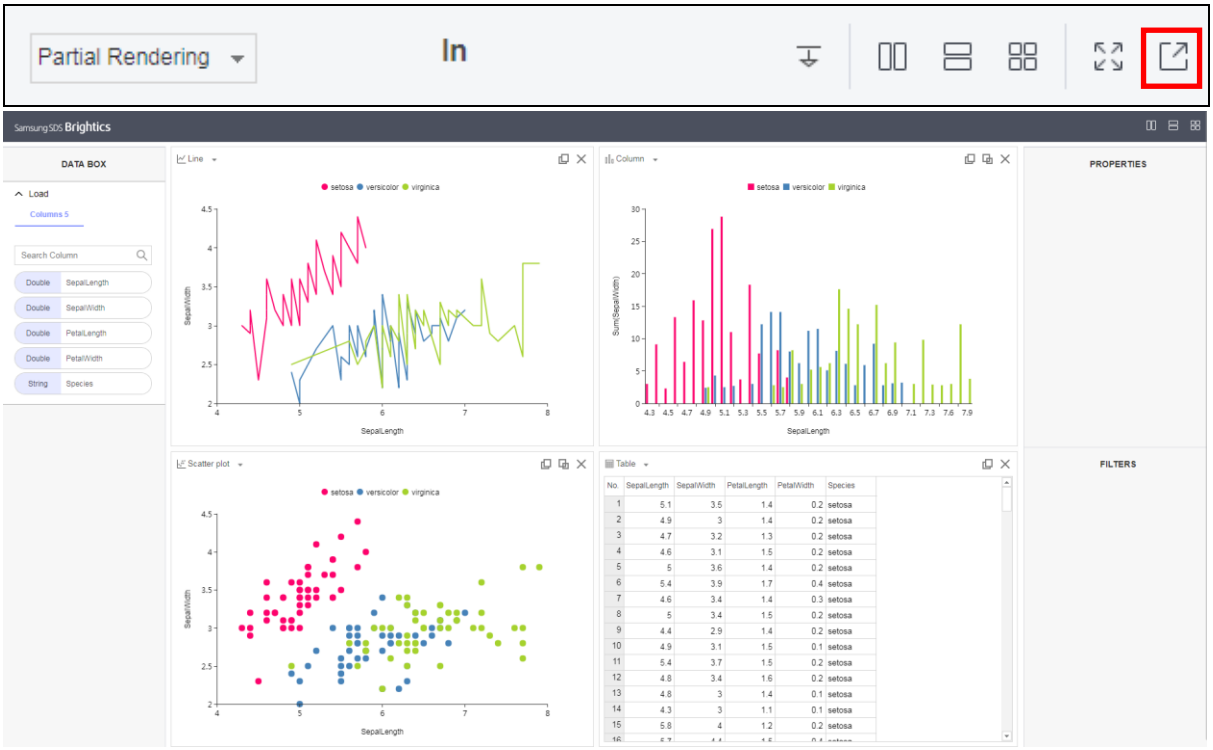


Figure 5-102 Popup Chart Screen

You can verify the name of the data that came in as Input in Data Box as well as column information.

B. Click the chart and modify Data source and Chart option information in PROPERTIES.

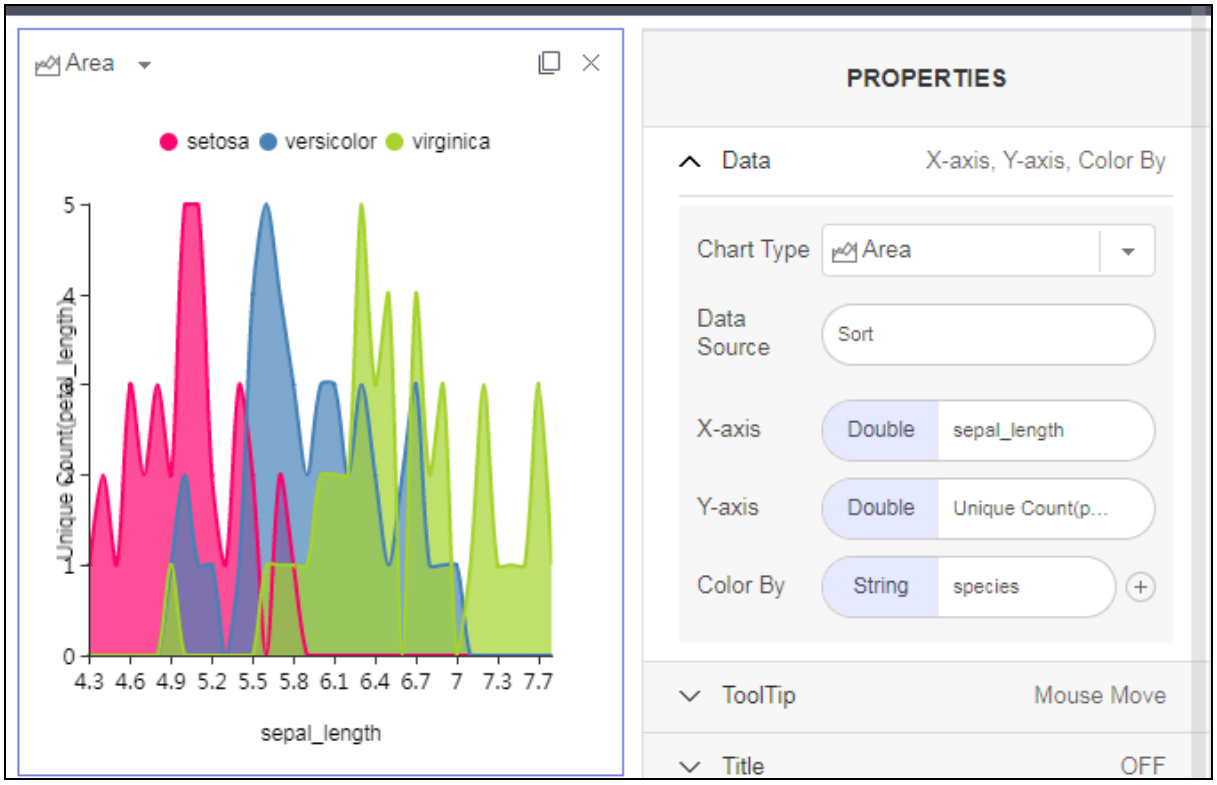
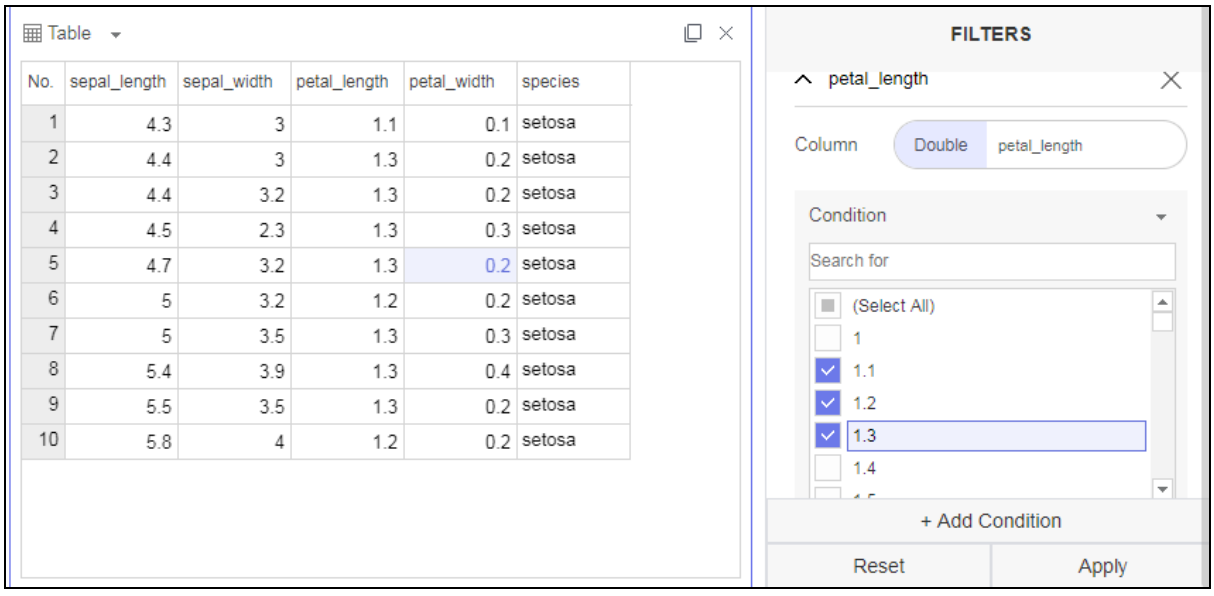


Figure 5-103 Popup Chart PROPERTIES Screen

C. You can draw a chart by clicking Chart and filtering data value in FILTERS.



No.	sepal_length	sepal_width	petal_length	petal_width	species
1	4.3	3	1.1	0.1	setosa
2	4.4	3	1.3	0.2	setosa
3	4.4	3.2	1.3	0.2	setosa
4	4.5	2.3	1.3	0.3	setosa
5	4.7	3.2	1.3	0.2	setosa
6	5	3.2	1.2	0.2	setosa
7	5	3.5	1.3	0.3	setosa
8	5.4	3.9	1.3	0.4	setosa
9	5.5	3.5	1.3	0.2	setosa
10	5.8	4	1.2	0.2	setosa

Figure 5-104 Popup Chart FILTERS Screen

5.2.14.4 Configure Chart Option

A. Call Chart Settings screen by clicking Chart Settings button.

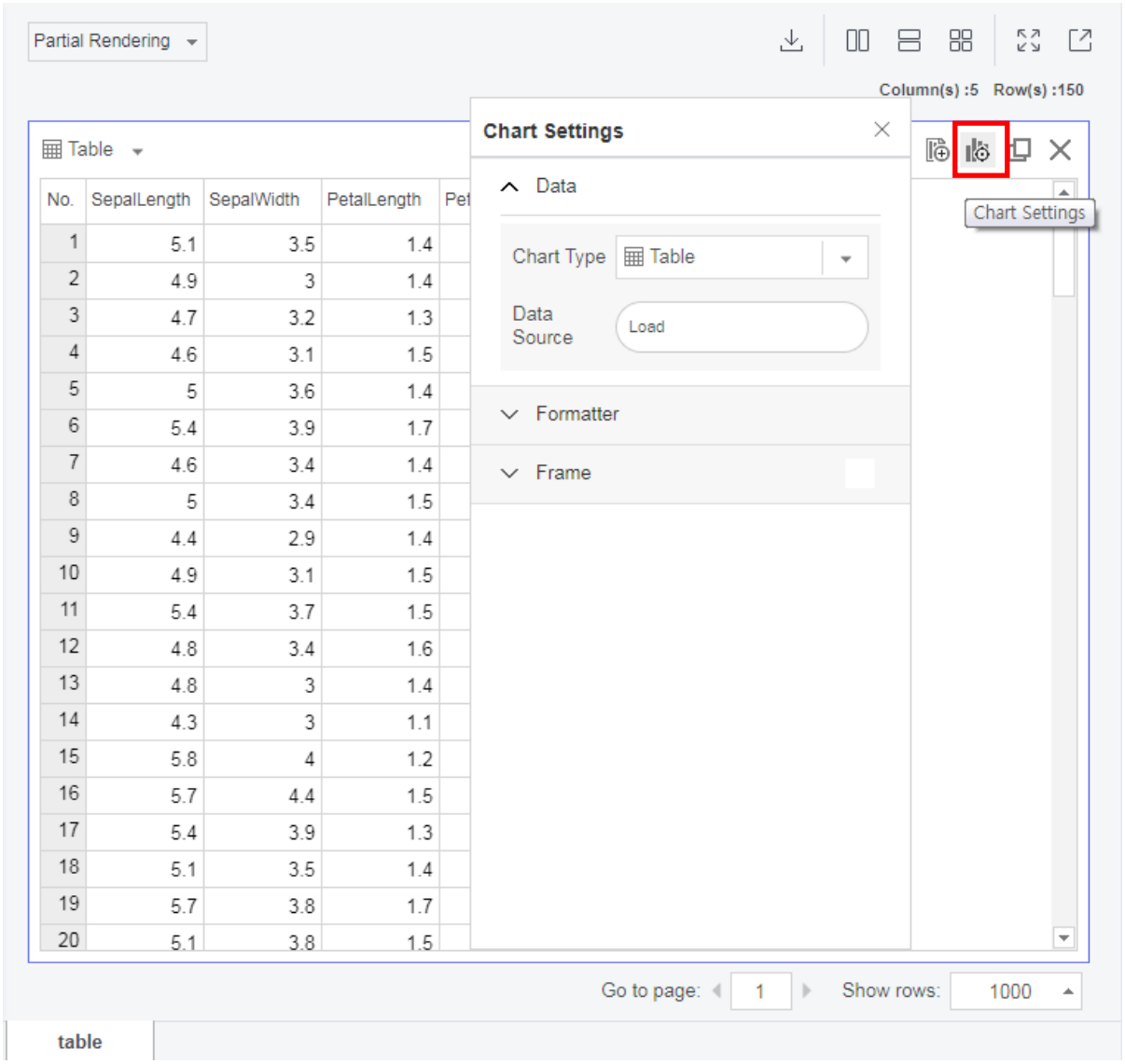


Figure 5-105 Chart Settings Window

B. Change Chart Option to represent the data on a desired chart.

Figure 5-106 Chart Option Changed to Scatter Chart

5.2.14.5 Add to Report

A. Click Report Add button in the Header of the chart that you want to represent as Report.

Figure 5-107 Add to Report Button

B. Select Report to add the corresponding chart to.

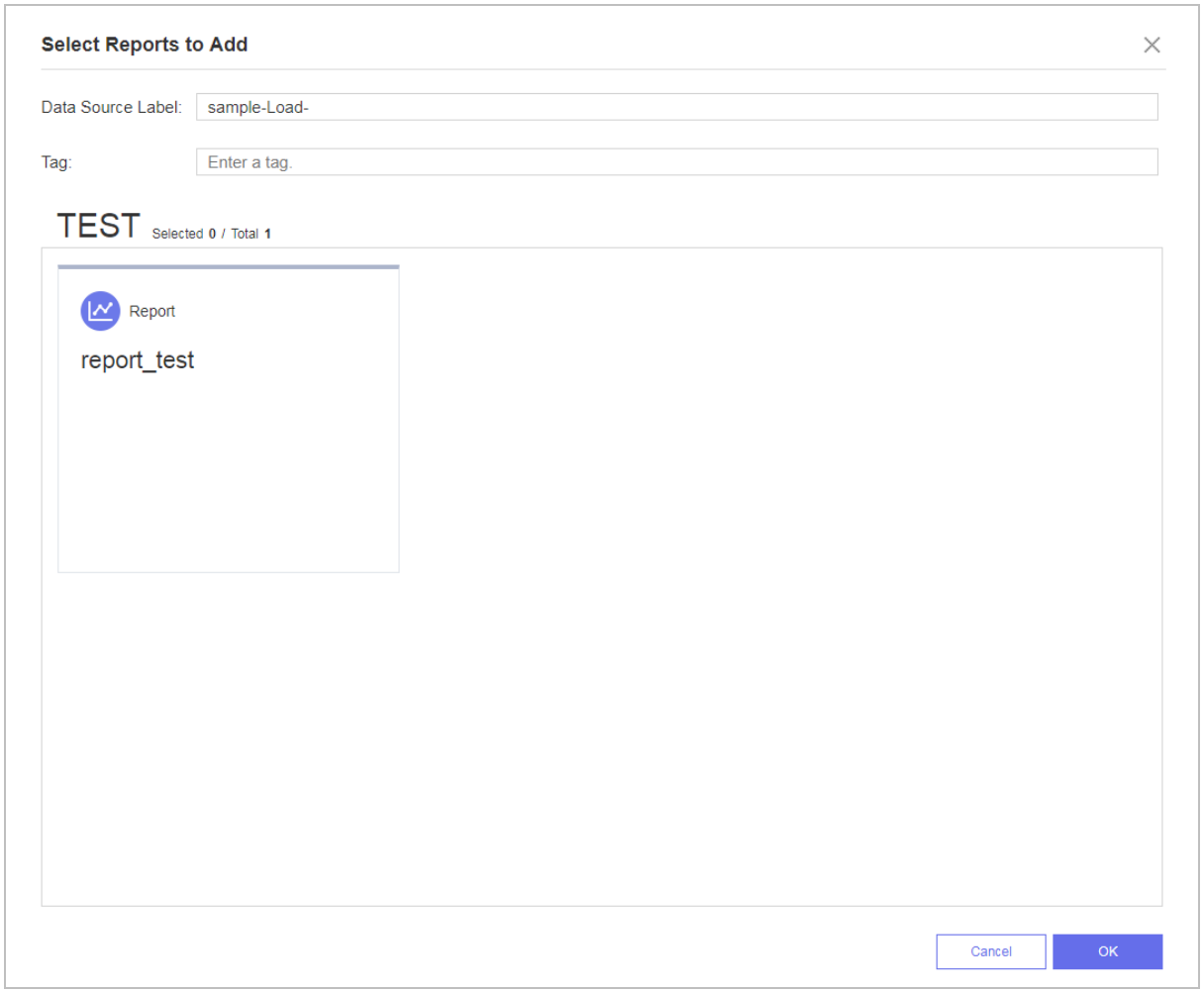


Figure 5-108 Select Reports to Add

5.2.14.6 Multi Chart

A. Click Multichart button in the corresponding chart to verify a new chart through grouping.

Figure 5-109 Multi Chart Icon

B. When Multichart window pops up, select a column (Group By) that becomes a criteria for grouping in Properties on the right-hand side of the screen. You can adjust the size of each chart through Width and Height.

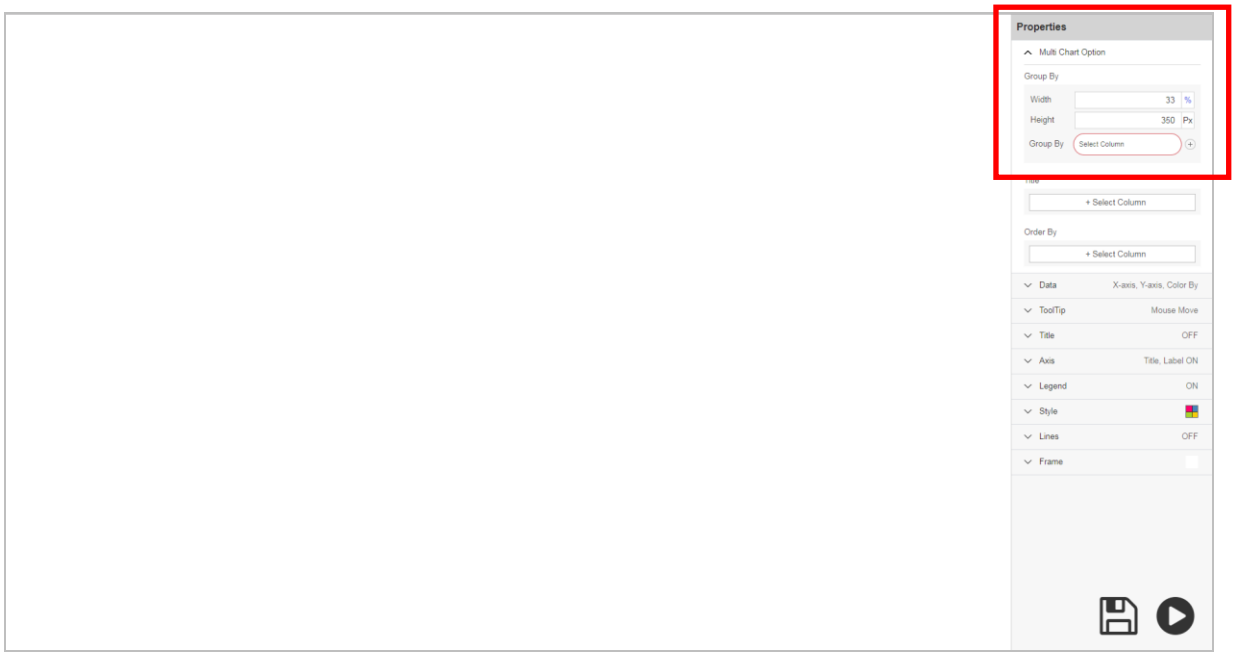


Figure 5-110 Multi Chart Settings

C. Click button on the bottom right-hand side of the screen to verify the result.

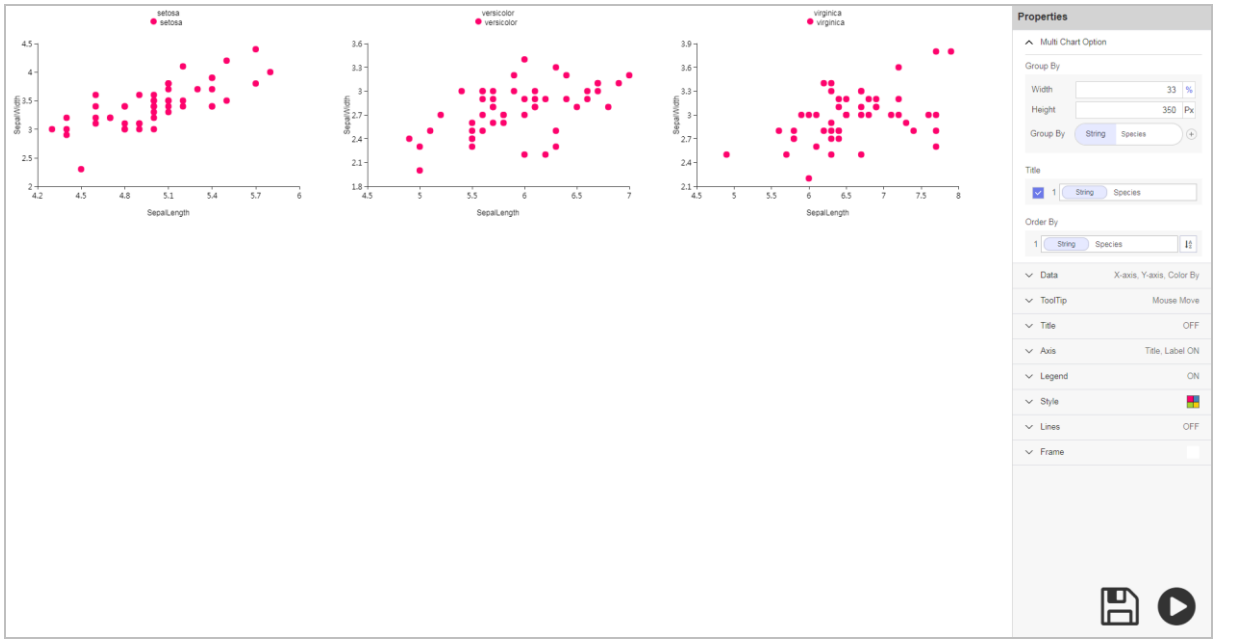
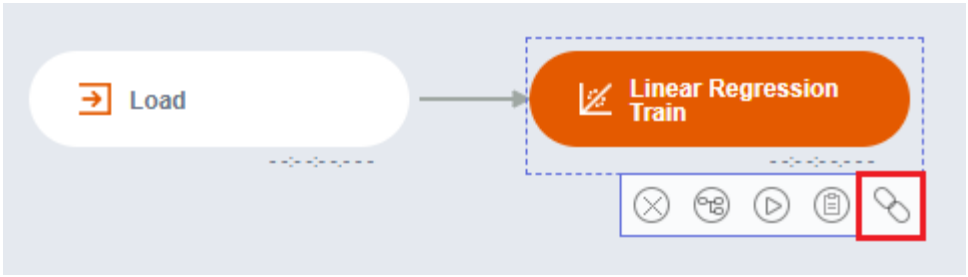


Figure 5-111 Multi Chart Viewer

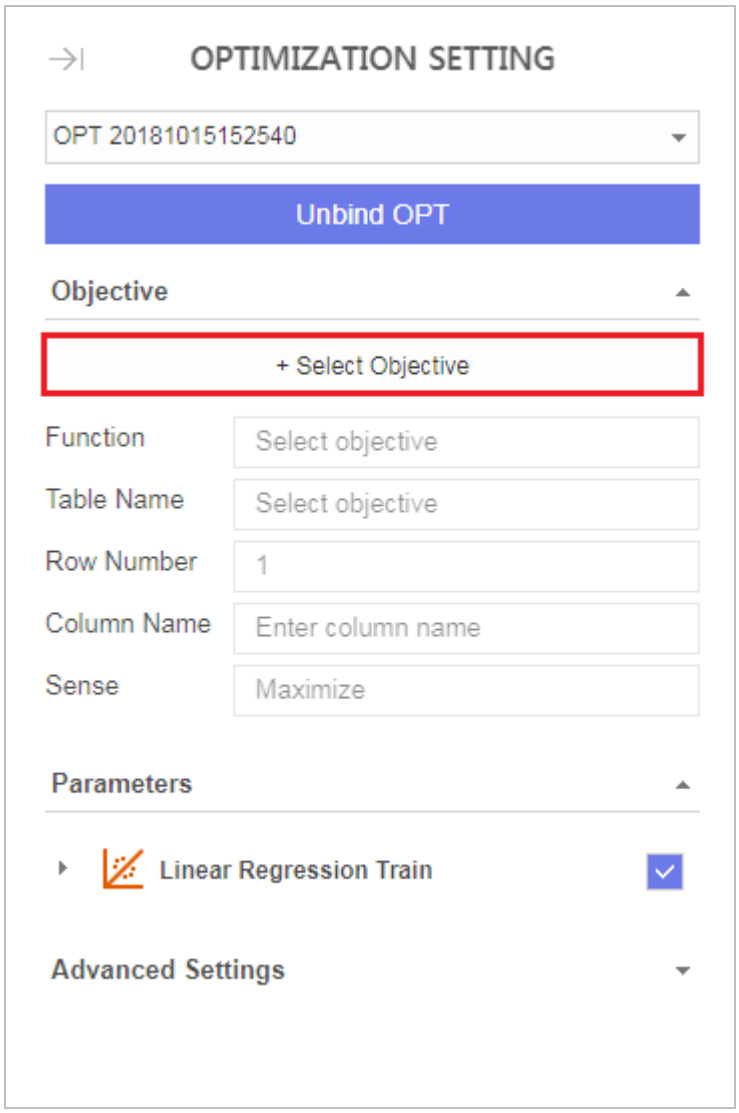
5.2.15 Optimize Analytics Model

5.2.15.1 Bind for OPT

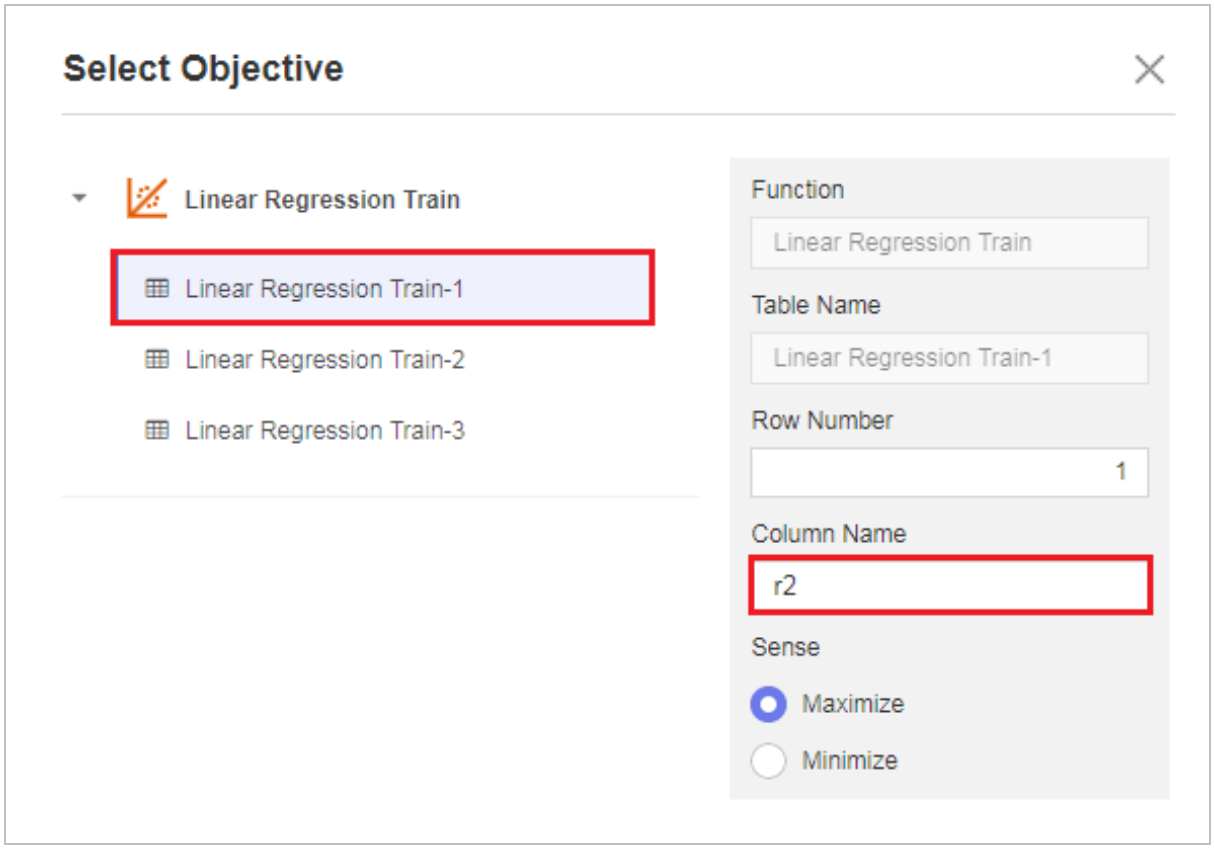
A. Click Bind for OPT button in the lower part of the selected area.



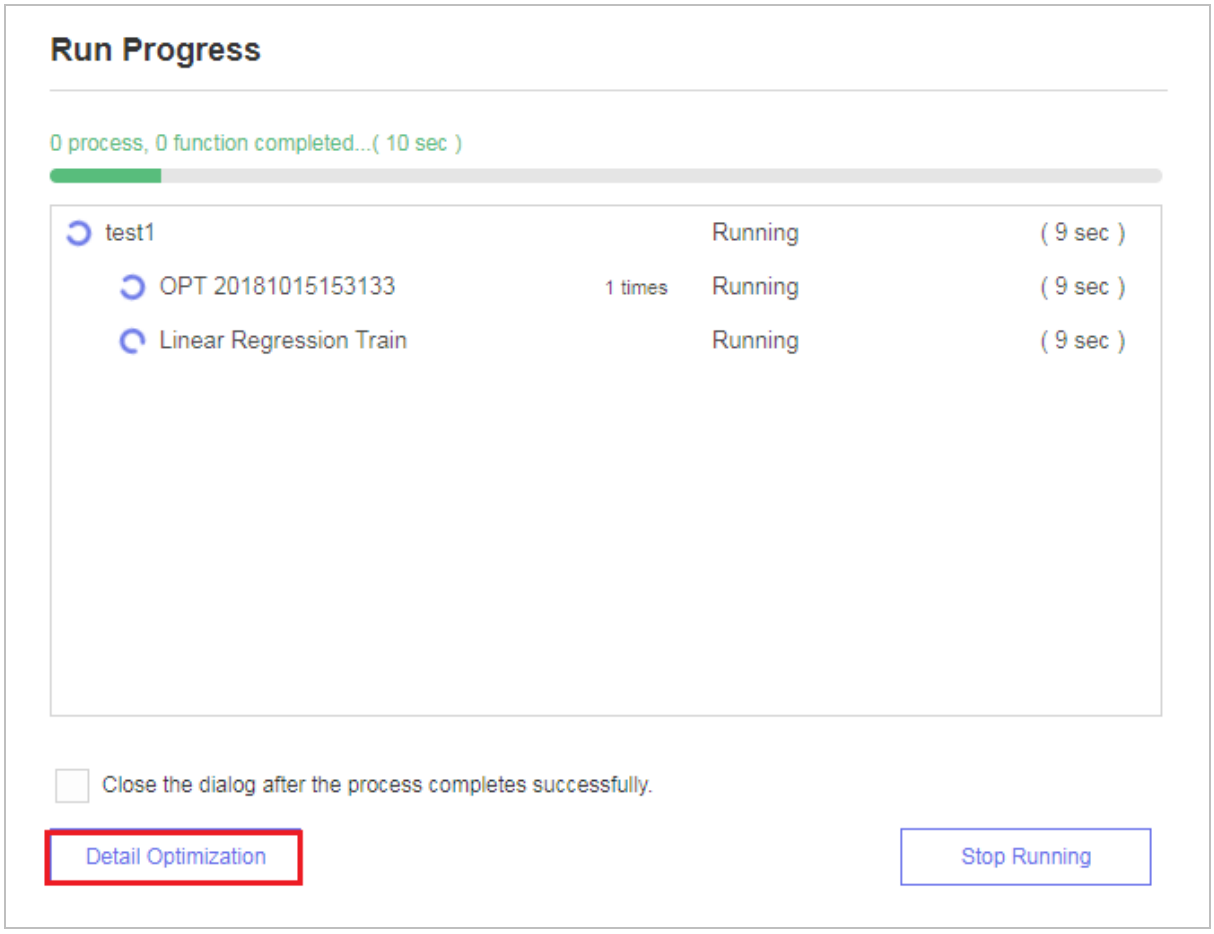
B. Select Objective in OPT Setting Panel on the right.



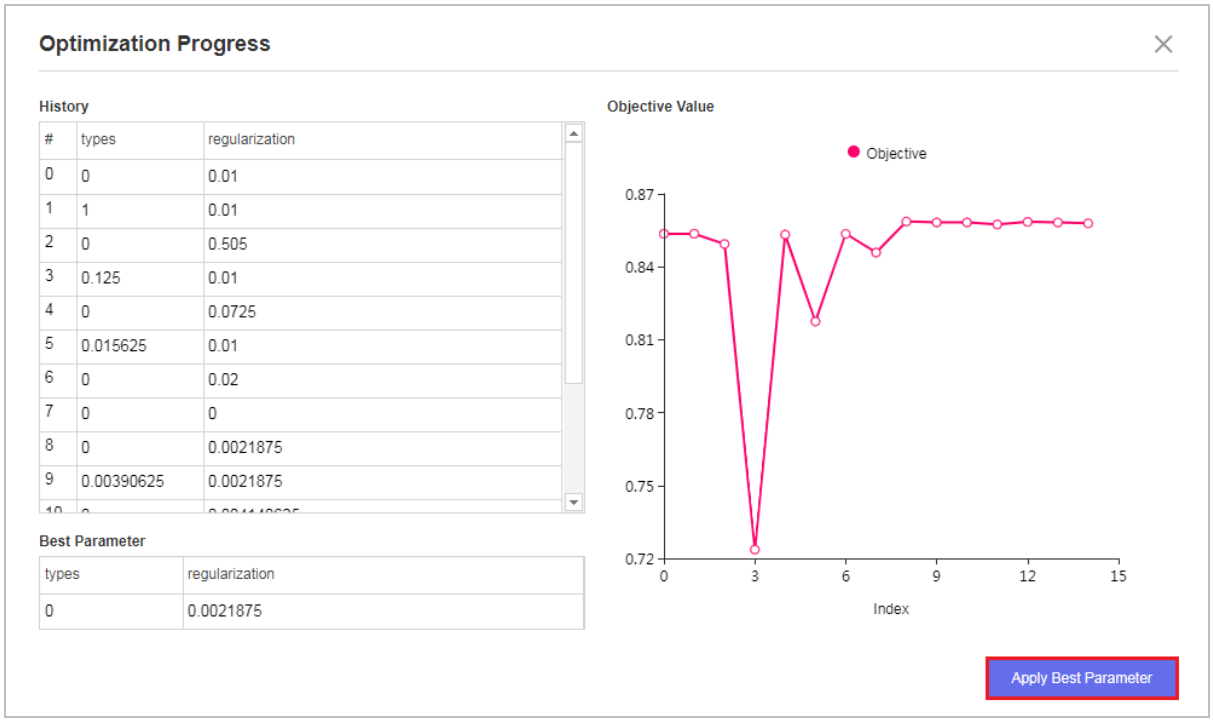
C. Select the table, row and column to optimize in Select Objective window.



D. Run a model and click Detail Optimization.



E. Verify Optimization process and enter the optimal parameter into function setting using Apply Best Parameter button once the optimization is completed.



5.2.16 Use Control Function

5.2.16.1 Use Condition Function

Condition function is used for branch execution of sub analytics model according to a user-defined Boolean condition when executing an analytics model.

A. Create a function using Select Function Popup window or Palette in Diagram Editor. When you click the function, Properties Panel where you can enter properties is enabled.
B. Enter condition properties (IF, Else IF).

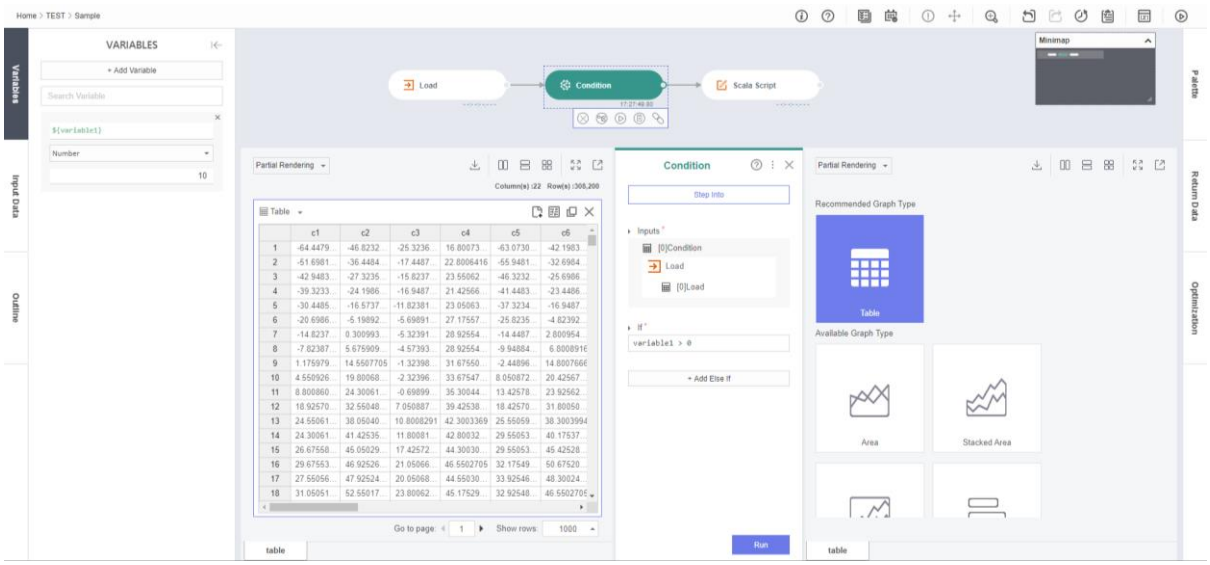


Figure 5-112 Condition Function Property Setting

C. When you click **Step Into** button, a screen is switched to allow you to write sub analytics model that will be run according to a condition. The switched screen displays a Tab which corresponds to the pre-defined condition. If you select the Tab, you can write sub analytics model that will be executed according to each condition.

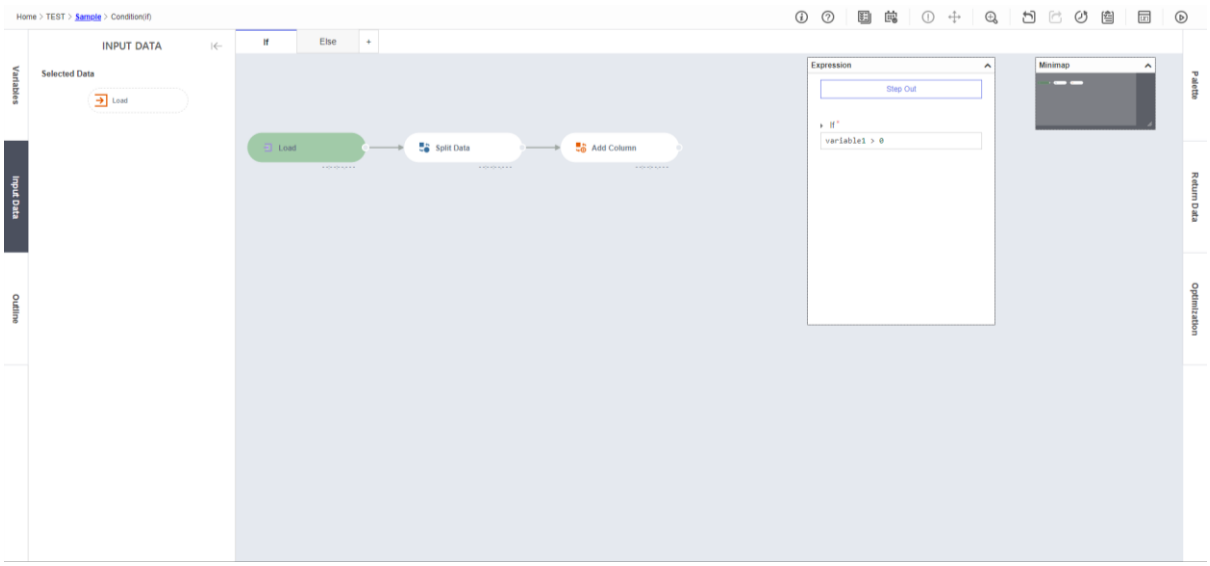


Figure 5-113 Condition Function Property Setting

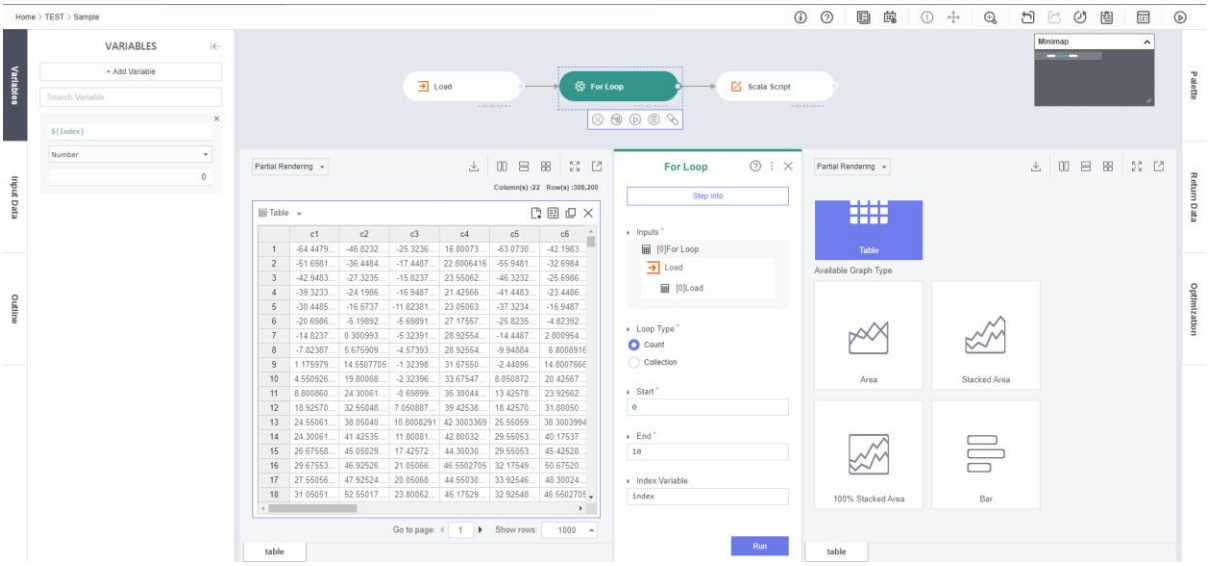
D. You can move to the upper side of the screen using **Step out** button or Navigator at the top.

Note	When setting Return Data in sub analytics model that corresponds to each condition, you have to do so in a way that column information is consistent.

5.2.16.2 Use For Loop Function

For Loop Function is used to repetitively execute sub analytics model as many times as was set by the user-defined condition.

A. Create a function using Select Function popup window or Palette in Diagram Editor. If you click the function, Properties Panel where you can enter properties is enabled.



Name	Description
Start	Enter start value.
End	Enter end value.
Index Variable	Currently running Index value is updated to the set variable.
Collection	Set Collection Variable that includes Element.
Element Variable	Currently running Element variable is updated to the set variable.
Index Variable	Currently running Index value is updated to the set variable.

Table 5-2 For Loop Function Property

B. If you enter property and click **Step into** button, a screen is switched to allow you to write sub analytics model that will be repetitively executed according to a condition.

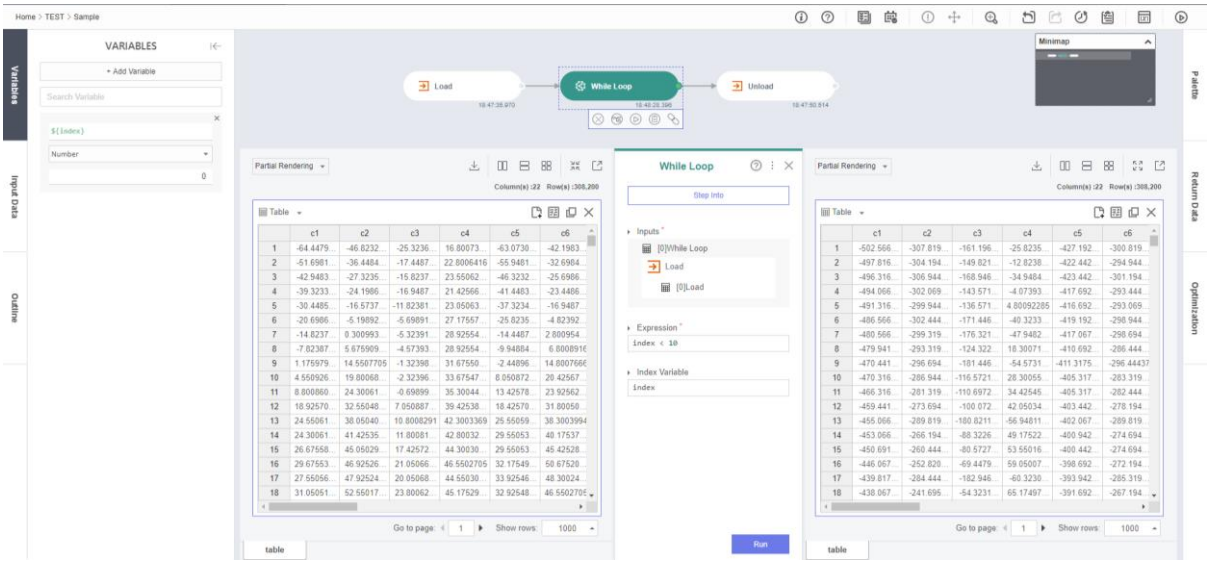
C. You can move to the upper side of the screen using **Step out** button or Navigator at the top.

5.2.16.3 Use While Loop Function

While Loop Function is used to repetitively execute sub analytics model until the user-defined condition

is satisfied.

A. Create a function using Select Function popup window or Palette in Diagram Editor. If you click the function, Properties Panel where you can enter properties is enabled. For closing condition, either use Index Variable or Set Value Function in sub analytics model to change the value of the variable used.



Name	Description
Expression	Enter closing condition.
Index Variable	Currently running Index value is updated to the set variable.

Table 5-3 While Loop Function Property

B. If you enter properties and click **Step into** button, a screen is switched to allow you to write sub analytics model that will be repetitively executed according to a condition.

C. You can move to the upper side of the screen using **Step out** button or Navigator at the top.

5.2.16.4 Use Flow Function

Flow Function is used when an analytics model calls another analytics model and executes it. Generally, called analytics model implements a common logic considering the possibility of being called by another analytics model.

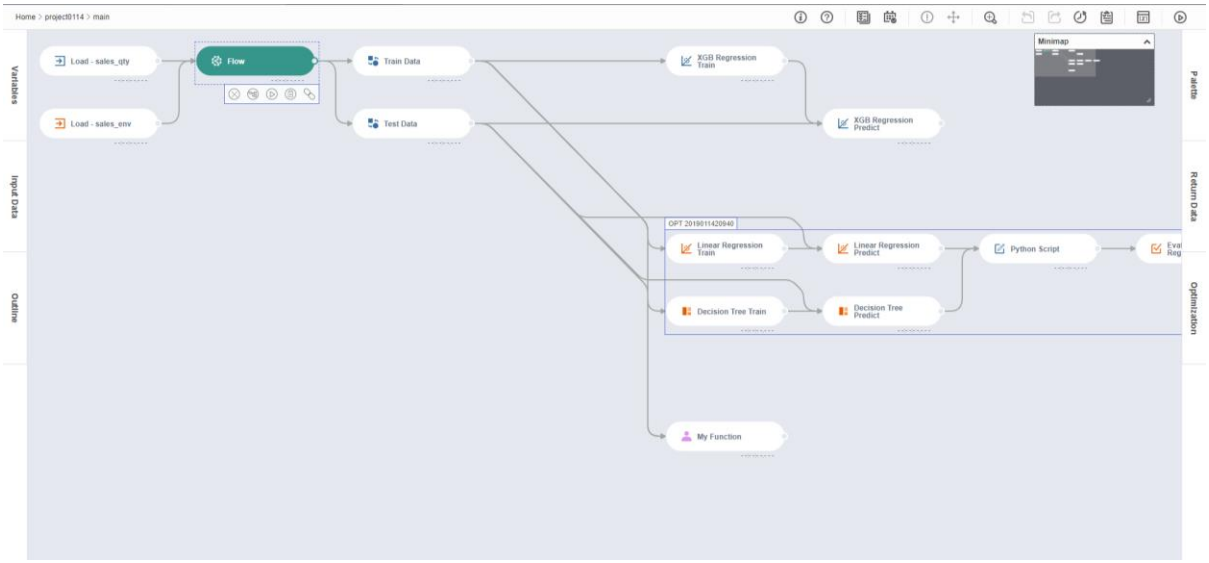


Figure 5- 114 Main Analytics Model – Call Analytics Model using Flow Function

A. Write an analytics model to call and use.

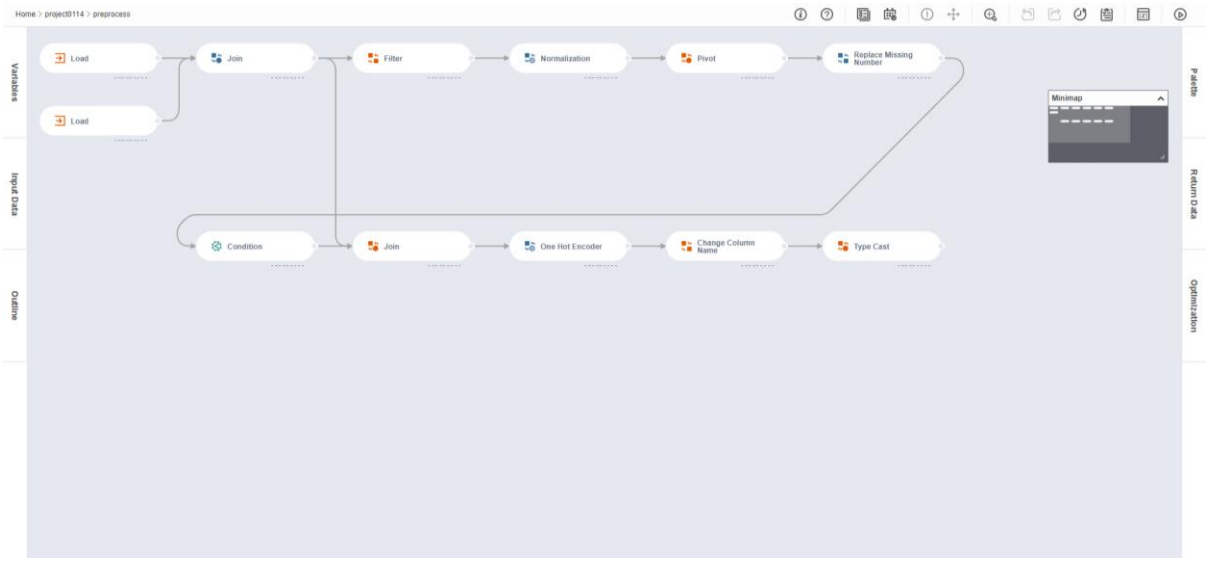


Figure 5-115 Preprocess Model written to be called by Main Analytics Model

B. Configure settings so that load function used in Preprocess Model is replaced with the connected Input Data at the time when the analytics model concerned is called. Use Drag & Drop function in Selected Data on the In Data List.

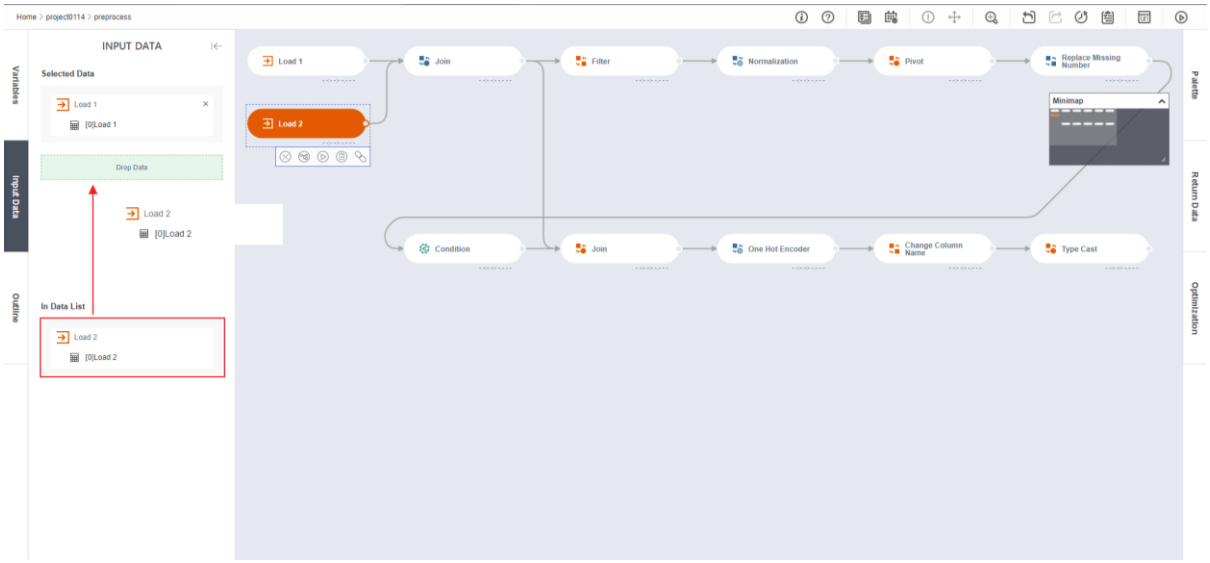


Figure 5-116 Input Data Setting

C. Configure Return Data so that the final resultant data of the preprocess model can be used in the main analytics model. If you select the function that contains the resultant data, configurable data is displayed on Out Data List in Return Data View, and you can configure the desired data with Return Data using drag & drop function.

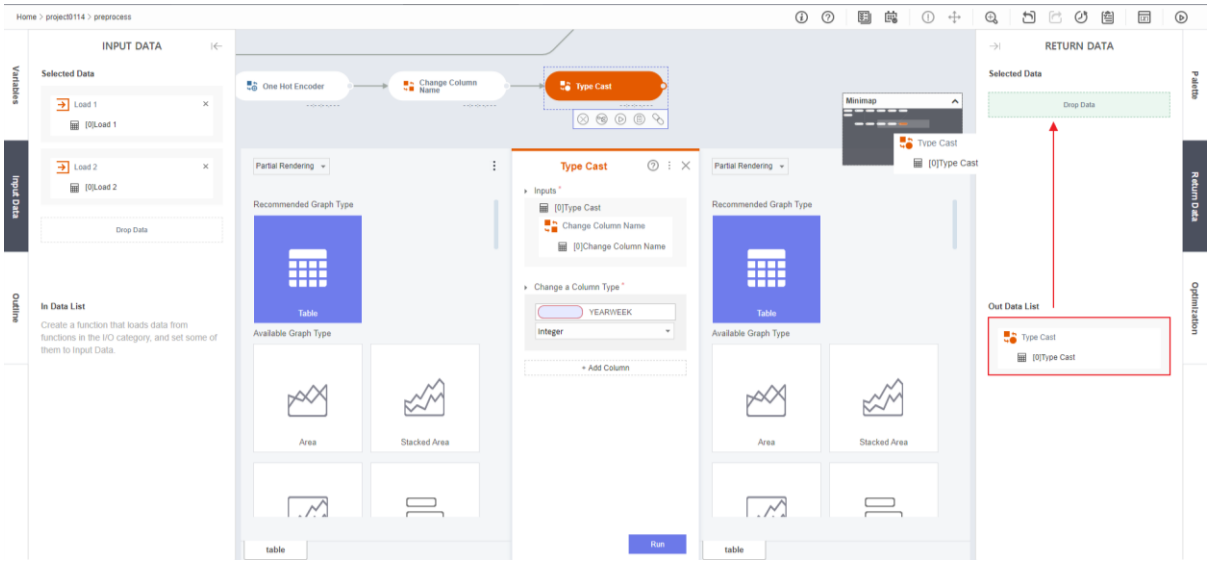


Figure 5-117 Return Data Setting

D. If you click Flow Function of main analytics model, Properties Panel where you can enter properties is enabled. Select and enter Preprocess Model with model parameter value.
When you run a function, Input Data connected to the Flow Function replaces Input Table (Read only) of preprocess model, and the resultant data is displayed as data of Return Table (Read only) set on the Return Data.

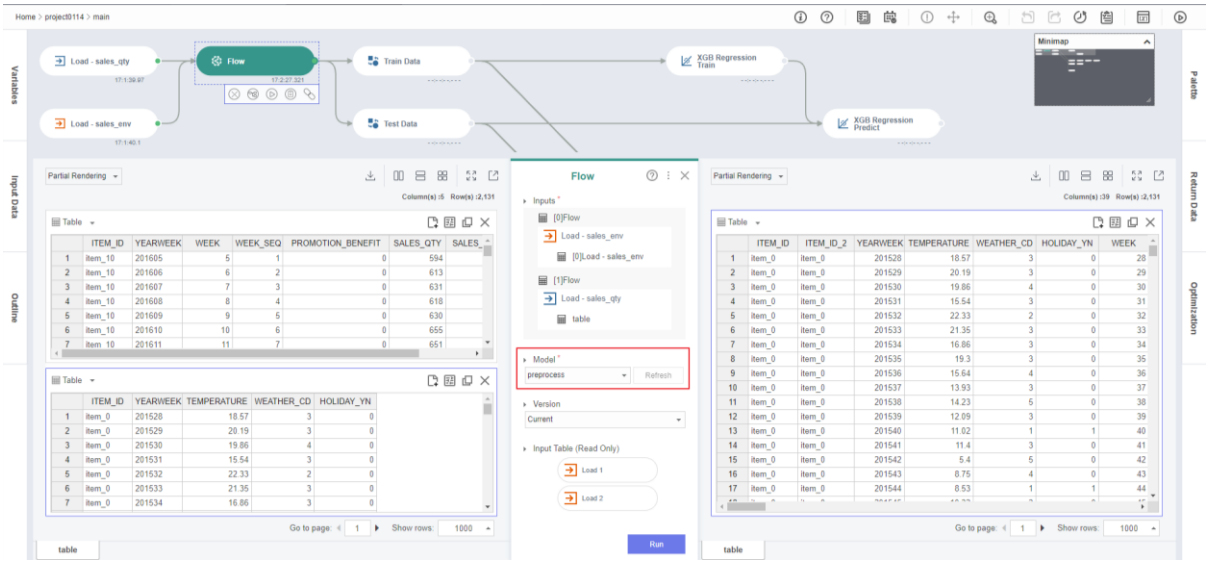


Figure 5-118 Flow Function Property Setting

5.3 Use Script Model Editor

5.3.1 Add Unit

A. Click **Add Scala**, **Add SQL**, or **Add Python** button on the left-sided Script View.

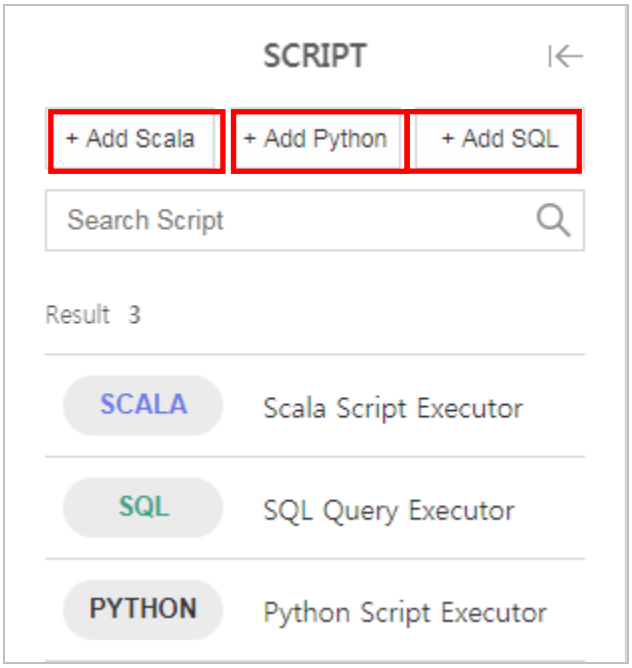


Figure 5-119 Script View

B. You can verify that a new unit is created next to the selected unit in Script Editor and Script View.

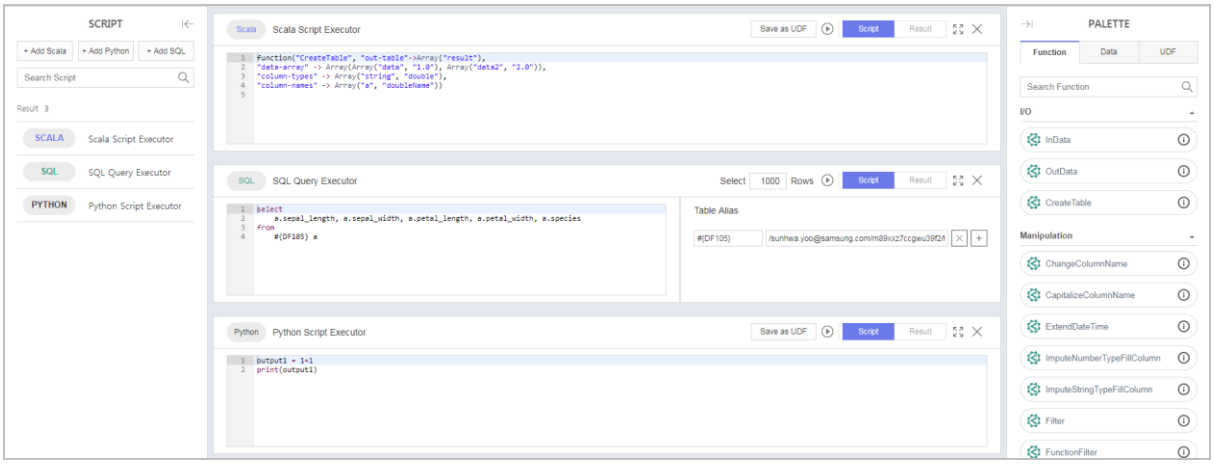


Figure 5-120 Unit Created

5.3.2 Execute Unit

A. Enter content into Scala/Python/SQL script and click  button.

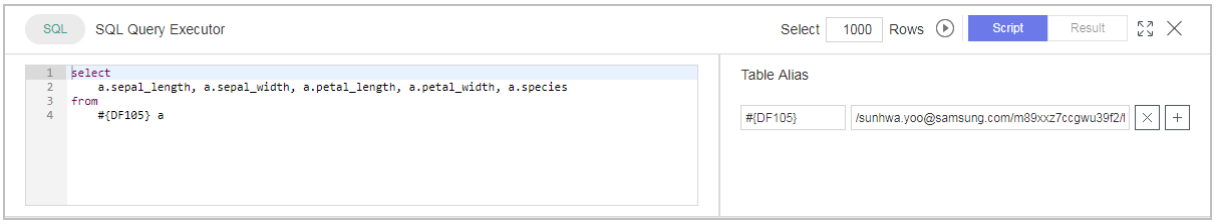


Figure 5-121 SQL Script Unit Executed

B. When execution is completed, result is updated at the bottom of the screen.

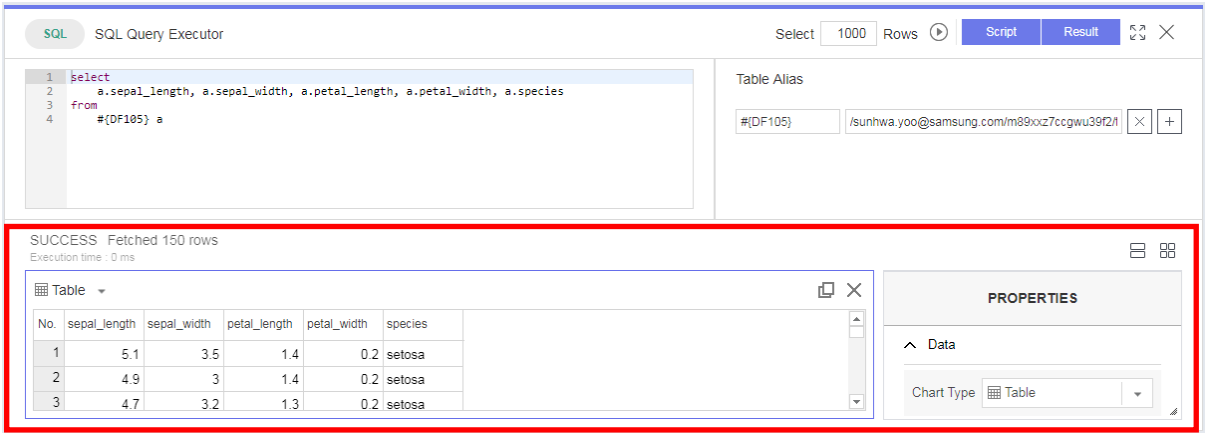


Figure 5-122 SQL Script Unit Executed

5.3.3 Delete Unit

A. Click  button in Scala/Python/SQL script.

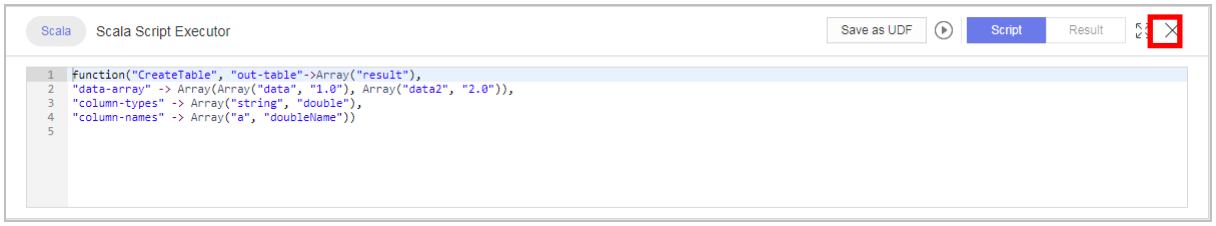


Figure 5-123 Scala Script Unit Deleted

5.3.4 Use SQL Unit

A. Click Add SQL button on the left-sided Script View. Drag one of the tables from the right-sided Data PALETTE and drop to SQL Query Executor window created. (Drag & Drop)

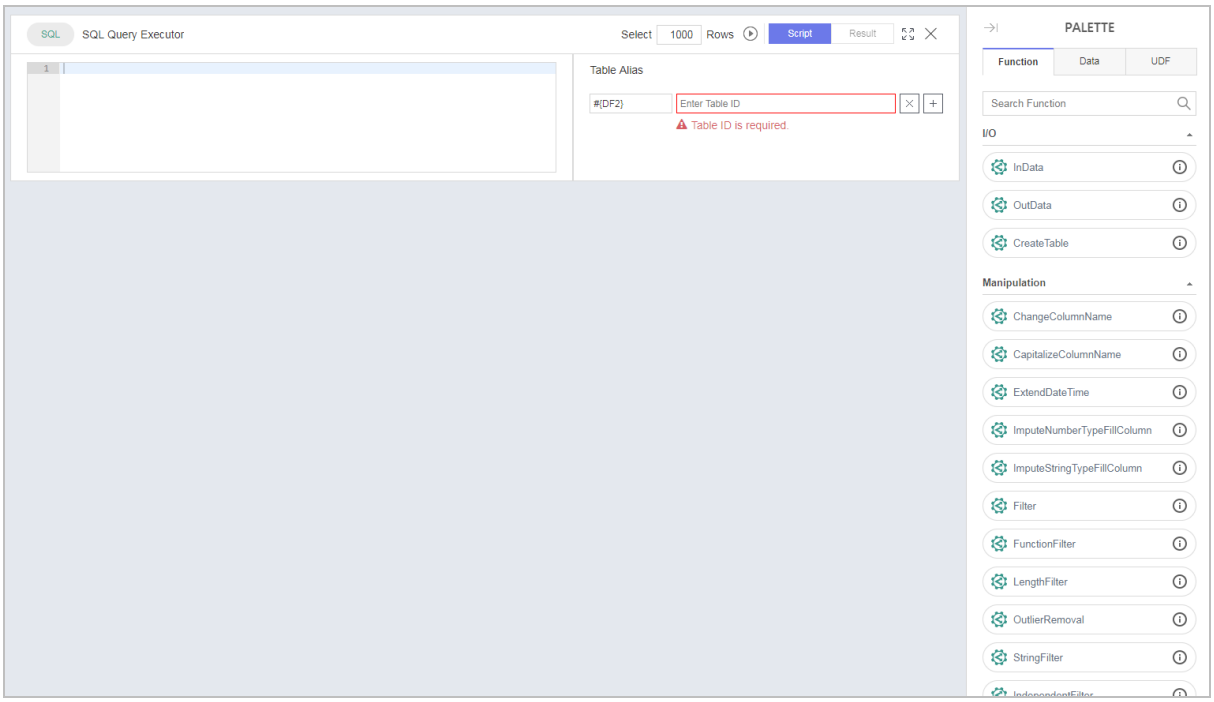


Figure 5-124 SQL Query Executor

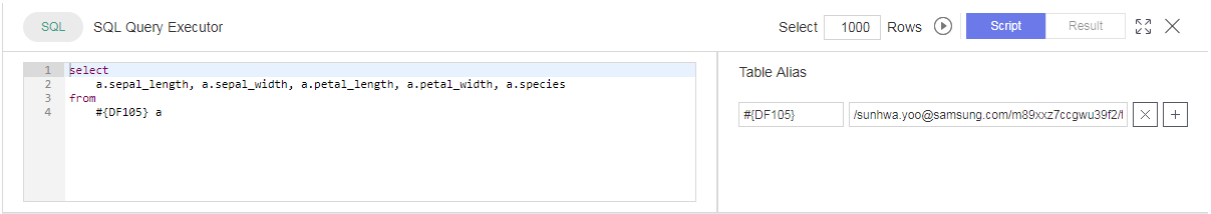


Figure 5-125 SQL Query Executor

Basic SQL select statement to select data from the corresponding table is displayed on the left-sided window. You can change Alias name of the corresponding table on the right-sided window. If you click Run button, select statement on the left is executed. A minimum 1,000 rows (default value) of data is retrieved and displayed as a result value, and PROPERTIES window is displayed on the right. If you click the table from the query's result, Chart Option Property window opens in the window.

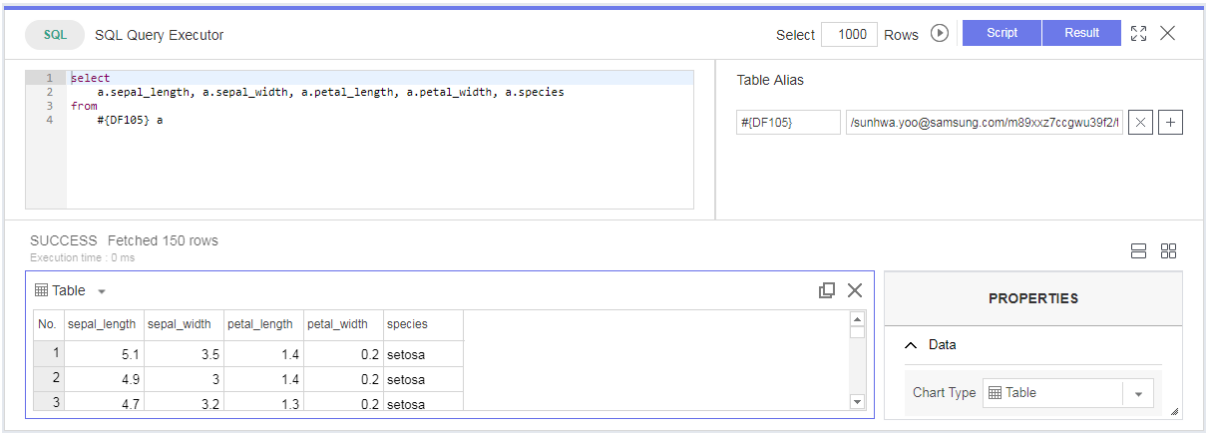


Figure 5-126 SQL Query Executor Result Window

You can set Chart Type, Tooltip, Title, Style, and Frame option in Chart Option Property window to visualize data for verification.

Figure 5-127 SQL Query Executor Chart Option Property

5.3.5 Create an User Defined Function

You can create a user-defined function using the script written on Scala script or Python script in Script Model.

A. Click Save as UDF button in Scala/Python script.

Figure 5-128 Create UDF in Scala Script

B. Toolkit appears in a new window.

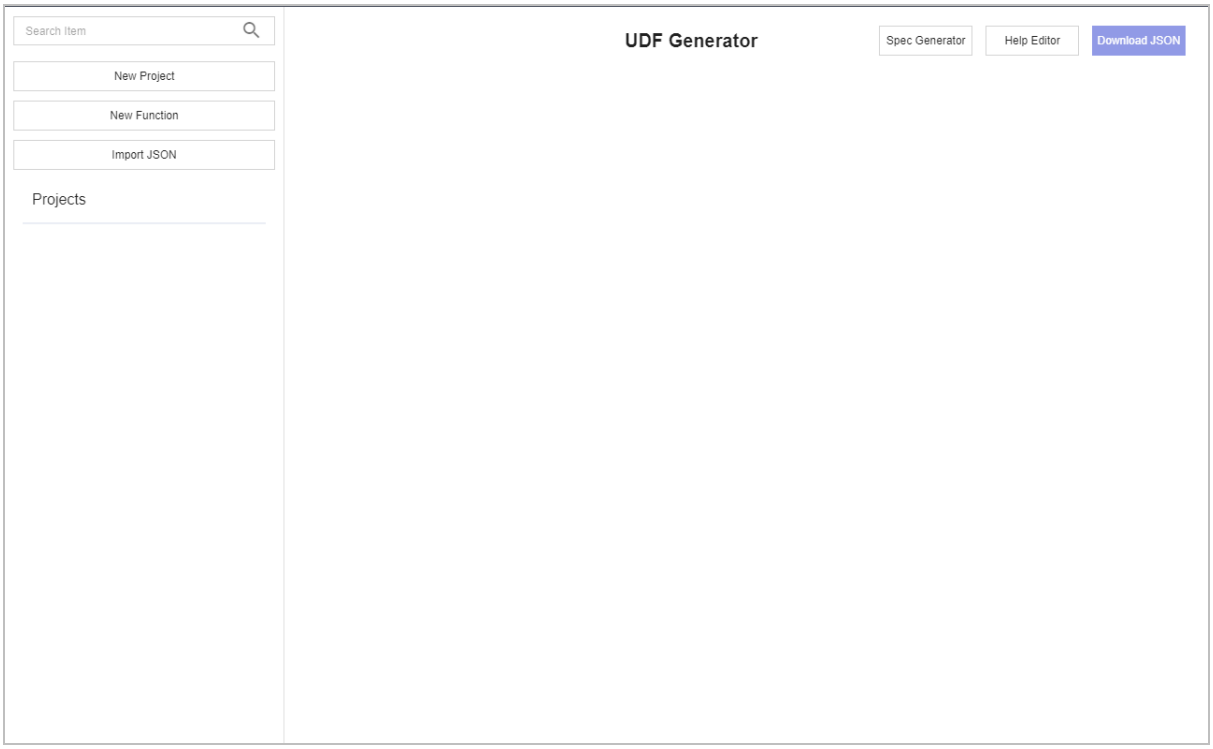


Figure 5-129 Toolkit Window

A. Project is necessary to create UDF. Click New Project on the left-hand side of the screen, enter Project Label in a window that appears after New Project is clicked, and create a new project.

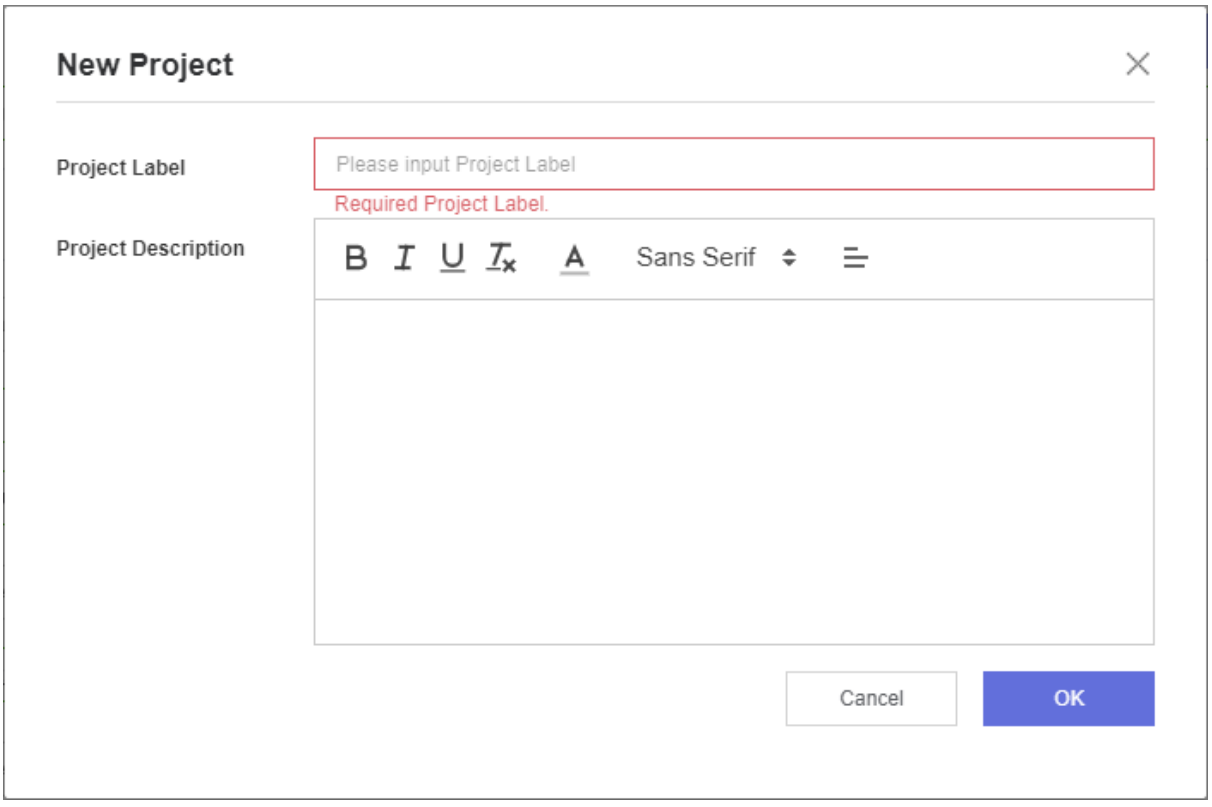


Figure 5-130 Window for Creating Toolkit Project

B. Click New Function on the left-sided menu. Select the Project that you created before from Project Label in a popup window that appears. Then select UDF from Category and enter Function Label to create UDF function.

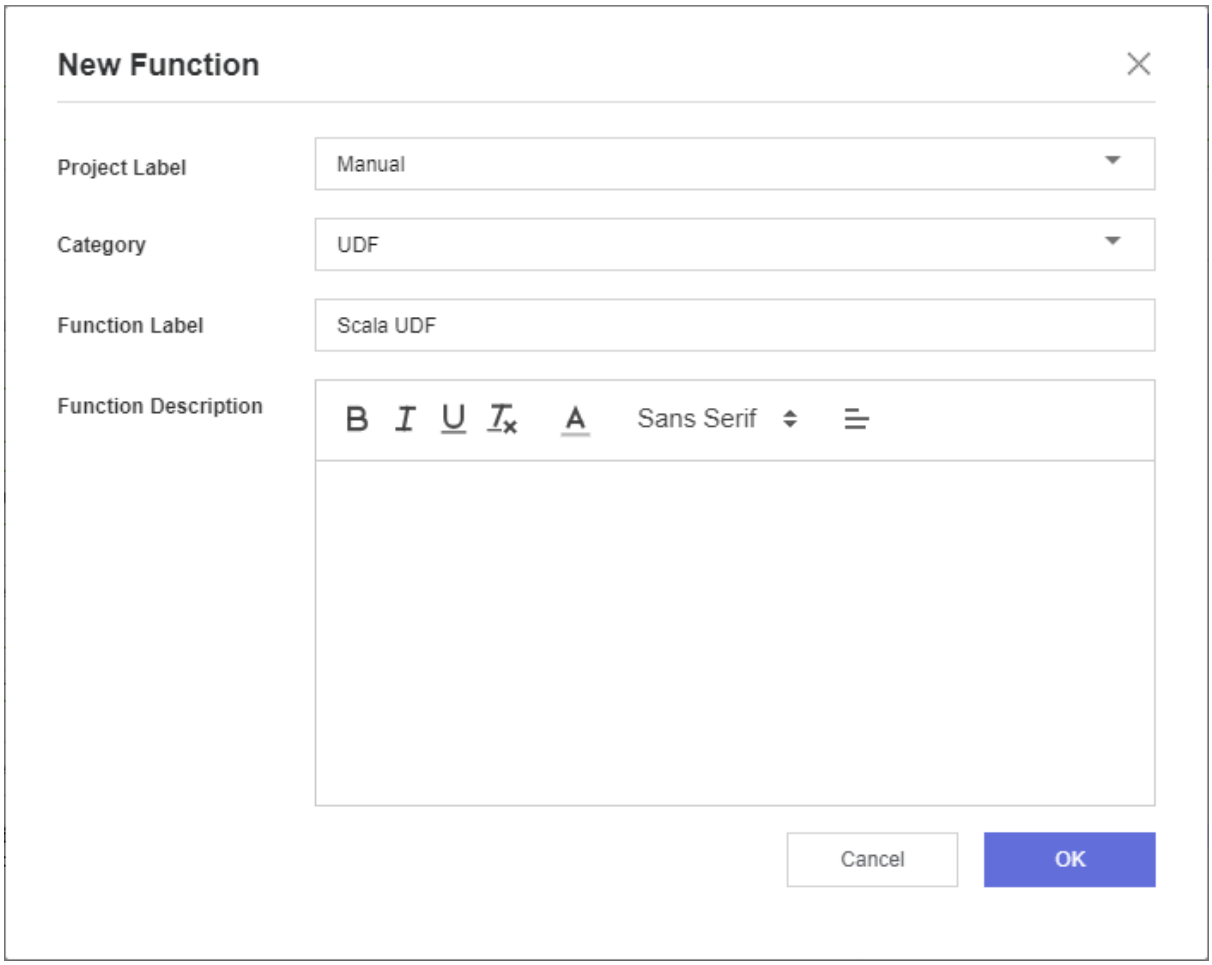


Figure 5-131 Window for Creating Toolkit Function

C. You can verify UDF Generator screen.

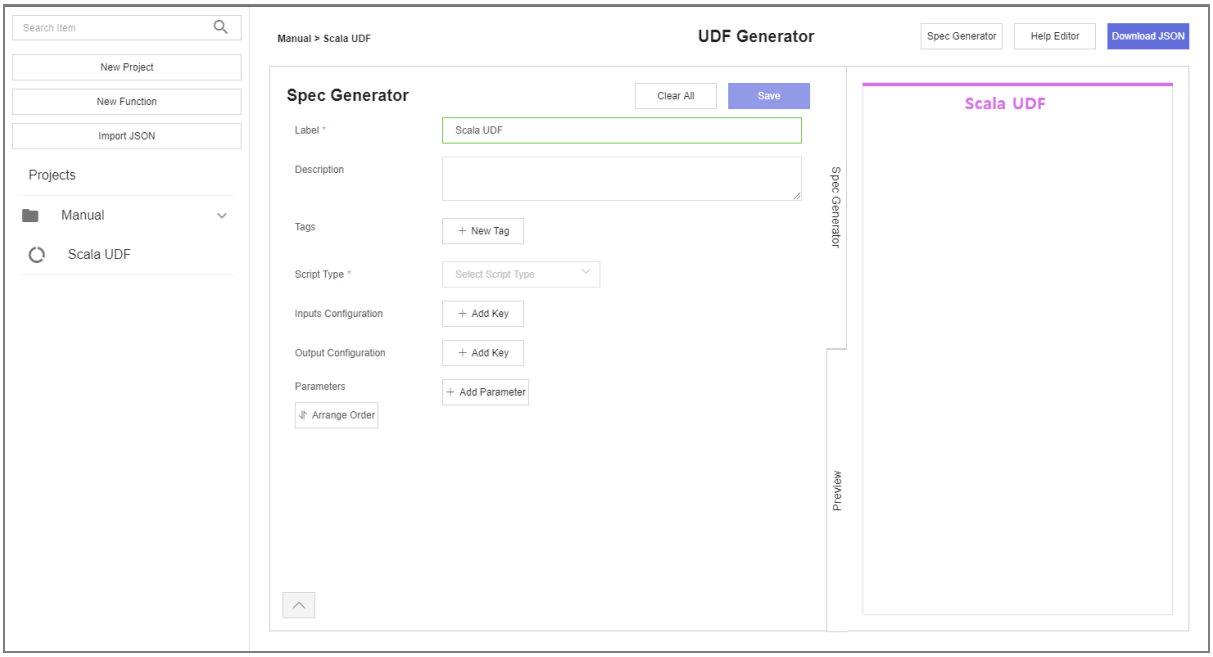


Figure 5-132 UDF Generator Screen

D. Enter Label and select Scala as Script type. And enter Inputs and Outputs respectively, and write Scala script to be applied to the UDF. Scala UDF has a constraint that the name must be entered as inputs when the type that you selected is table.

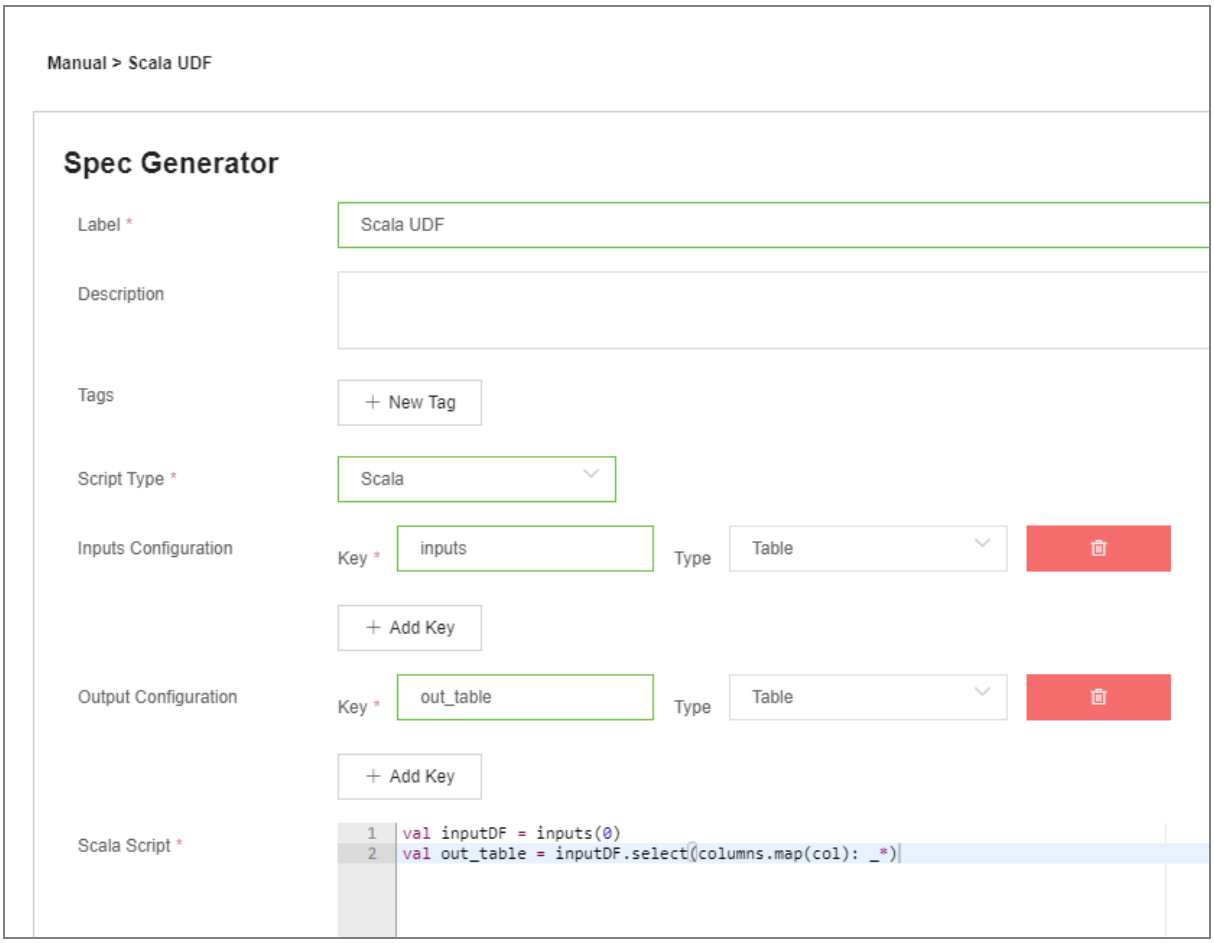


Figure 5-133 Scala UDF Example of Selecting Columns from the Input Table and Exporting as Output

E. The same is true for Python UDF except that Python should be selected as Script type, and Python code should be written in Script area. In case of Python, you can write your desired name even if the input type is table.

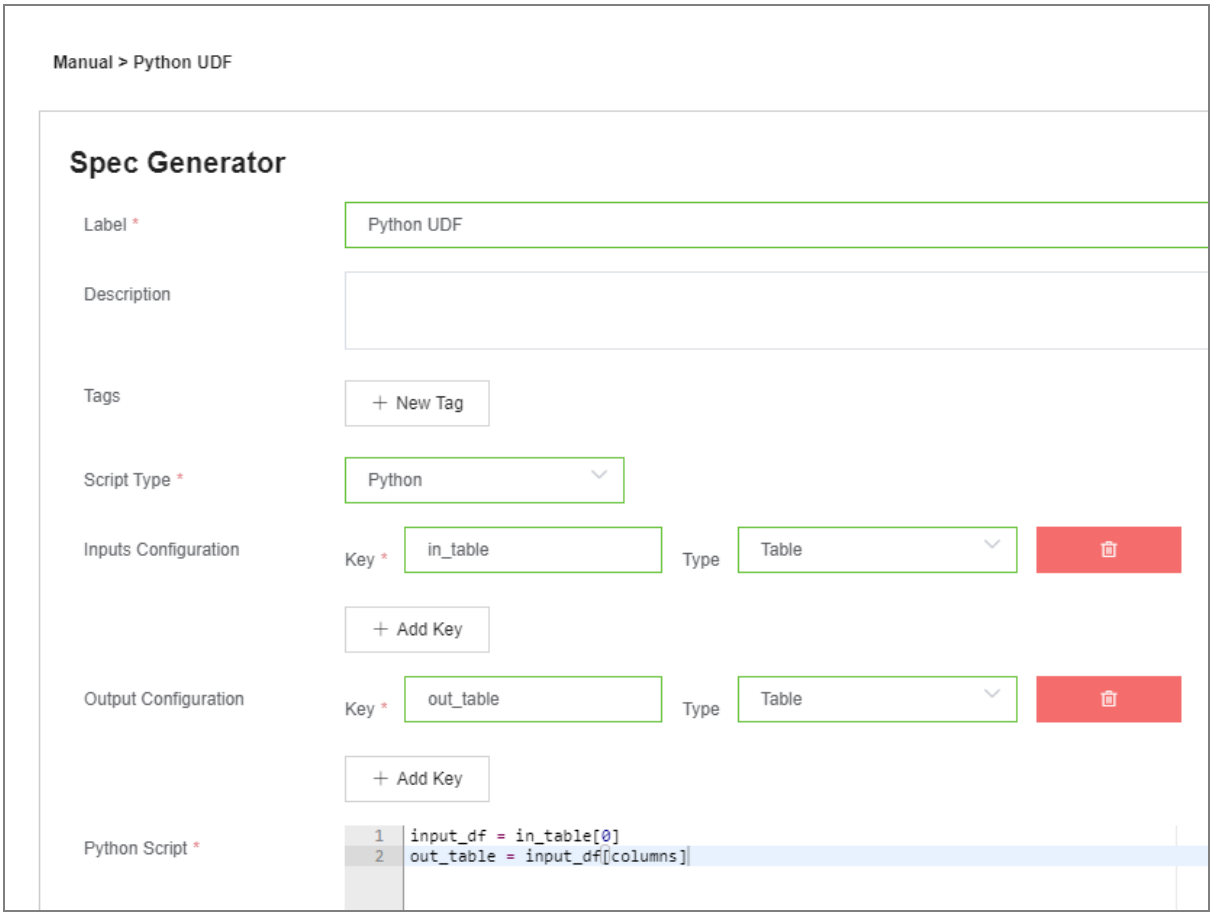


Figure 5-134 Python UDF Example of Selecting Columns from the Input Table and Exporting as Output

F. If you press Save button on the top right-hand side of the screen after writing UDF, you can view the screen in advance on the right-sided Preview Panel.

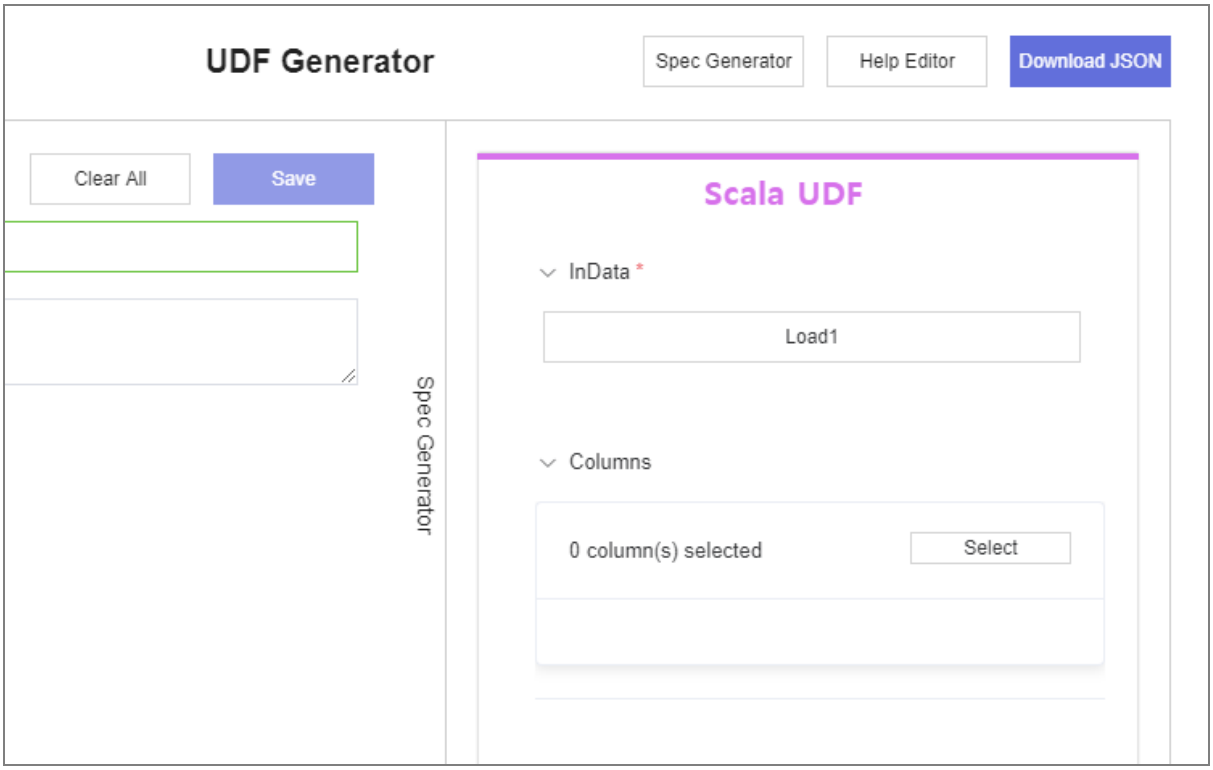


Figure 5-135 Example of Right-sided Preview Screen

Note	There must be one or more outputs in order to use UDF in Dataflow. For table which is one of the input data of UDF created using Scala script, *Inputs(0)* format should be used like Scala Script Function. In case of input data of UDF created using Python script, your desired name can be used. For example, if you use input_key for inputs configuration, you can use *input_key[0]* format.

G. If you click Download JSON button on the right-hand side of Preview screen, UDF json file defined by the user is downloaded.

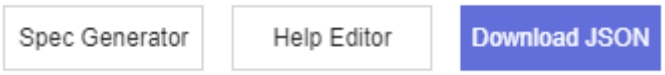


Figure 5-136 Download JSON Button on the Top Right-hand Side of the Screen

H. You should import UDF json in order to use UDF created in DataFlow. If you go back to the Script model again and select UDF tab on the right-sided Palette, you can import UDF.

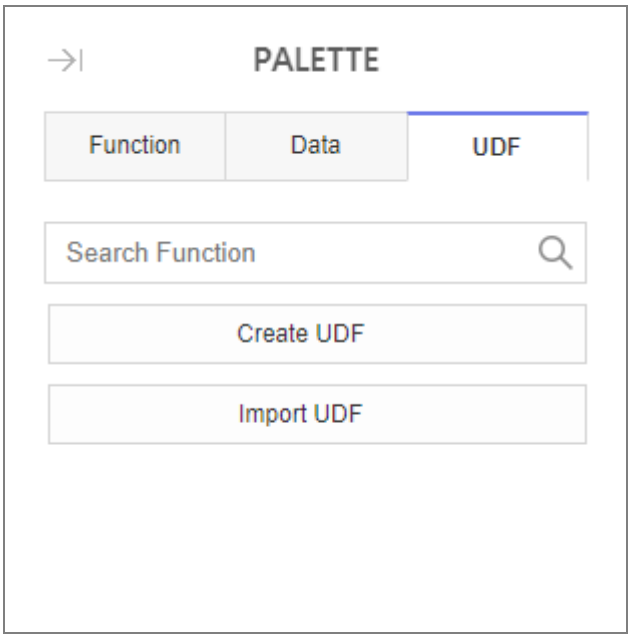


Figure 5-137 UDF Tab in Palette

I. Upload the Json file that you downloaded by clicking Local button from a popup window that becomes visible after clicking Import UDF button, and click **OK** button to add UDF.

Figure 5-138 Popup Window to Import UDF Json

J. You can verify that UDF has been added.

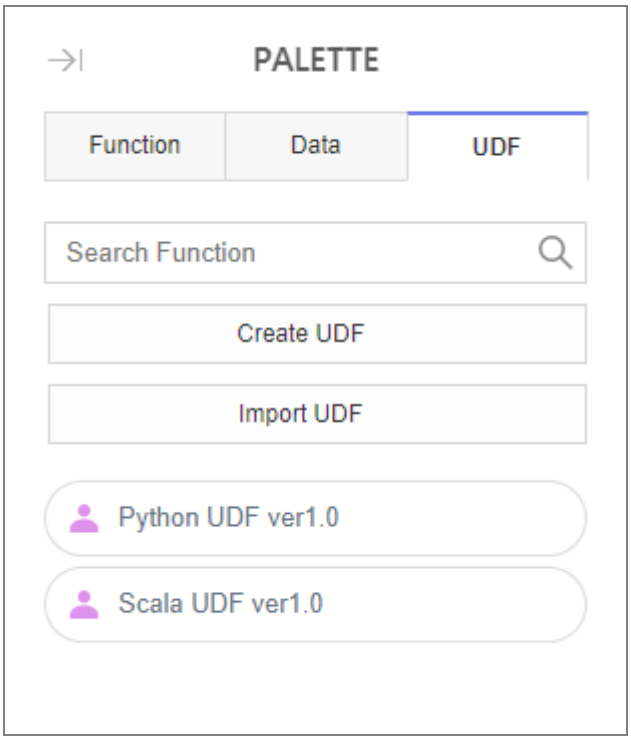


Figure 5-139 UDF Added

5.3.6 Edit an User Defined Function

You can update the user defined function created.

A. When you mouse over the user defined function created in UDF Viewer, editable menu is displayed.

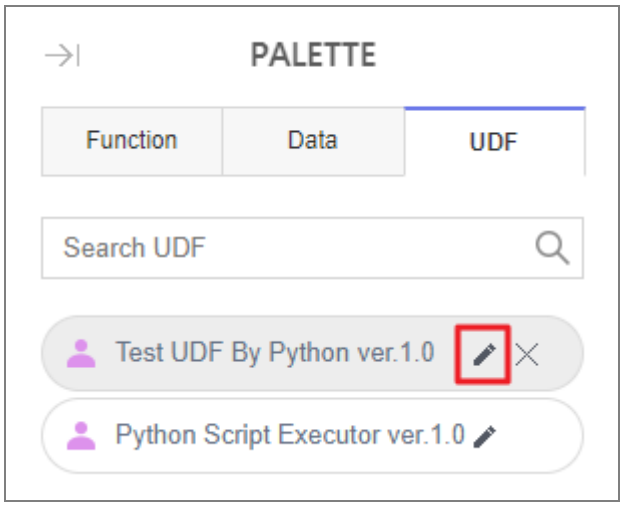


Figure 5-140 Update Menu being Displayed when UDF Viewer is Moused Over

B. Click Update button and call Update as Scala/Python UDF popup.

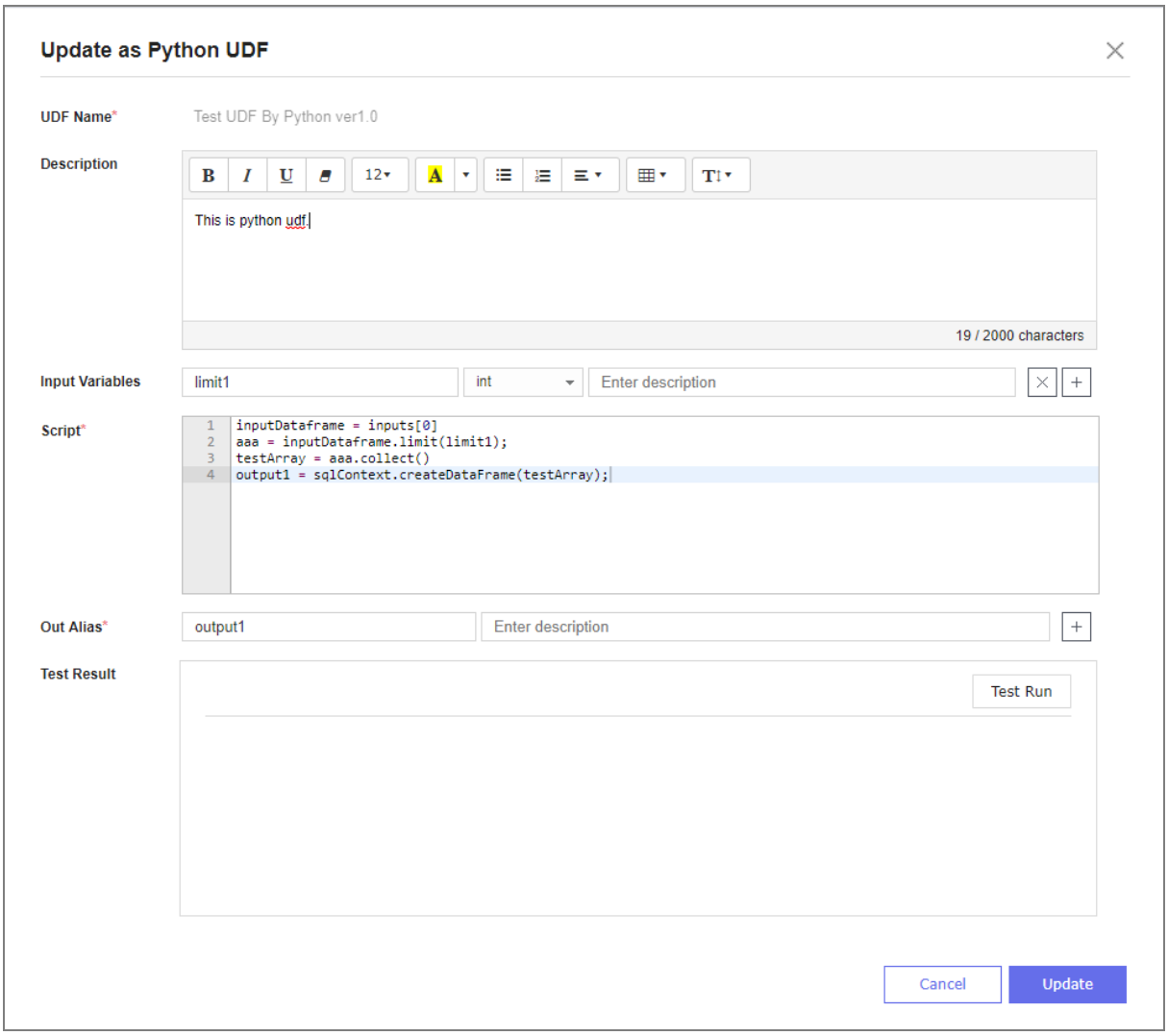


Figure 5-141 Update as Python UDF Popup Window

C. Modify data that you want to modify and click Update button.

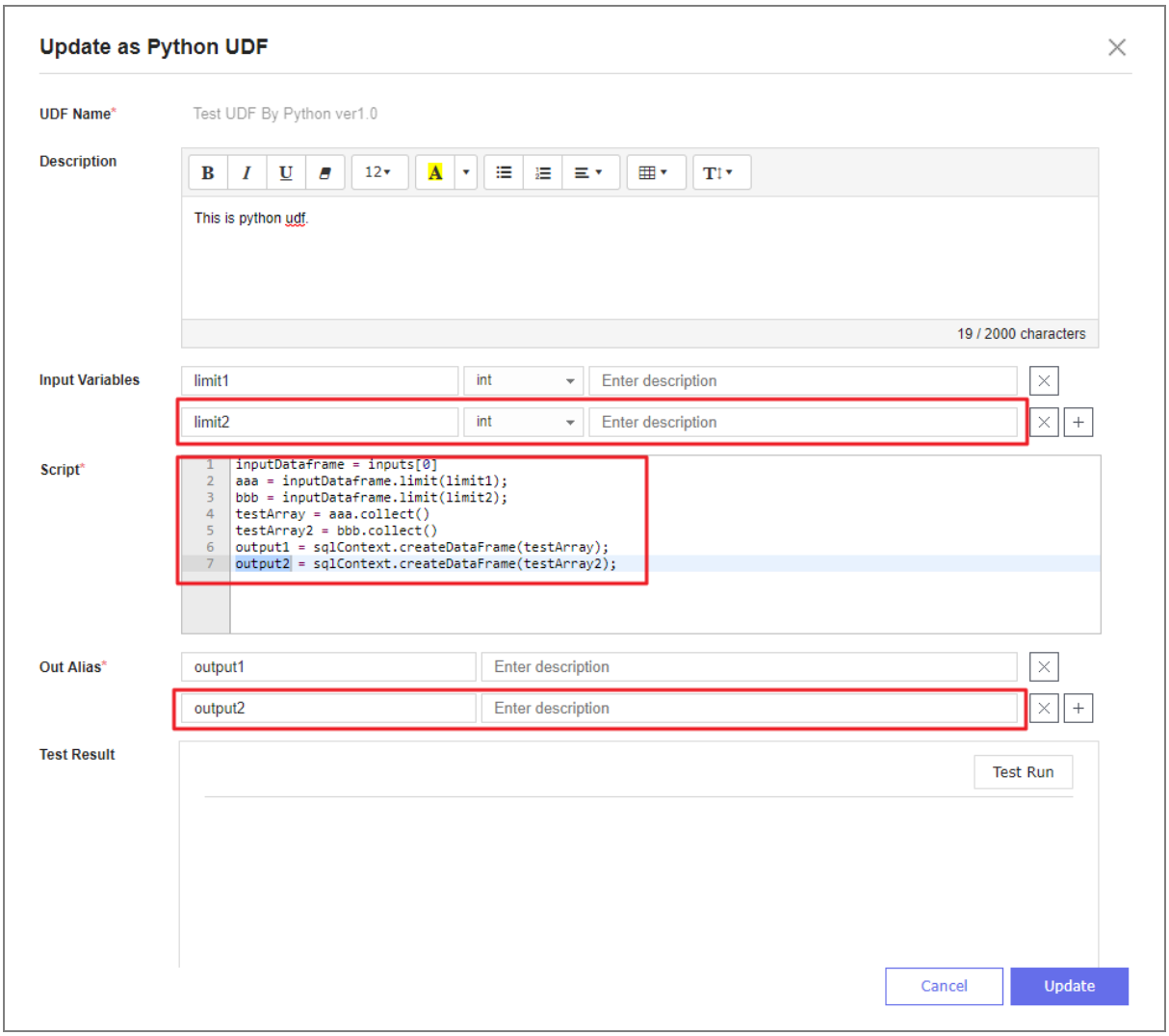


Figure 5-142 Input Variables Added, Script Modified, and Out Alias Added

D. User defined function is added as a new version with the same name.

Figure 5-143 Message Box Indicating Successful Update

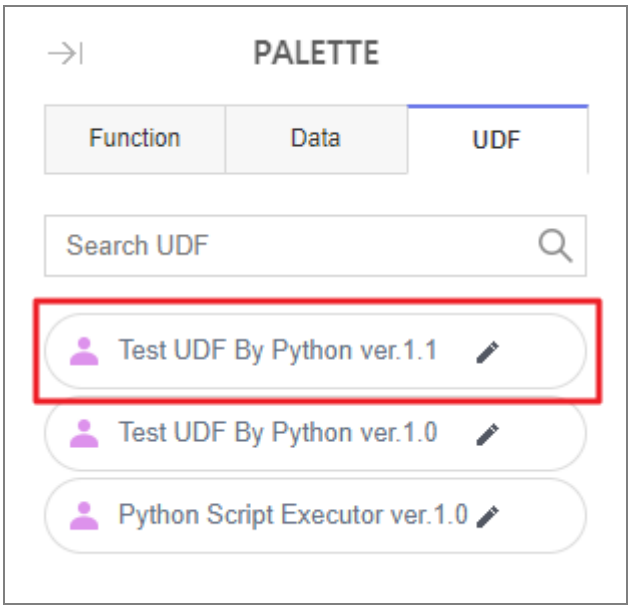


Figure 5-144 Updated User Defined Function being displayed at UDF Viewer

5.3.7 Delete an User Defined Function

Delete the user defined function created.

A. When you mouse over user defined function created in UDF Viewer, deletable menu is displayed.

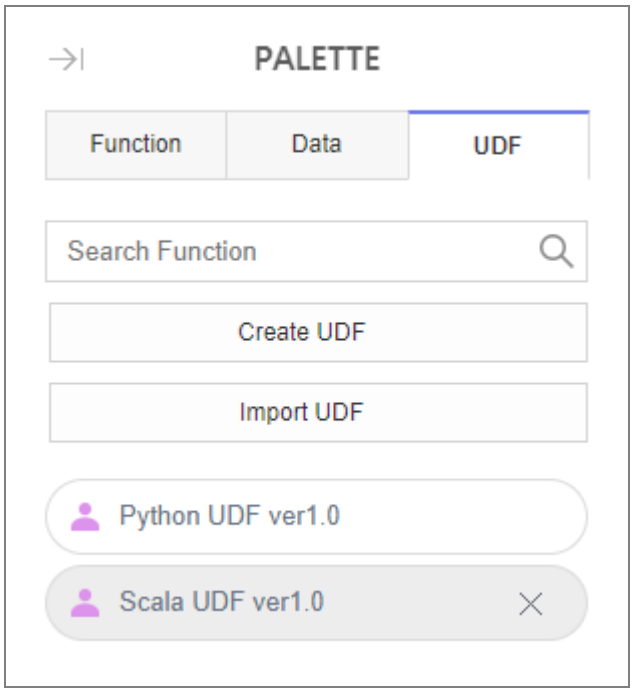


Figure 5-145 Deletable Menu being displayed when UDF Viewer is Moused Over

B. Click delete menu to delete the user defined function.

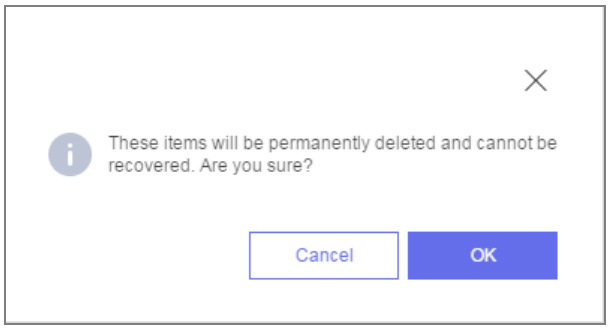


Figure 5-146 Confirm Window that appears when Delete Menu is Clicked

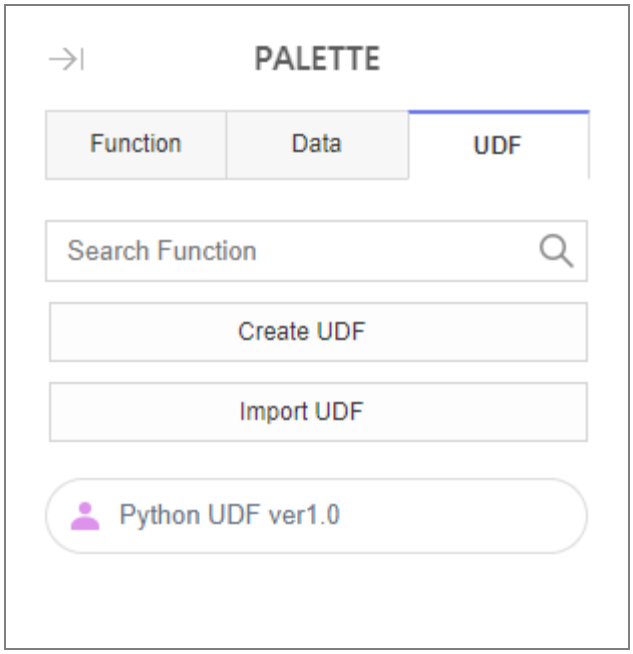


Figure 5-147 User Defined Function Deleted from UDF Viewer

5.3.8 Use an User Defined Function

You can use an added user defined function in Data Flow.

A. When a user defined function is added, it is displayed in Data Flow's Palette Function.

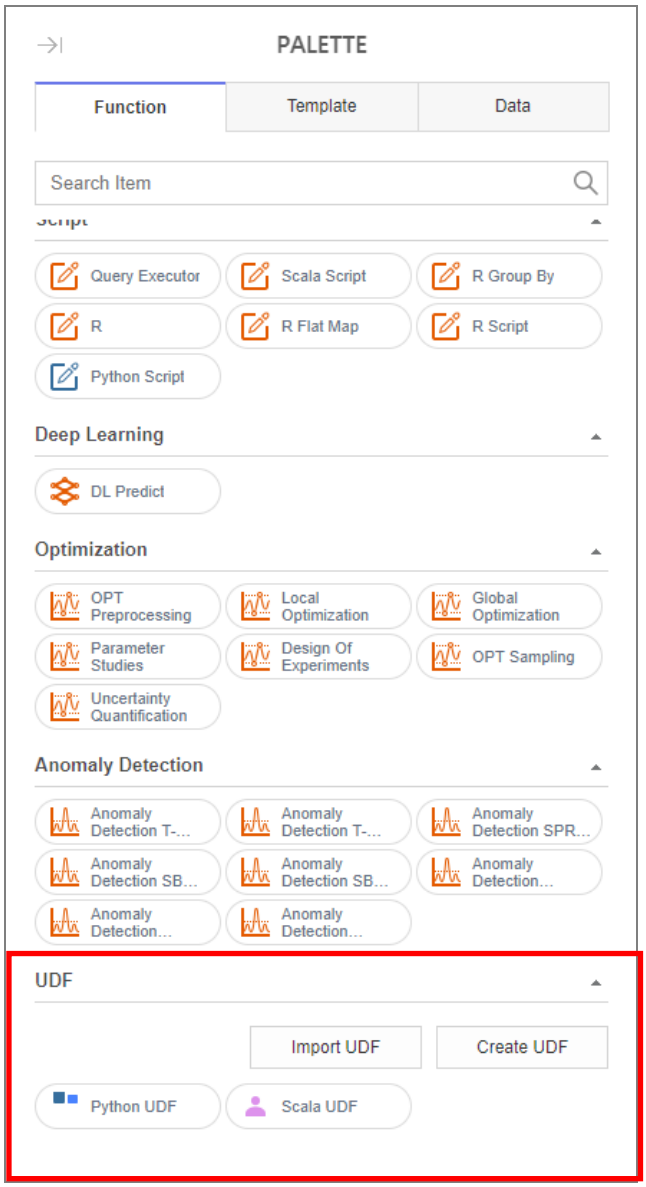


Figure 5-148 User Defined Function being Displayed in Data Flow Palette Function

B. Drag and drop the user defined function to Data Flow Diagram.

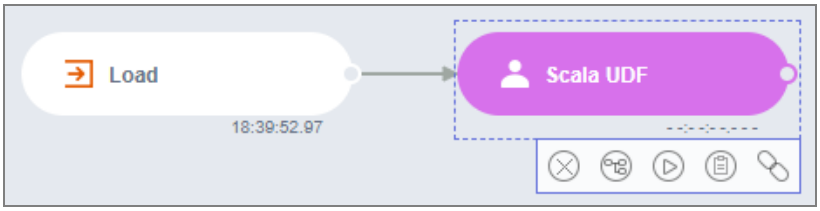


Figure 5-149 User Defined Function Added to Data Flow Diagram

C. Click the user defined function concerned, and enter the parameter value in Properties Panel.

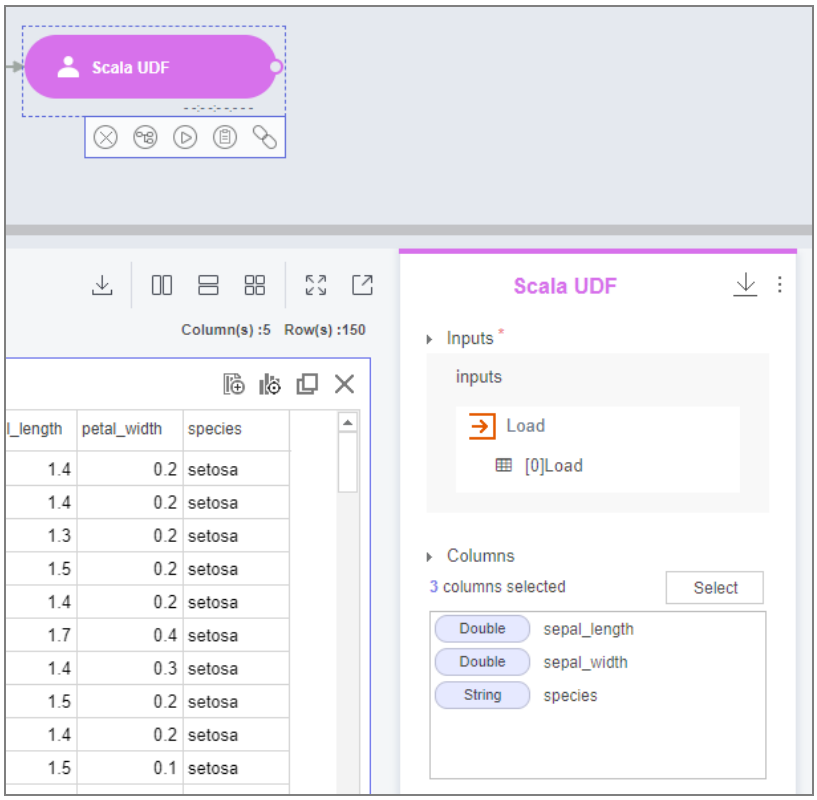


Figure 5-150 Parameter Value of User Defined Function Entered

D. Click **Run** button to execute the user defined function, and verify the execution result.

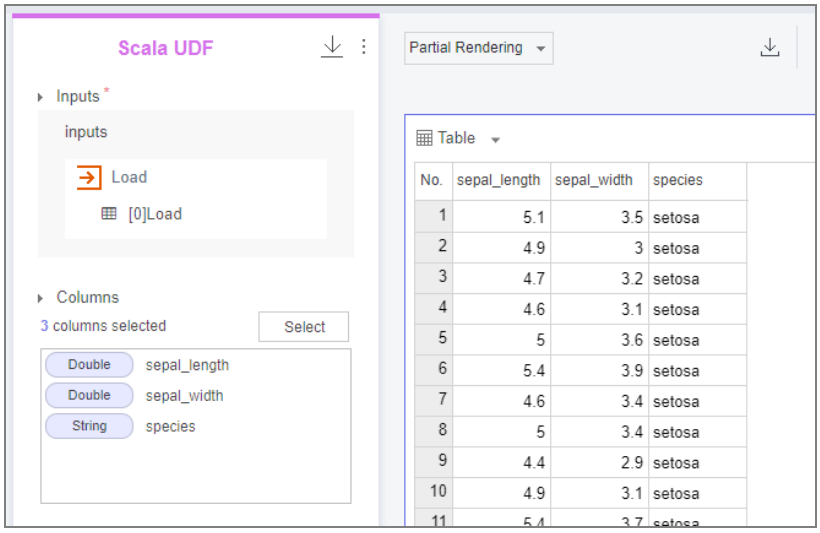


Figure 5-151 Out Data Displayed after User Defined Function Execution

5.4 Deep Learning Model Editor

DEEP LEARNING MODEL EDITOR allows you to create functions to use for analysis models and connect functions. TOOLBAR menu consists of EXPORT feature to download Python files, SUMMARY feature to see how a model is executed, ZOOM feature, UNDO / REDO features for jobs, and RUN feature to execute an analysis model.

5.4.1 Create a Function

There are three ways to create a function.

5.4.1.1 Create a New Function in Diagram Editor

A. Mouse over a location in DEEP LEARNING MODEL EDITOR where you want to create a function. When 

or 

button is enabled, click it and open a popup window to create a function.

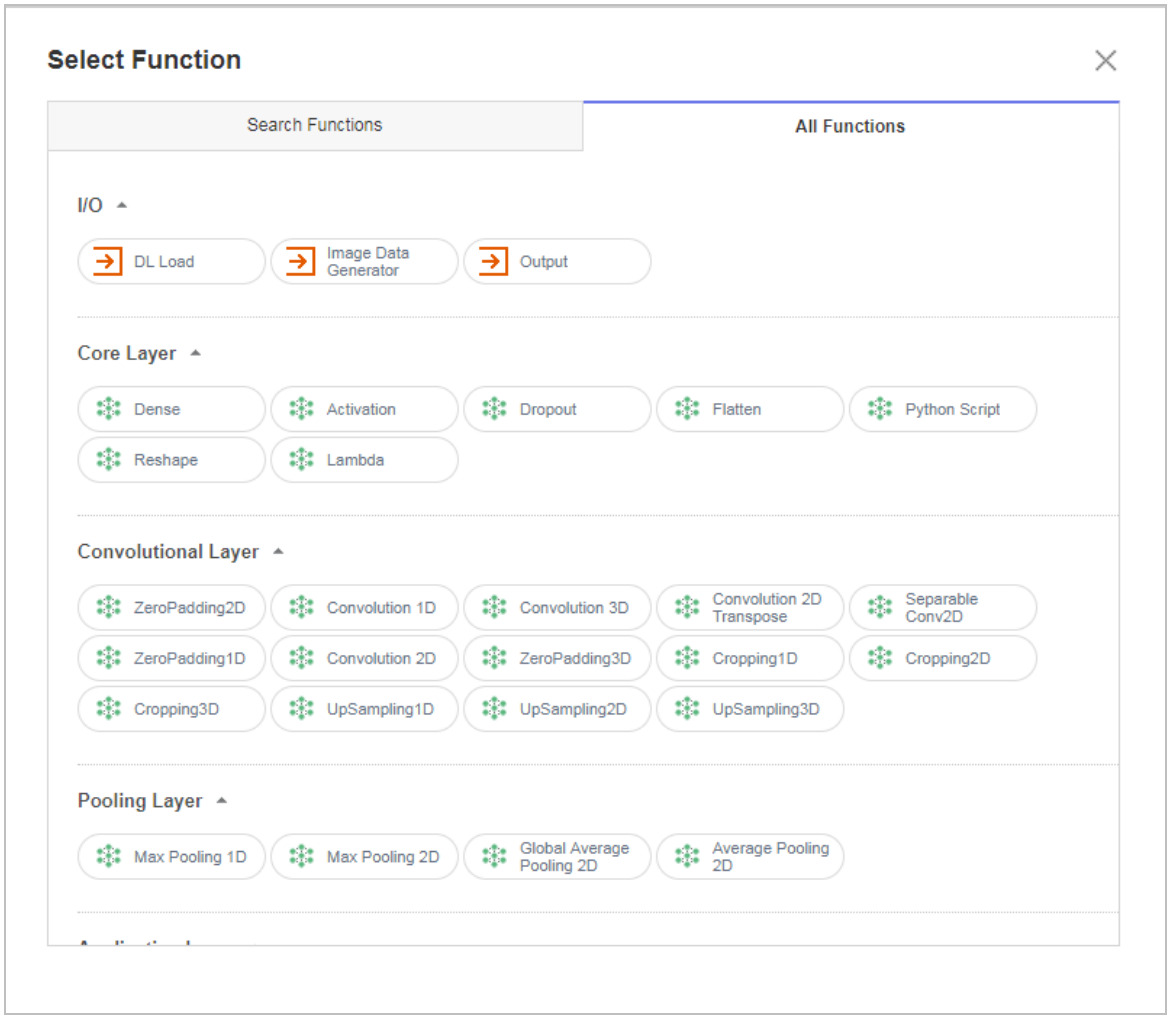


Figure 5-152 SELECT FUNCTION window

B. Click a function you want to create, and the created function will be displayed in DEEP LEARNING MODEL EDITOR.

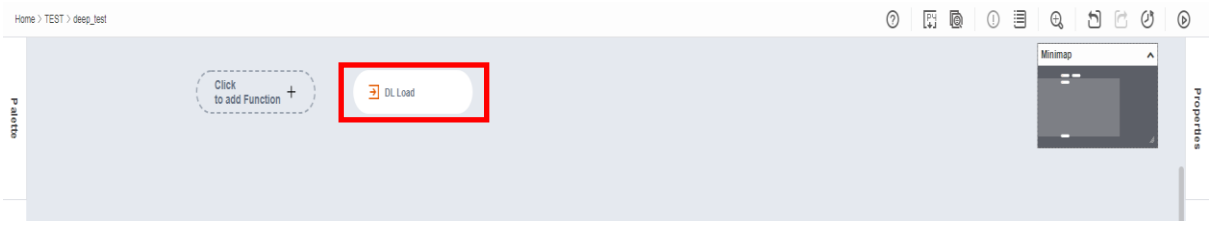


Figure 5-153 Function created in DEEP LEARNING MODEL EDITOR

5.4.1.2 Create a New Function by Selecting from Palette

A. Click PALETTE button in order to use PALETTE VIEWER on the left.

B. Drag a function you want and drop to the desired location in DEEP LEARNING MODEL EDITOR.

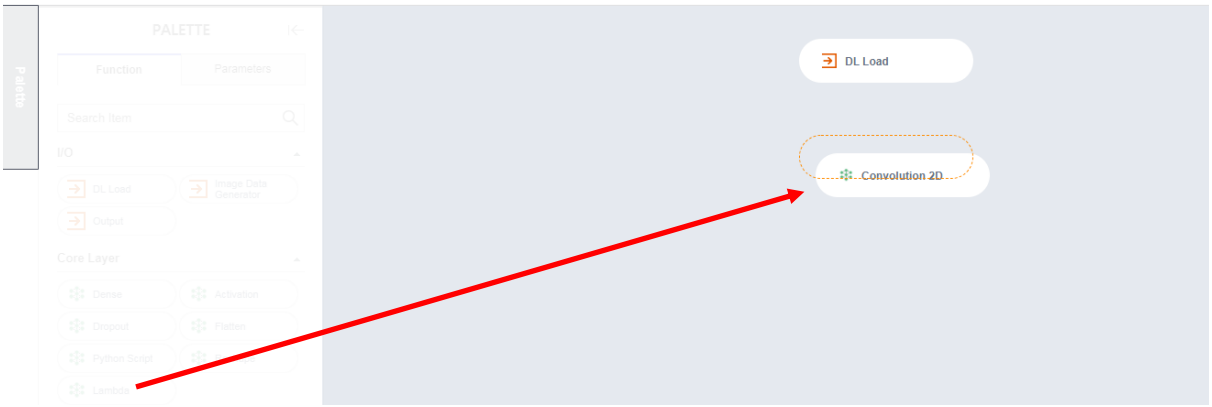


Figure 5-154 Function dragged from PALLETE and dropped to DEEP LEARNING MODEL EDITOR

C. The created function is displayed in DEEP LEARNING MODEL EDITOR

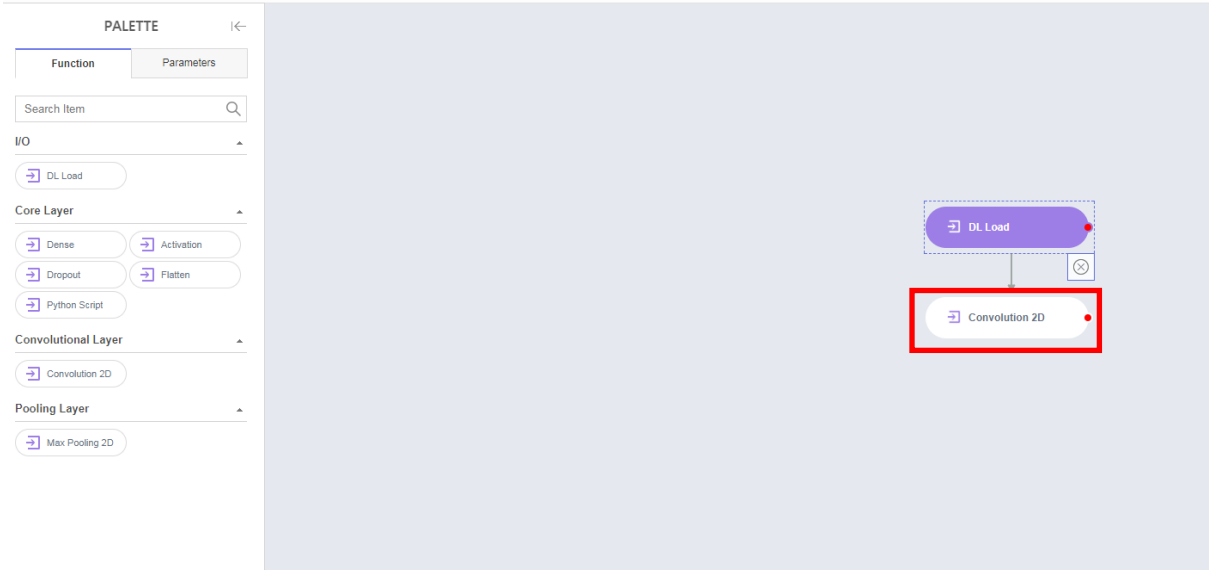


Figure 5-155 Function created in DEEP LEARNING MODEL EDITOR

5.4.1.3 Create a Function by Cloning the Selected Function

A. Mouse over a function you want to clone.

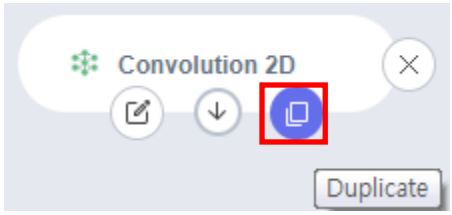


Figure 5-156 Function moused over

B. Drag  button and drop to the desired location in DEEP LEARNING MODEL EDITOR.

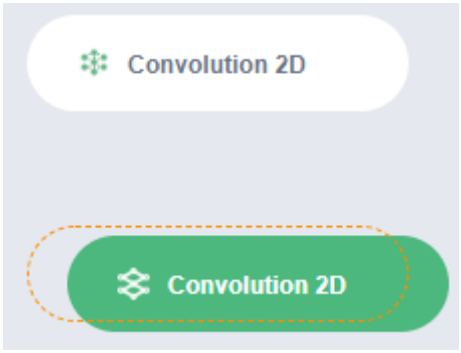


Figure 5-157 Function dragged and dropped to DEEP LEARNING MODEL EDITOR

C. The created function is displayed in DEEP LEARNING MODEL EDITOR.

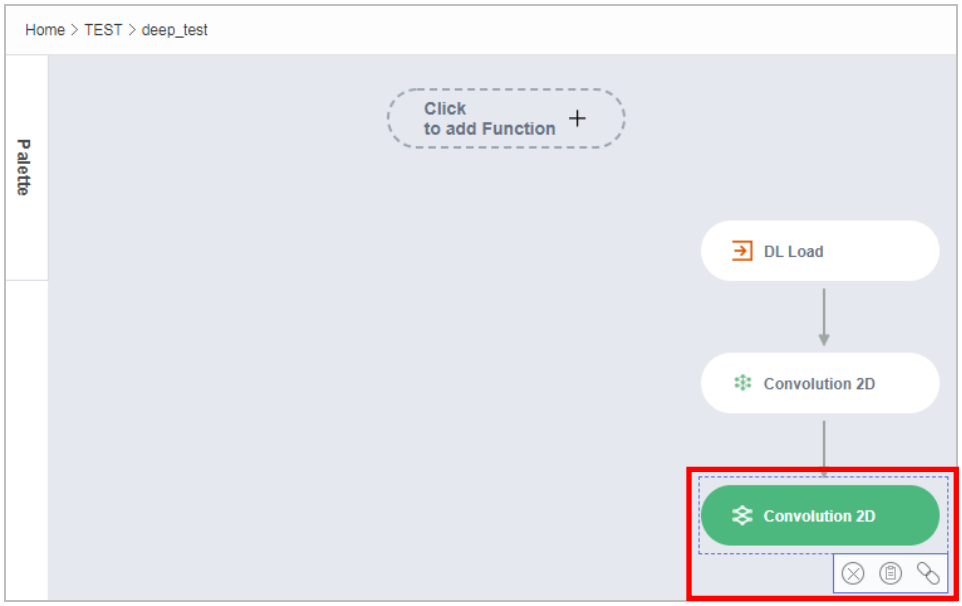


Figure 5-158 Function created in DEEP LEARNING MODEL EDITOR

5.4.2 Change a Function

A. Mouse over a function that you want to change.

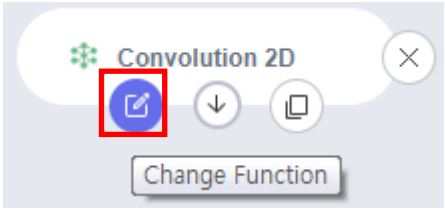


Figure 5-159 Function Moused Over

B. Click  button to call SELECT FUNCTION window which allows you to choose a function.

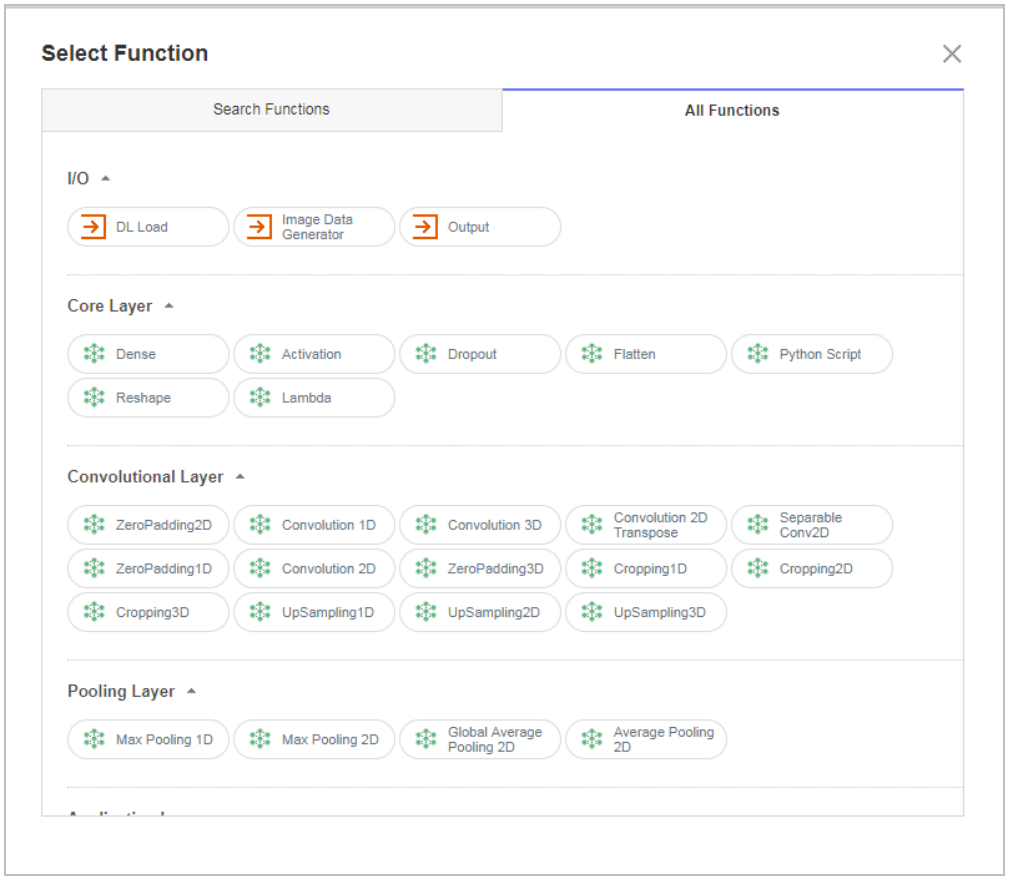


Figure 5-160 Select Function

Select a function you want to change, and the changed function will be displayed in DEEP LEARNING MODEL EDITOR.

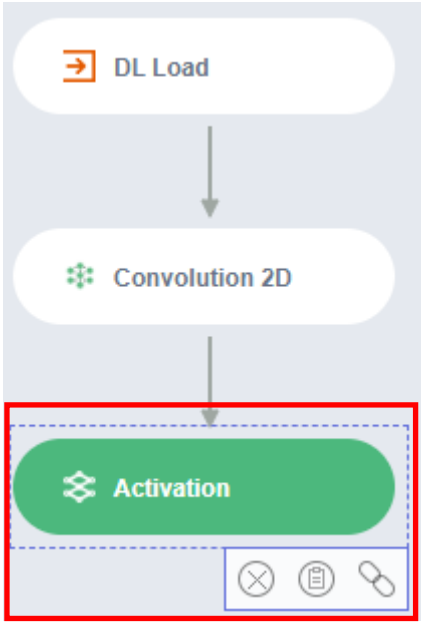


Figure 5-161 Changed Function Displayed in DEEP LEARNING MODEL EDITOR

5.4.3 Remove a Function

A. Mouse over a function you want to remove and click button to remove.

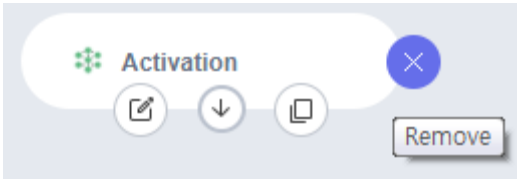


Figure 5-162 Function Moused Over

D. You can also remove multiple functions. Drag a mouse to multi-select functions and click button to remove functions.

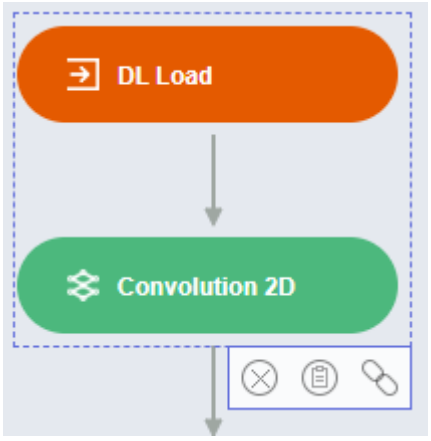


Figure 5-163 Function Moused Over

5.4.4 Use a Connection

5.4.4.1 Create a Connection

Create a connection to connect functions and allow the output of a preceding function to be used as input of its following function

E. Mouse over a preceding function which you want to create a connection to. Click button and drop to a following function you want to connect to.

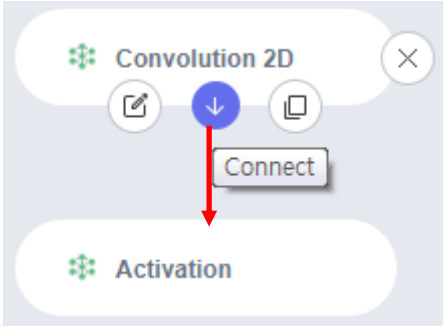


Figure 5-164 Function Moused Over

5.4.4.2 Delete a Connection

F. Mouse over a connection you want to remove. Click button to remove the connection.

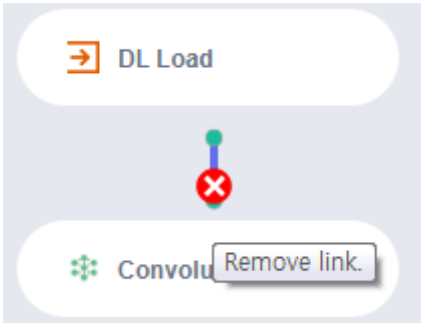


Figure 5-165 Connection Moused Over

5.4.5 Use a Parameter

5.4.5.1 Create a Parameter

A. Modify a parameter in the PARAMETERS view.

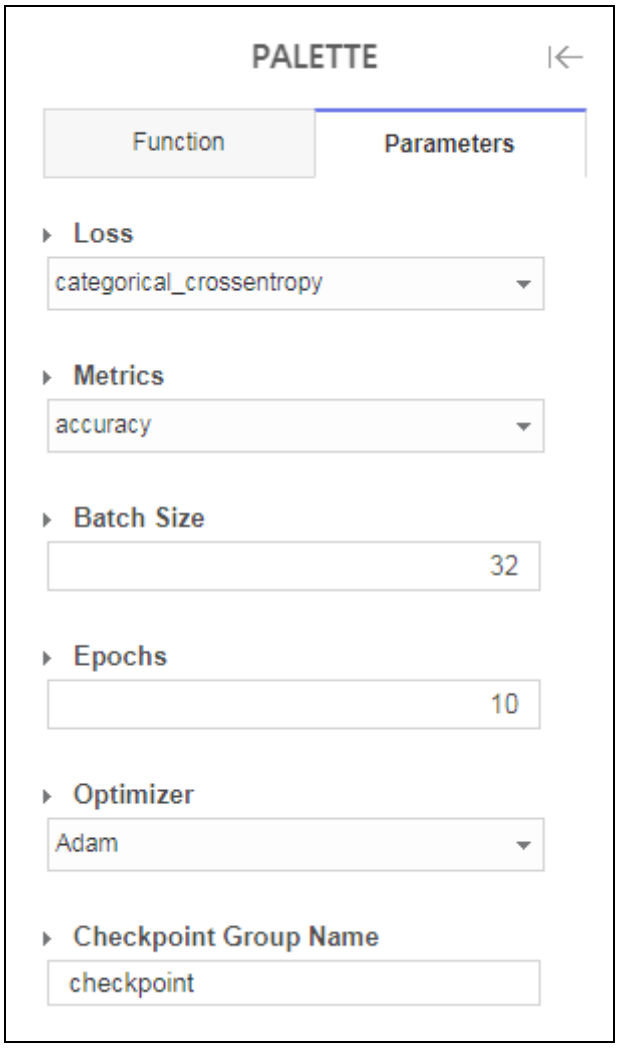


Figure 5-166 PARAMETERS View

5.4.6 Use History

If you record job history and select a particular job history, you will be redirected to when the corresponding job was performed. Both DEEP LEARNING MODEL EDITOR and SHEET EDITOR record the

entire history of tasks performed. Click button in DEEP LEARNING MODEL EDITOR to select the time you want to move to or click and button to REDO and UNDO respectively.

A. Click button in DEEP LEARNING MODEL EDITOR.

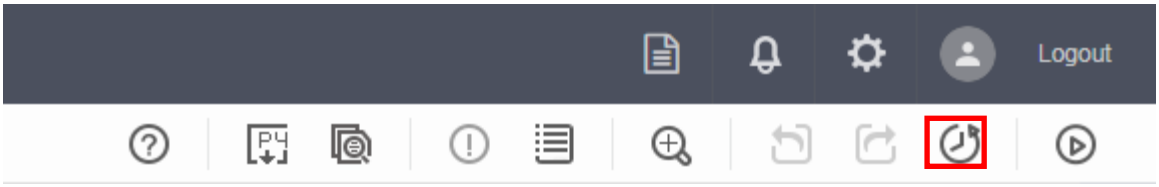


Figure 5-167 History Button in DEEP LEARNING MODEL EDITOR

B. When HISTORY window pops up, you can see the job history. If you select a job history in HISTORY window that you want to move to, it will redirect you to the chosen job history.

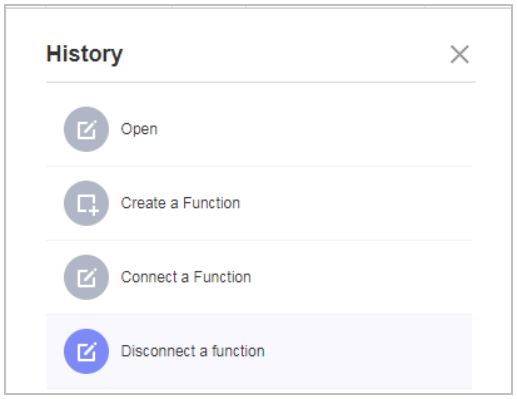


Figure 5-168 History

5.4.7 Use an Index

INDEX allows you to search previously-used functions easily and fast. The increasing number of used functions and increasing complexity of DEEP LEARNING MODEL EDITOR in the future would make it difficult to locate previously-used functions at once. So if you choose a function from an index, it will redirect you to the function you are looking for, thereby ensuring user convenience.

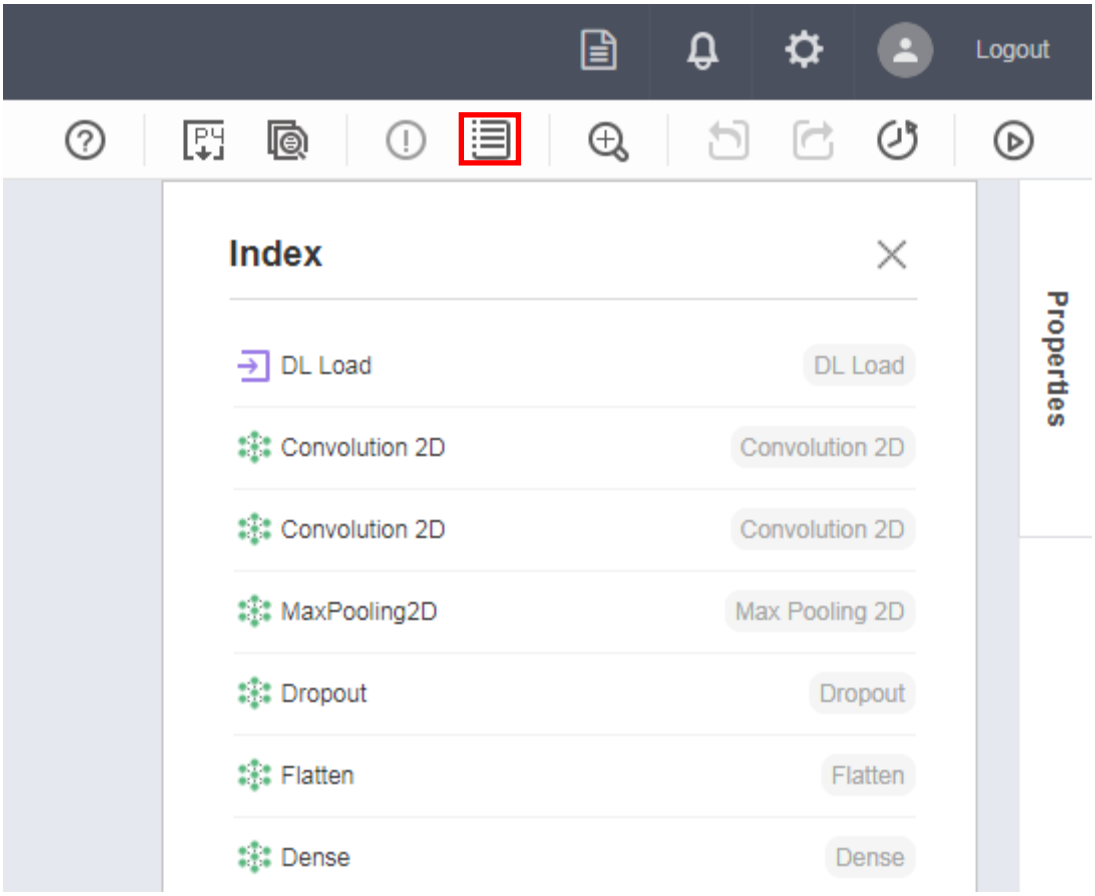


Figure 5-169 INDEX View

5.4.8 Export

Download a model which remains open in DEEP LEARNING MODEL EDITOR as a Python file

A. Click  button in DEEP LEARNING MODEL EDITOR.

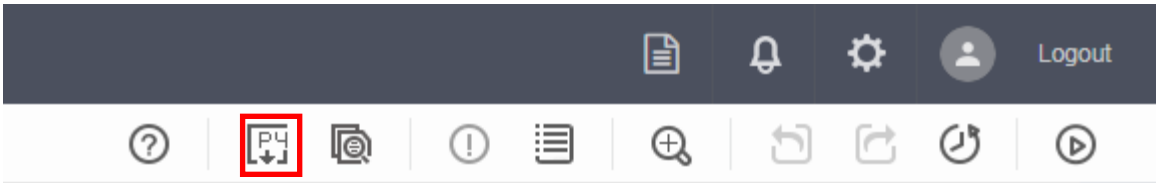


Figure 5-170 Click SCHEDULE Button in DEEP LEARNING MODEL EDITOR.

5.4.9 Zoom

Use Zoom button to zoom in / out DEEP LEARNING MODEL EDITOR.

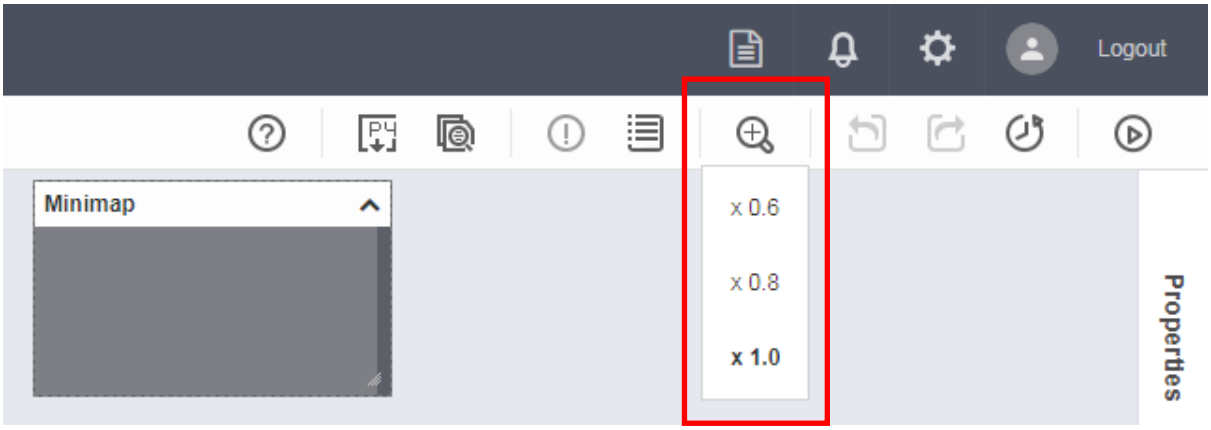


Figure 5-171 Zoom x1.0 Clicked

5.4.10 Tooltip

Enter a memo in DEEP LEARNING MODEL EDITOR function. If you mouse over a function in diagram, a tooltip will be displayed. The tooltip is enabled / disabled through TOOLTIP button on the upper right side of the screen.

A. Click button to enable TOOLTIP.

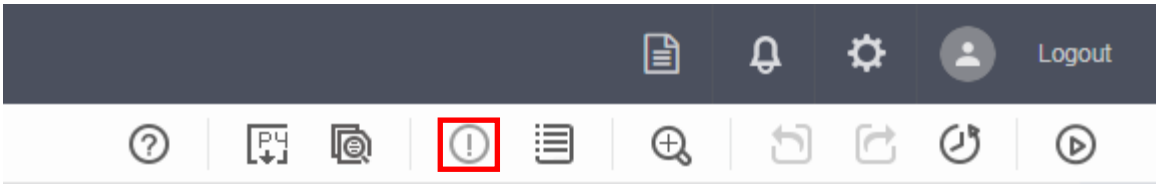


Figure 5-172 Click TOOLTIP Button

5.4.11 Minimap

Minimap shows all the user-created functions in DEEP LEARNING MODEL EDITOR at a glance. It allows users to see the used functions at once easily and fast by considering the increasing number of used functions and complexity of DEEP LEARNING MODEL EDITOR in the future.

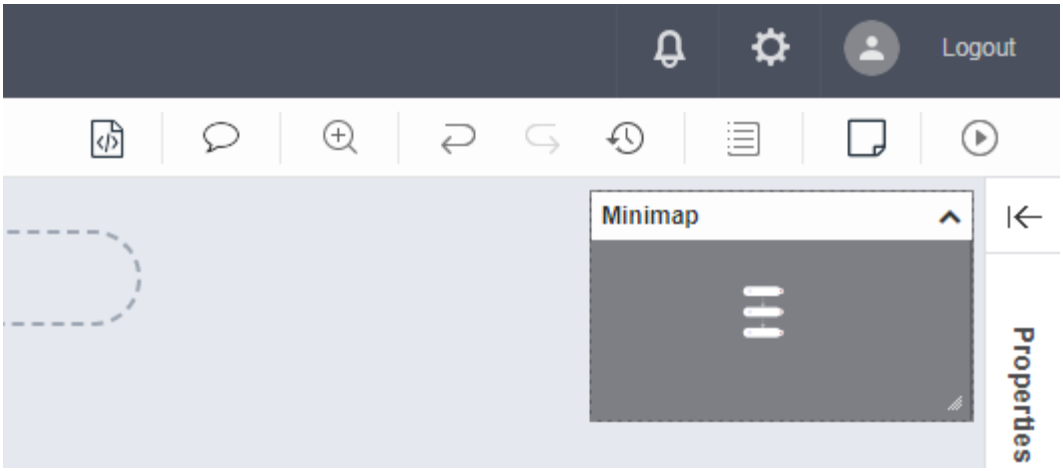


Figure 5-173 Minimap Window

Drag a mouse to move MINIMAP window from a previous location. Click ^ button to collapse MINIMAP and drag ◢ to resize it.

5.4.12 Execute a Model

Execute functions created with DEEP LEARNING MODEL EDITOR in order of layers.

A. Click button in DEEP LEARNING MODEL EDITOR.

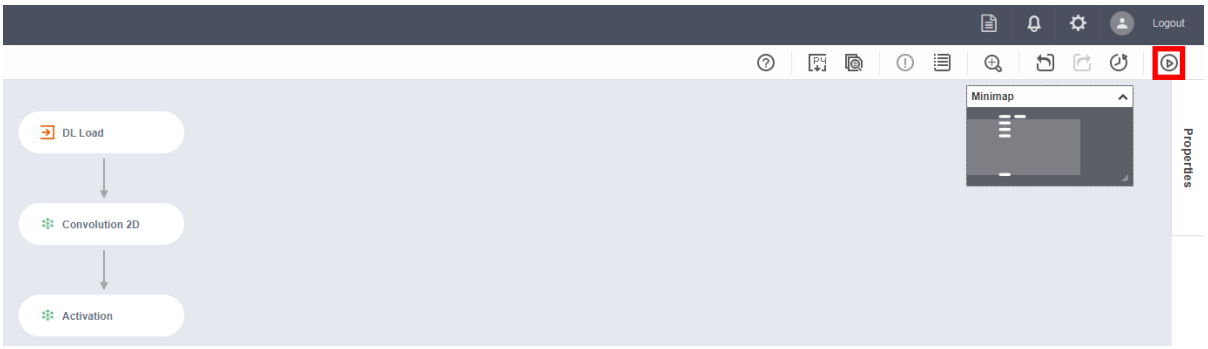


Figure 5-174 RUN Button in DEEP LEARNING MODEL EDITOR

B. When a model is run, RUN DATA dialog is displayed to show the progress of model execution..

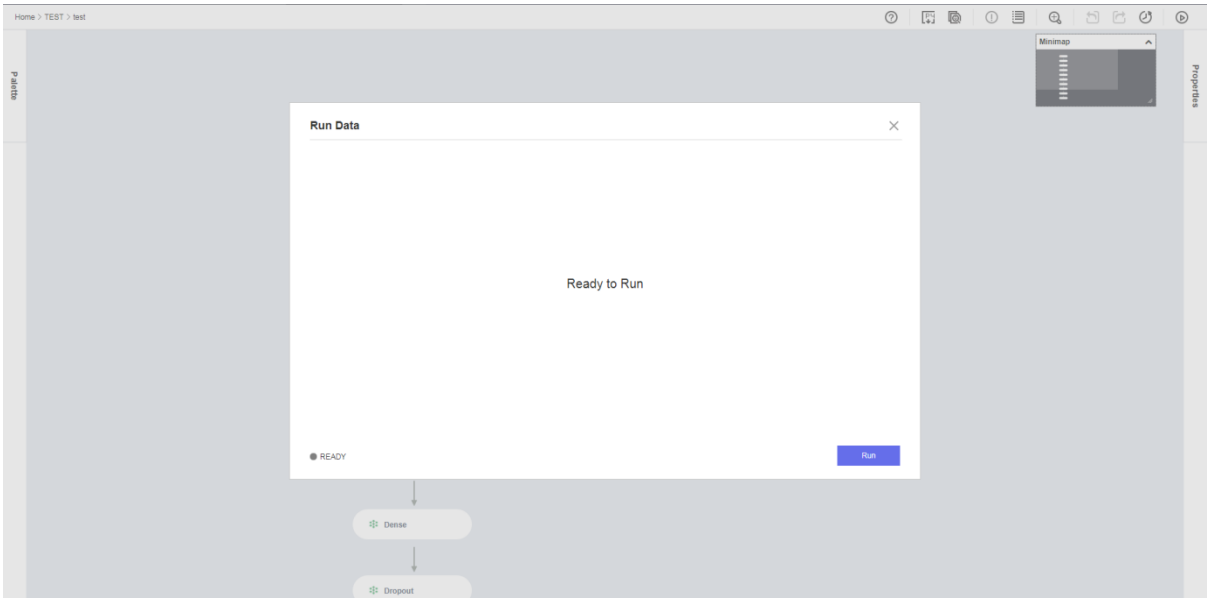


Figure 5-175 RUN DATA Dialog

5.5 Report Editor

REPORT visualizes and intuitively analyzes data and effectively delivers its meanings. Brightics allows you to visualize data analysis results in a chart and write the description of the chart by adding text content. DATA BOX view in REPORT allows you to connect data to the report, and OBJECT / PROPERTIES view allows you to add a chart or text or change configurations. TOOLBAR menu in REPORT consists of PUBLISH, BORDERS, ZOOM IN / OUT and UNDO / REDO features.

5.5.1 Add a Page

ADD PAGE button on the upper side of report allows you to add a page.

Figure 5-176 ADD PAGE Button

5.5.2 Move to Another Page

You can move to another page by clicking PAGE VIEW button on the upper side of a report and then choosing a page you want to move to.

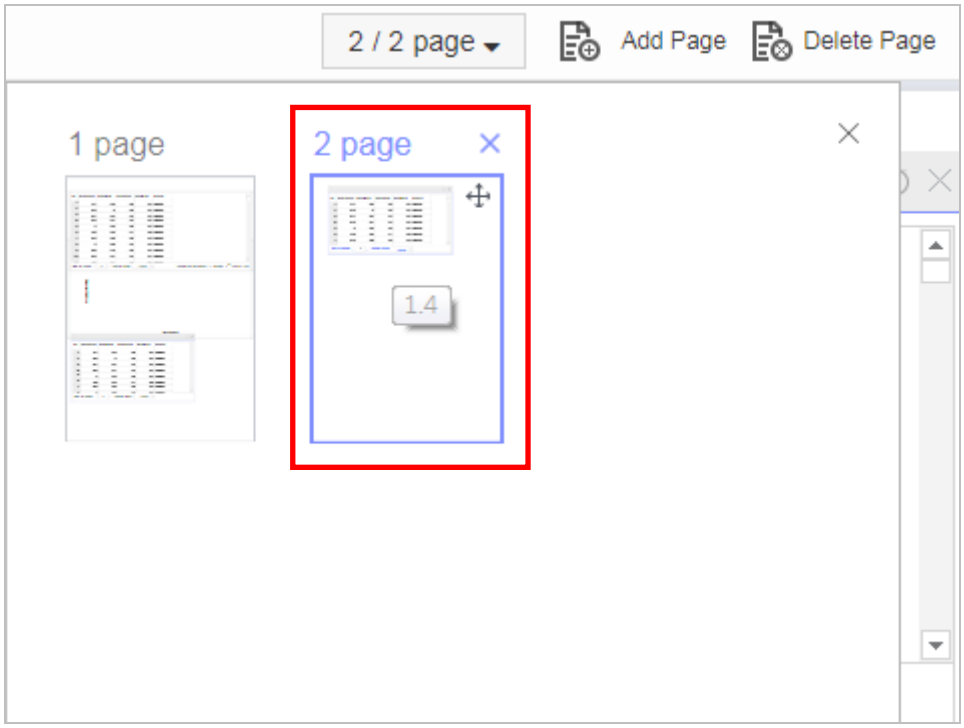


Figure 5-177 PAGE View

5.5.3 Delete a Page

You can delete a page by either clicking DELETE PAGE button on the upper side of a report or clicking ✕ button in the PAGE view.

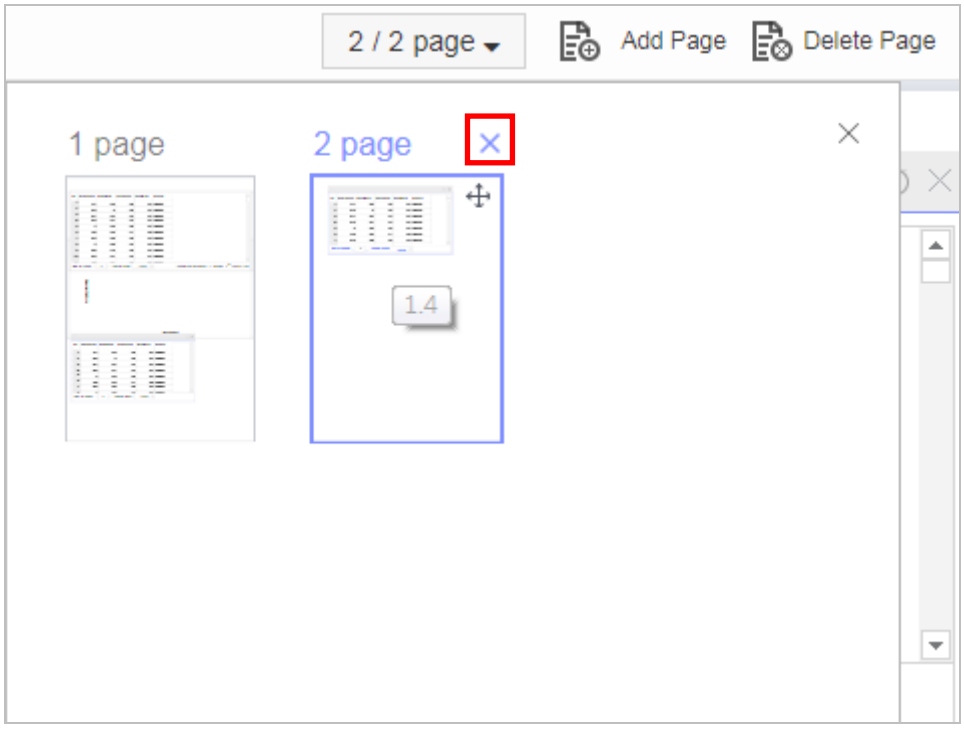


Figure 5-178 DELETE PAGE Button

5.5.4 Add Content

You can add content to REPORT page by using either DATA BOX view or OBJECT view.

5.5.4.1 Add a Chart Using Data Box View

A. Click CHART TEMPLATE in CHART tab of data source in the DATA BOX view.

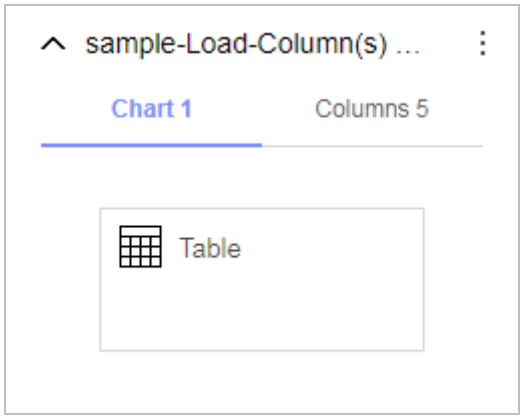
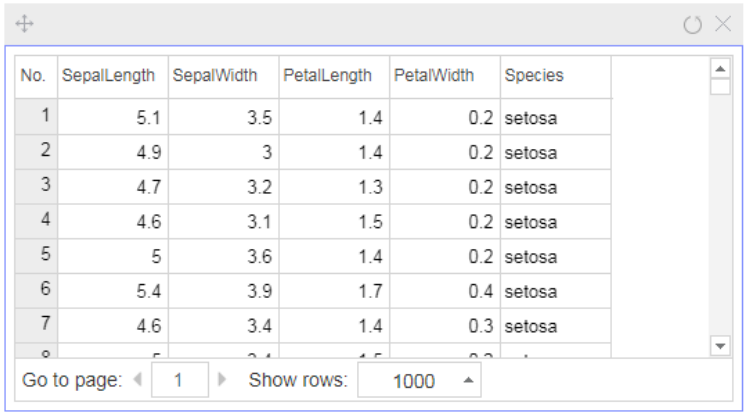


Figure 5-179 Chart Template

B. A selected chart template (table) is added to a report.



No.	SepalLength	SepalWidth	PetalLength	PetalWidth	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa

Go to page: 1 Show rows: 1000

Figure 5-180 A Table Added to a Report

5.5.4.2 Add a Chart using Object View

A. Click **CHART** button or ▼ button to chooose a chart type in the OBJECT view.

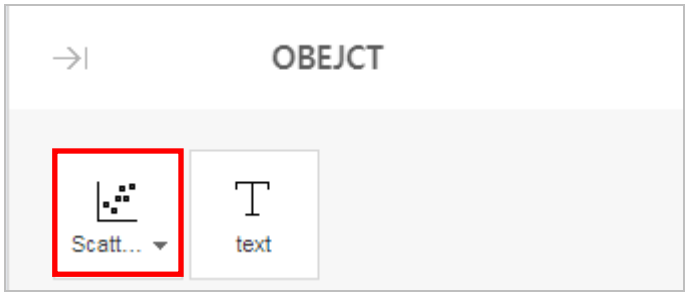


Figure 5-181 ADD CHART UNIT Button

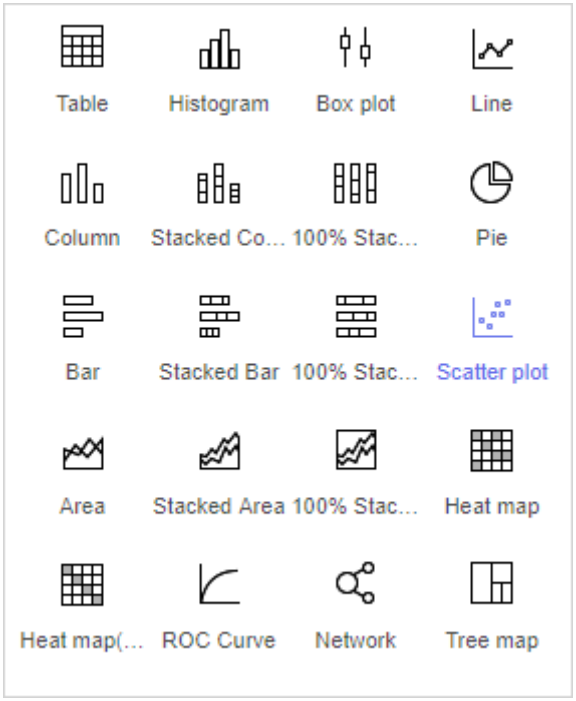


Figure 5-182 SELECT CHART TYPE Window

B. A selected chart is added to a report as content.

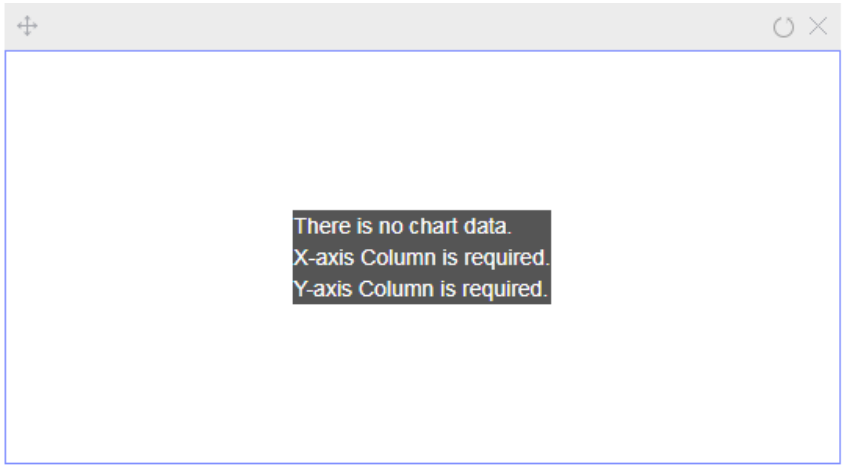


Figure 5-183 A Chart Added to a Report

5.5.4.3 Add Text using OBJECT view

A. Click **TEXT** button in the OBJECT view.

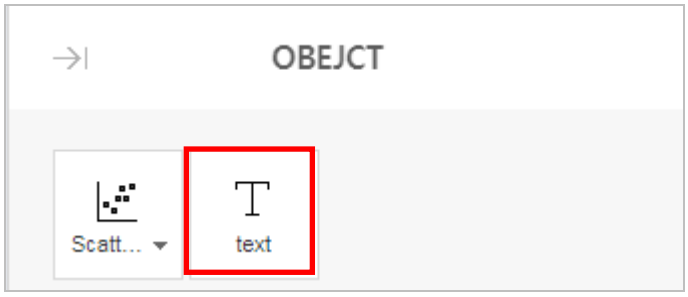


Figure 5-184 ADD TEXT CONTENT button

B. Text content is added to a report.

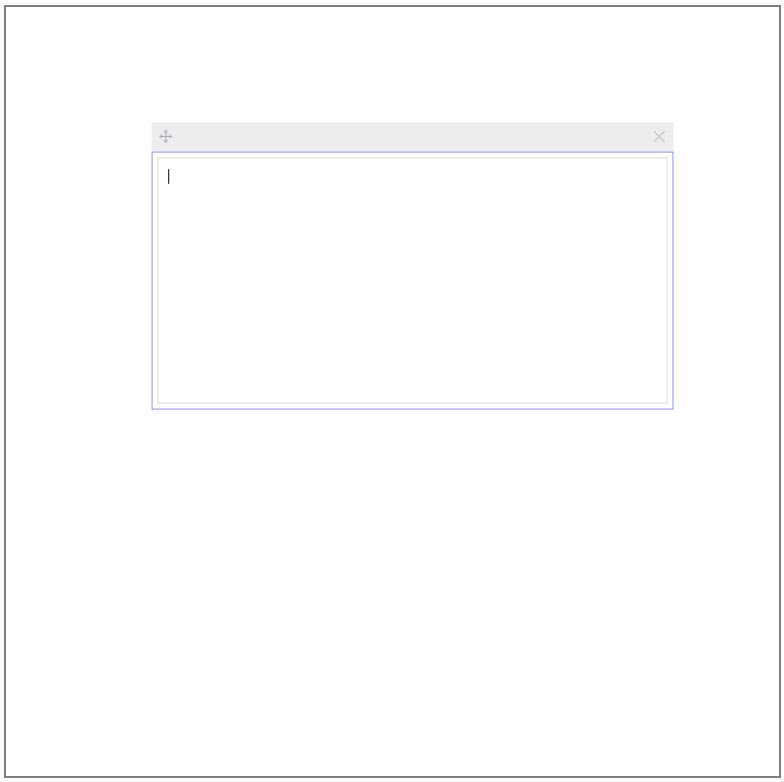


Figure 5-185 Text Content Added to a Report.

5.5.5 Move Content

If you select the content that you want to move, a toolbar will appear on the top of the content. Then, you can move the content by dragging the toolbar.

Figure 5-186 Text Content Toolbar

5.5.6 Delete Content

Select the content you want to delete and click button on the right side of toolbar to delete it.

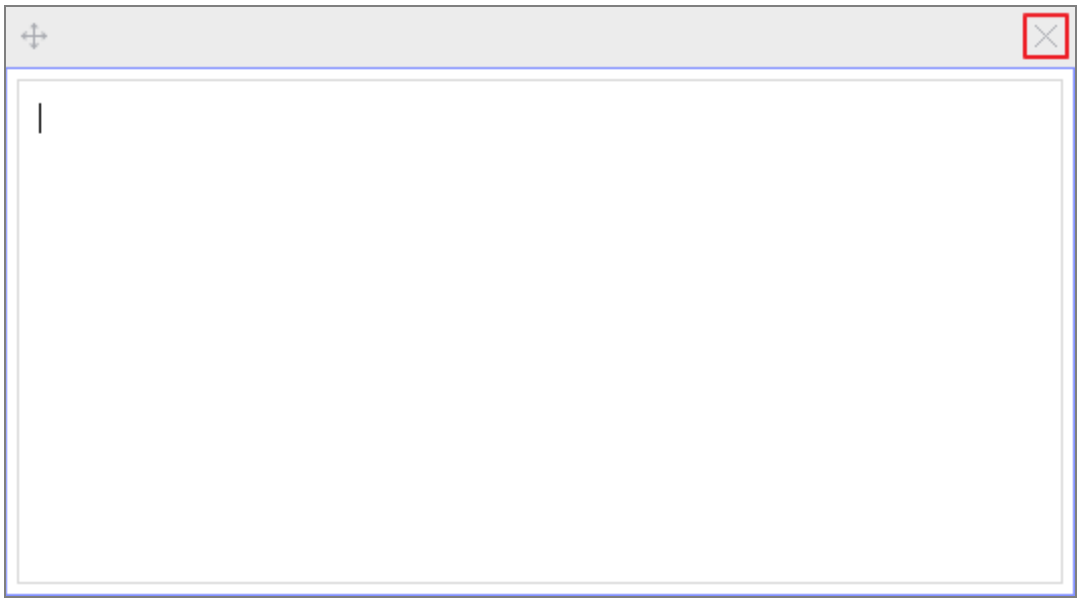
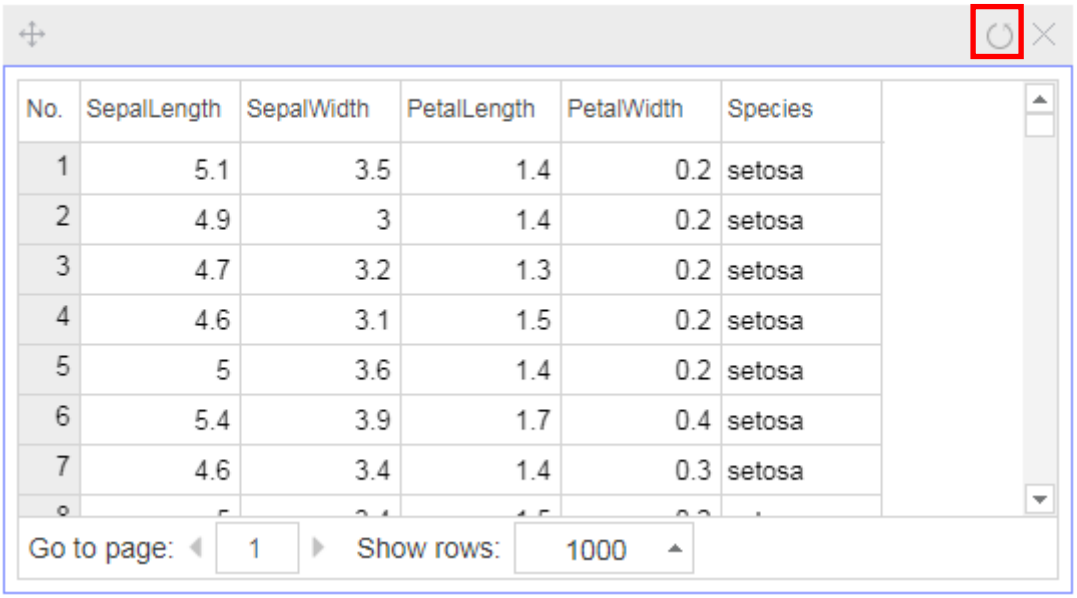


Figure 5-187 DELETE CONTENT Button

5.5.7 Refresh Content

Click button on the right side of the toolbar in CHART content to refresh content and draw a chart again.



No.	SepalLength	SepalWidth	PetalLength	PetalWidth	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa

Go to page: 1 Show rows: 1000

Figure 5-188 REFRESH CONTENT Button

5.5.8 Define Content Properties

PROPERTIES view allows you to choose an option for selected content. If content is NOT selected, you can define page properties.

5.5.8.1 Define Data Source / Columns

You can select data source and columns of chart content either from PROPERTIES view directly or DATA BOX view by dragging the columns. If you define chart columns by dragging them in the DATA BOX view, the data source of the dragged columns becomes data source of the chart.

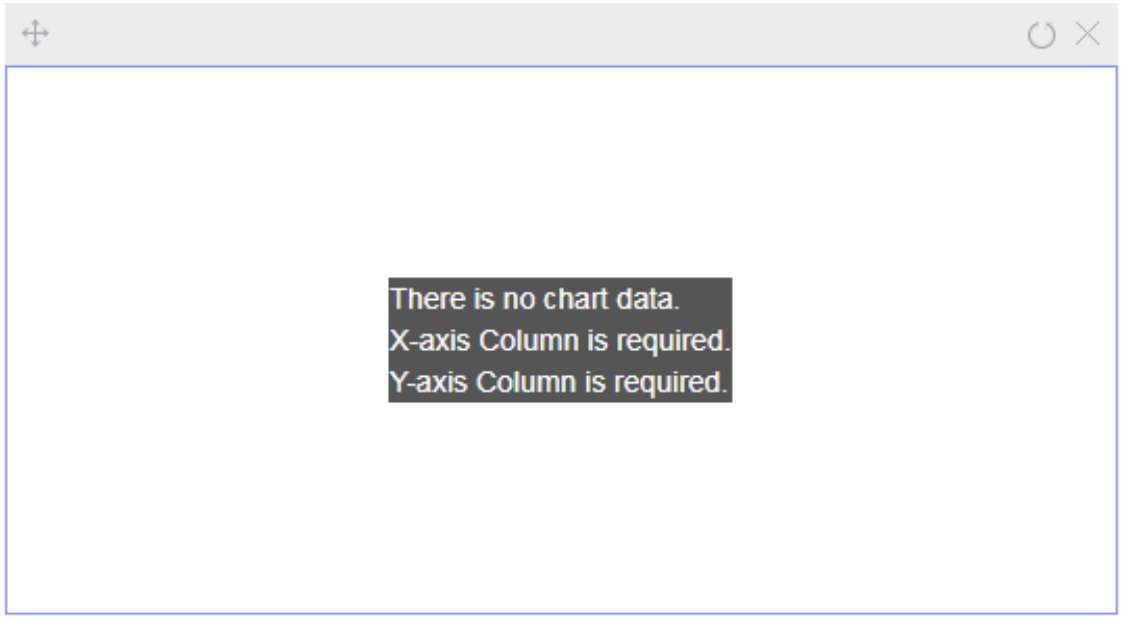


Figure 5-189 Chart Content Which Requires the Definition of its Data Source and a Column

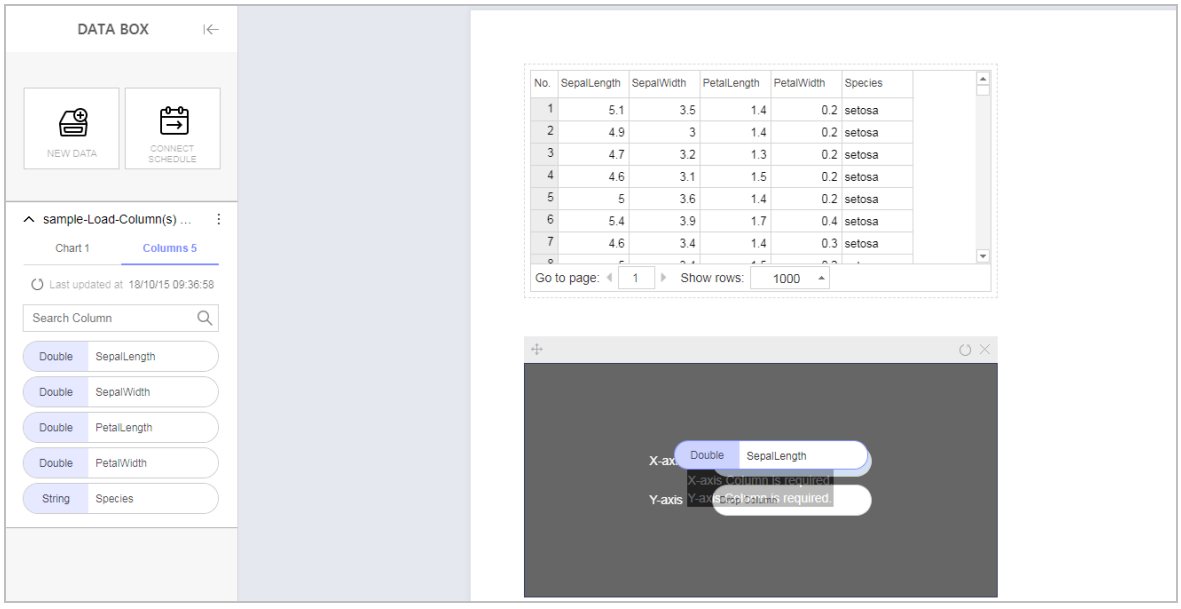


Figure 5-190 Define Data Source and Columns by Dragging Columns in the DATA BOX View

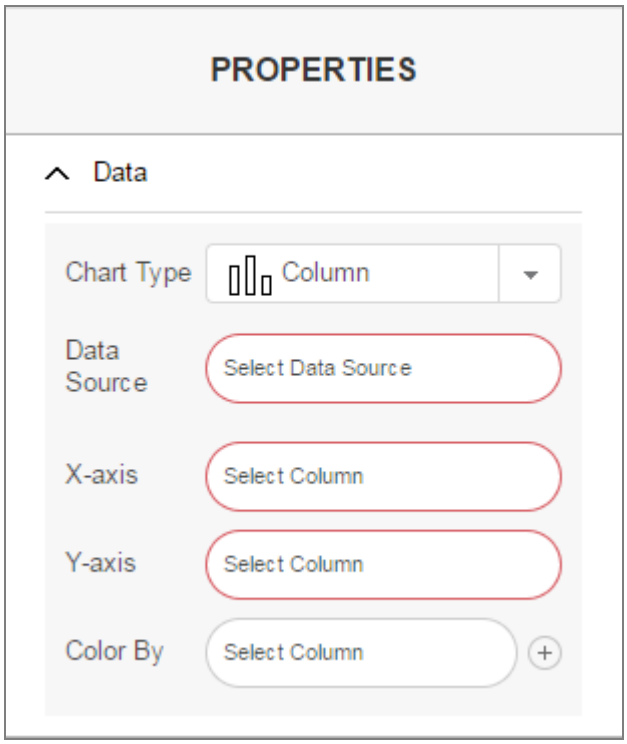


Figure 5-191 Define Data Source and Columns in the PROPERTIES View

5.5.8.2 Configure Options

PROPERTIES view also allows you to set options for both text and chart content. For text content, you can define text style, size, color and alignment. The options for chart content vary according to a chart type, and you can define chart title, axis, legend and marker.

Figure 5-192 Options for Text Content

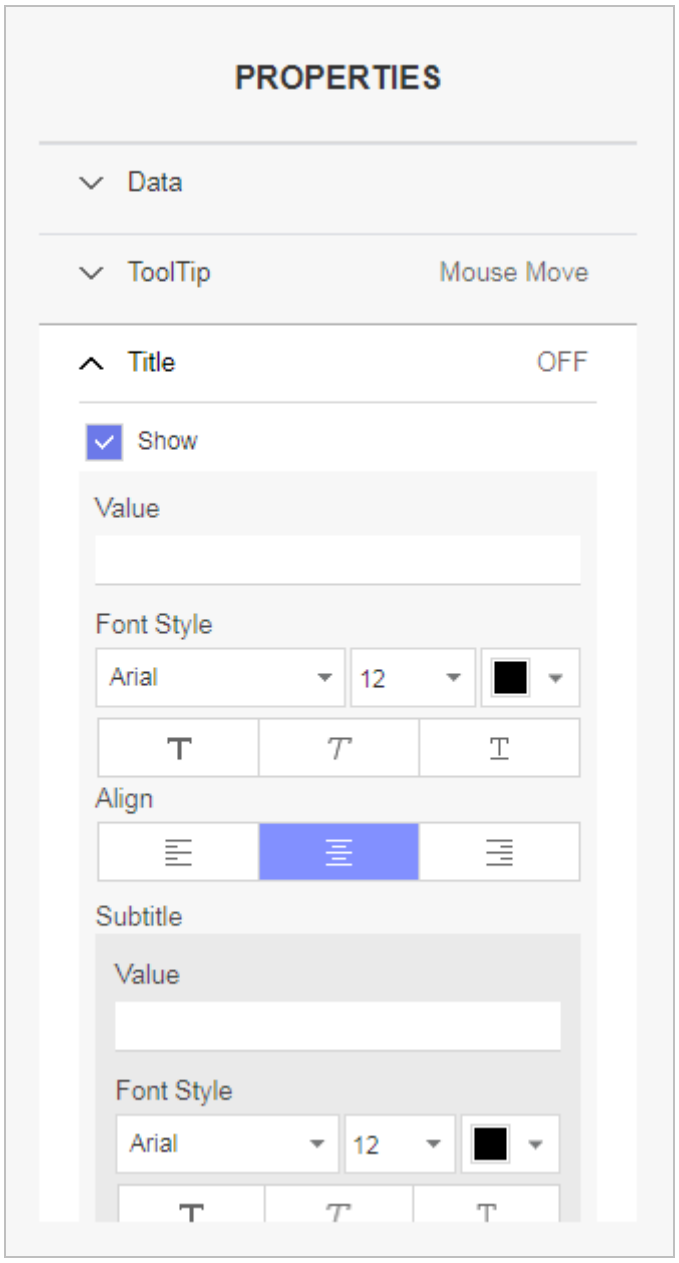


Figure 5-193 Options for Column Charts among Chart Content

5.5.9 Data Box View

DATA BOX view allows you to see the list of data sources linked to report, and add / rename / delete / refresh data source, delete a chart template, and link data source schedule.

5.5.9.1 Add a Data Source

A. Click **NEW DATA** button in the DATA BOX view.

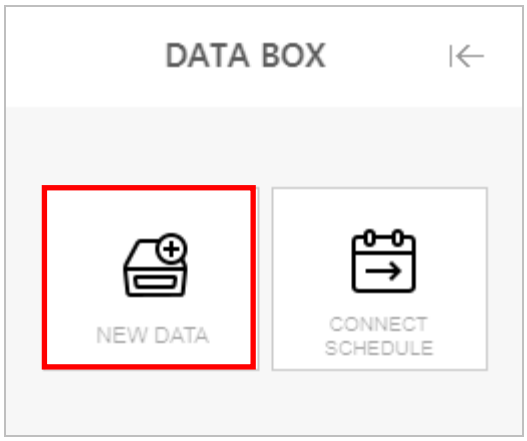


Figure 5-194 NEW DATA Button in DATA BOX View

B. Select *data* in NEW DATA window and click **FINISH** button.

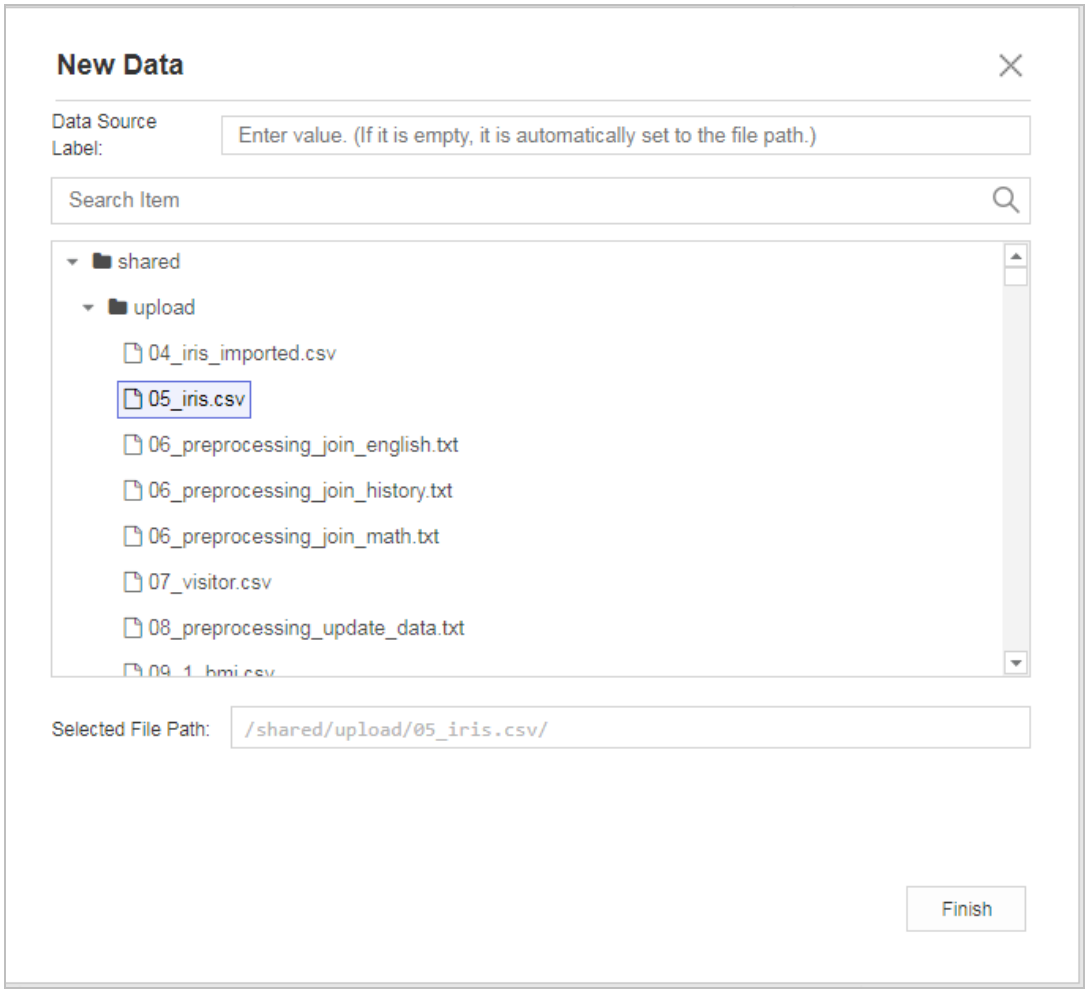


Figure 5-195 NEW DATA Window

C. The data source added to DATA BOX view is displayed after a process terminates in RUN PROGRESS window. The CHART tab of data source shows a chart template of the data source. And the COLUMNS tab shows the column of the data source and includes REFRESH button to update the data source.

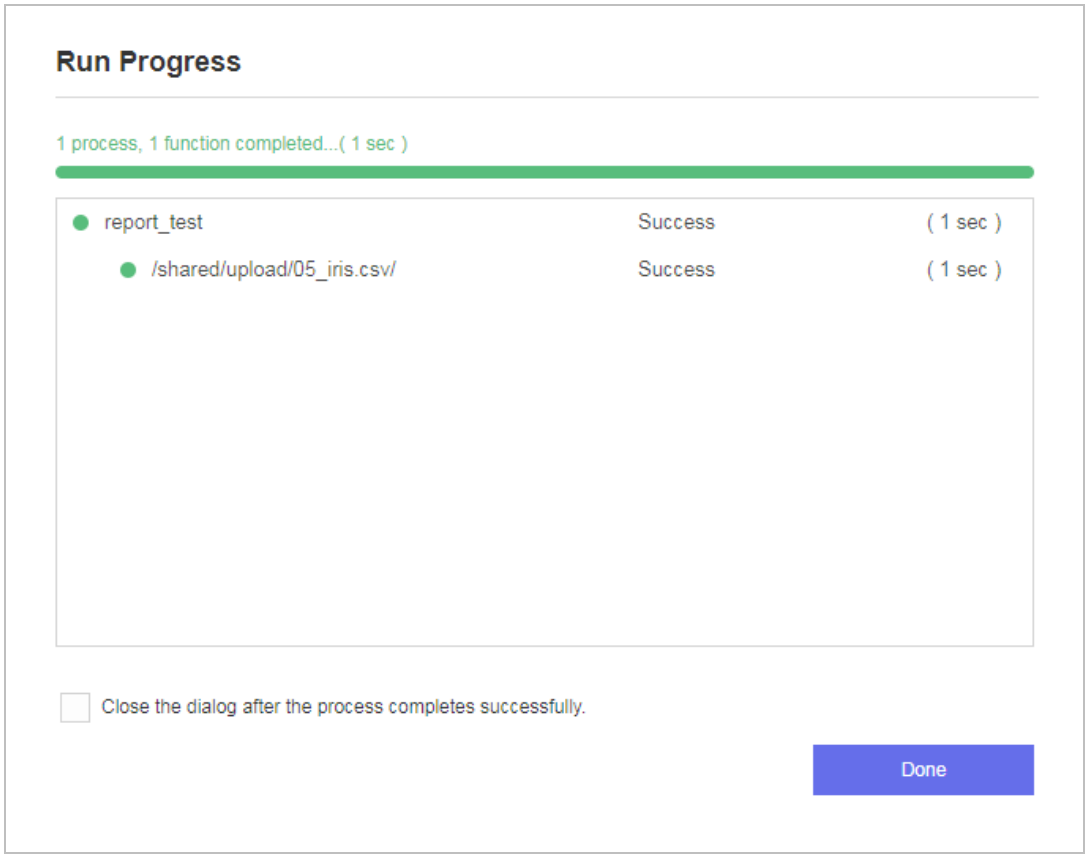


Figure 5-196 RUN PROGRESS Window to Show the Progress in Adding a Data Source

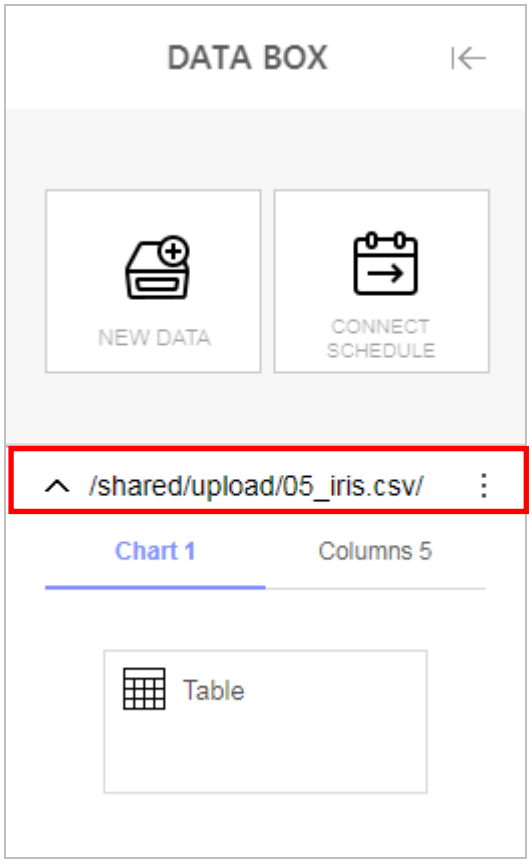


Figure 5-197 Data Source Added to DATA BOX

5.5.9.2 Rename a Data Source

C. Click ⋮ button of the data source in the DATA BOX view that you want to rename and choose **EDIT**.

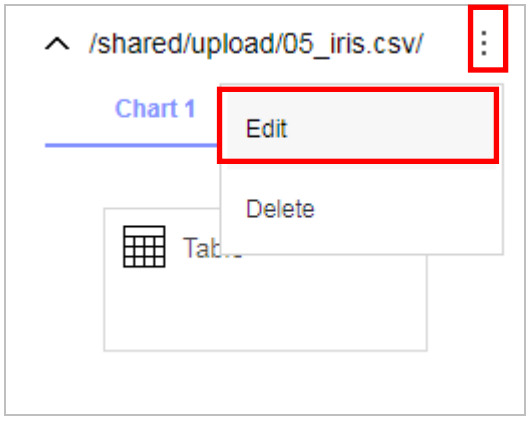


Figure 5-198 A Button to Edit a Data Source

D. Enter *Data Source Alias* in EDIT window and click **OK** button.

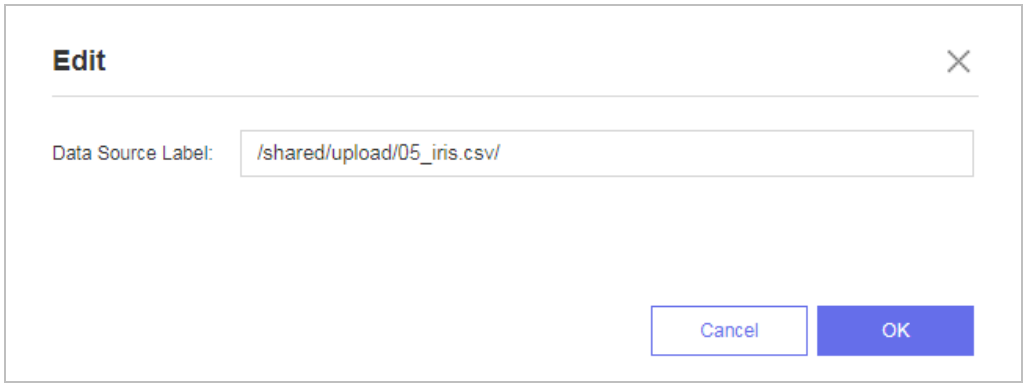


Figure 5-199 A Window to Edit a Data Source

E. The data source is renamed.

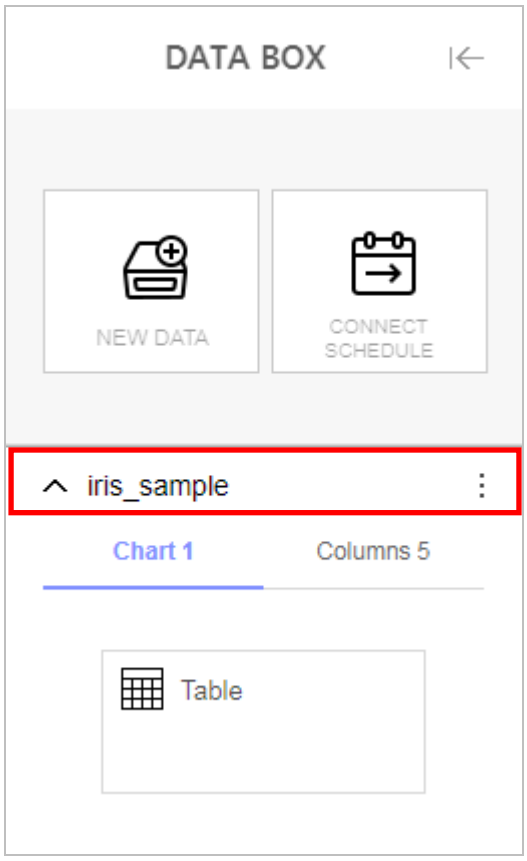


Figure 5-200 Renamed Data Source

5.5.9.3 Delete a Data Source

A. Click ⋮ button of the data source you want to delete from DATA BOX view and choose **DELETE**.

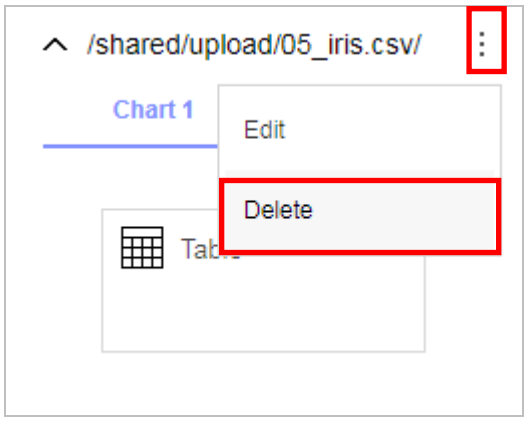


Figure 5-201 A Button to Delete a Data Source

B. Click **OK** button, and the data source will be deleted.

5.5.9.4 Refresh a Data Source

A. Click ↻ button in COLUMNS tab of the data source.

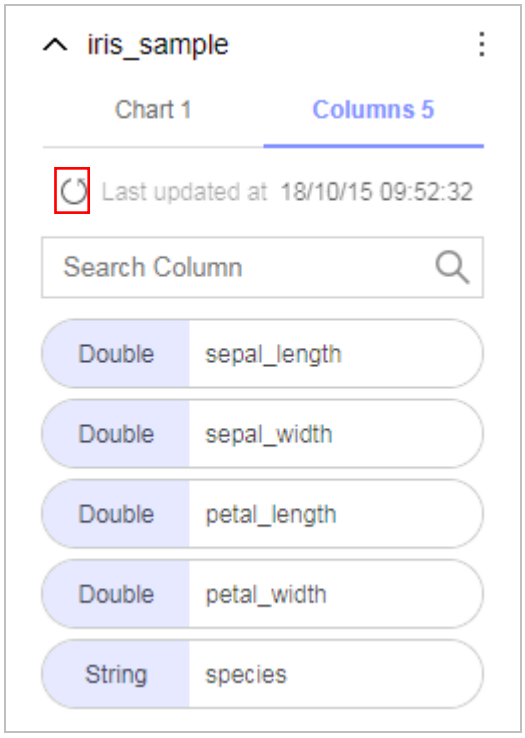


Figure 5-202 A Button to Refresh a Data Source

B. The last updated time is changed after a process terminates in RUN PROGRESS window. If a column of data source is changed, the changed column is applied.

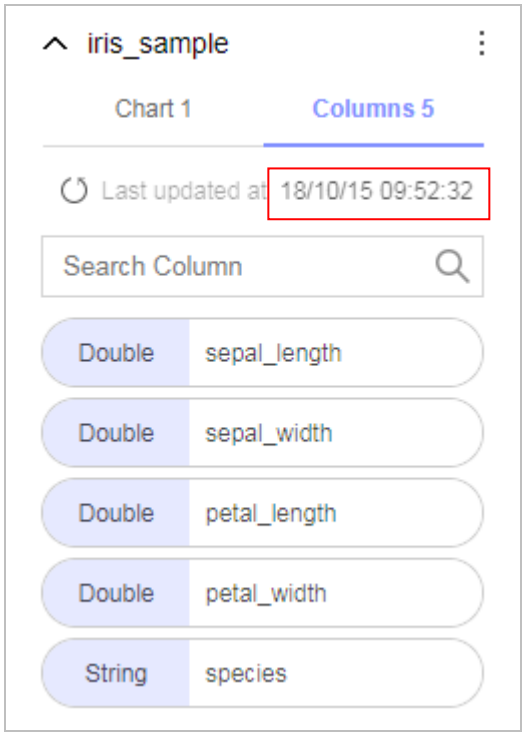


Figure 5-203 Refreshed Data Source

5.5.9.5 Delete a Chart Template

A. Click button of the chart template you want to delete from CHART tab of data source.

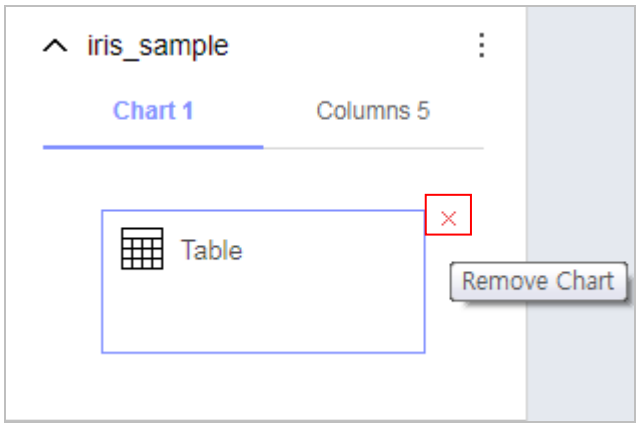


Figure 5-204 A Button to Delete a Chart Template

B. Click **OK** button, and the chart template will be deleted.

5.5.9.6 Connect a Data Sauce Schedule

A. Click button of the data source whose schedule you want to connect to and choose **CONNECT SCHEDULE**.

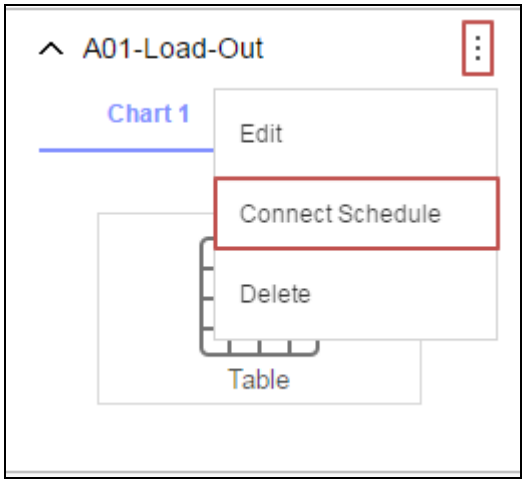


Figure 5-205 A Button to CONNECT SCHEDULE of a Data Source

B. Choose a schedule from CONNECT SCHEDULE window and click **OK** button.

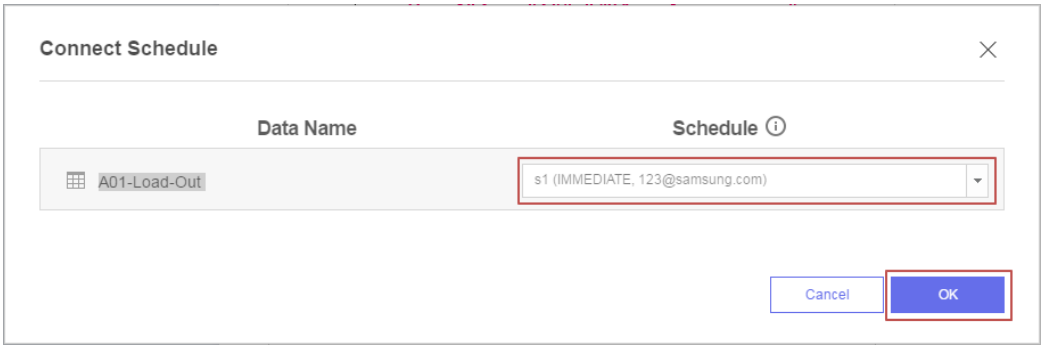


Figure 5-206 A Window to Connect Data Source Schedule

C. The seleted schedule is connected to the data source.

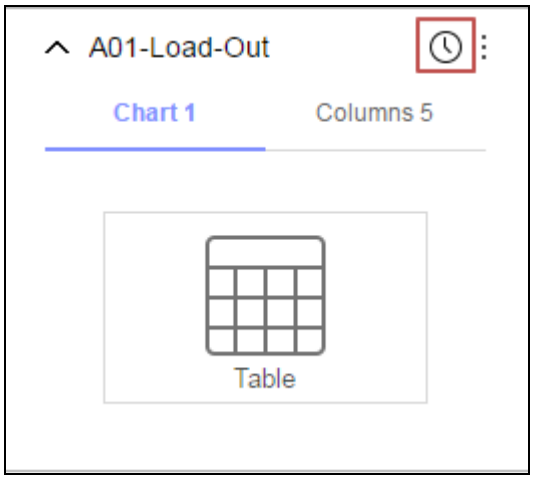


Figure 5-207 An Icon to Verify the Data Source Schedule is Connected

5.5.9.7 Connect a Schedule to Data Source at Once

A. Click **CONNECT SCHEDULE** button in the DATA BOX view.

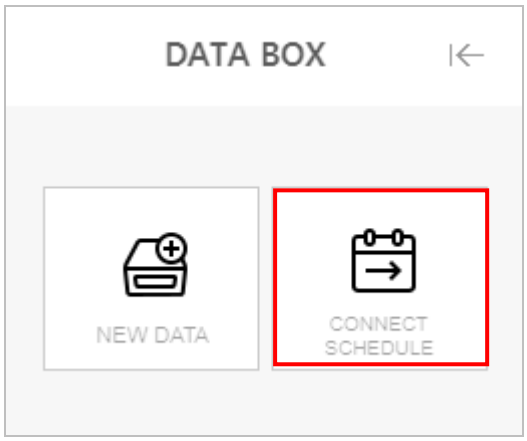


Figure 5-208 A Button to Connect a Schedule to Data Sources At Once

B. Choose the schedule of a upper model in the CONNECT SCHEDULE window and click **OK**.

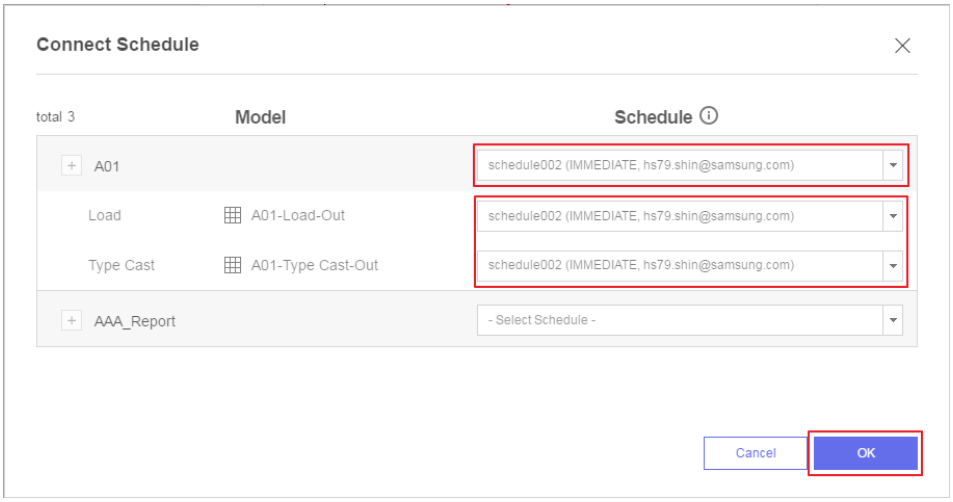


Figure 5-209 A Window to Connect a Schedule to Data Sources At Once

C. The selected schedule is connected to all the data sources of the same model.

5.5.10 Export PDF

A. Click EXPORT PDF at the top right of the toolbar in the REPORT window which has been created.

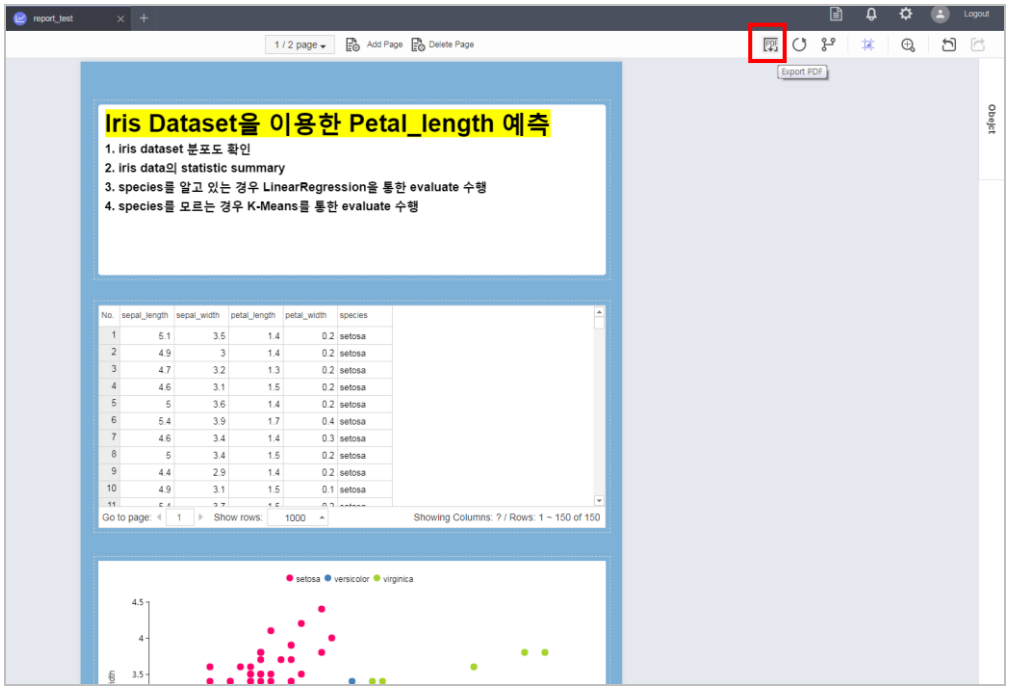


Figure 5-210 Toolbar at the Top Right of REPORT – EXPORT PDF

B. PDF preview window appears in a new tab. Click PRINT PDF button at the top left side, and PRINT window will appear.

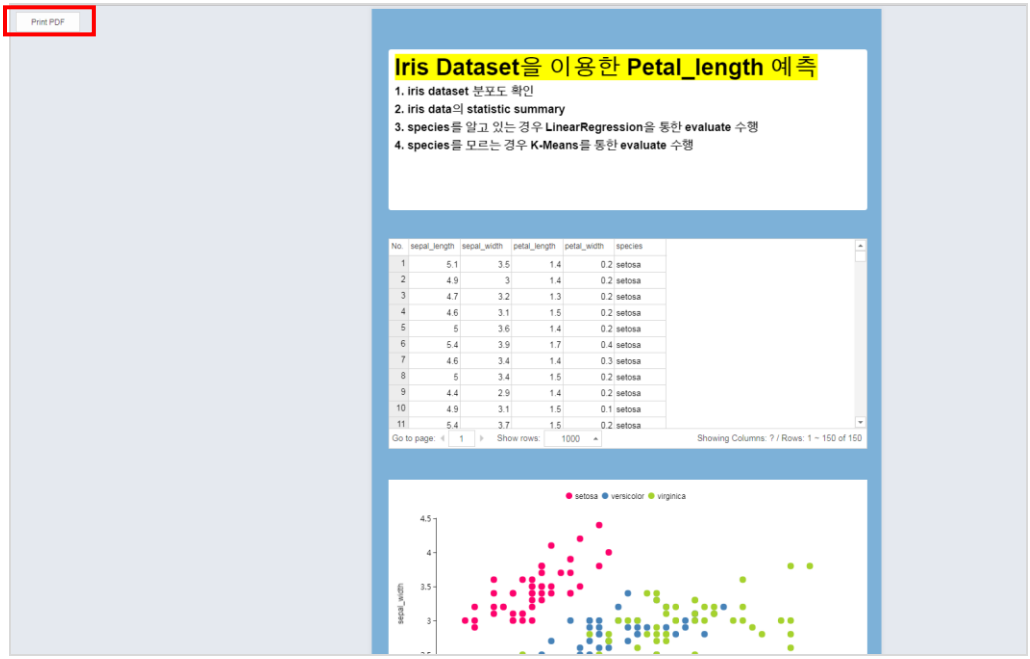


Figure 5-211 PRINT PDF Button at the Top Left of a Report

Click PRINT button, and the report will be printed.

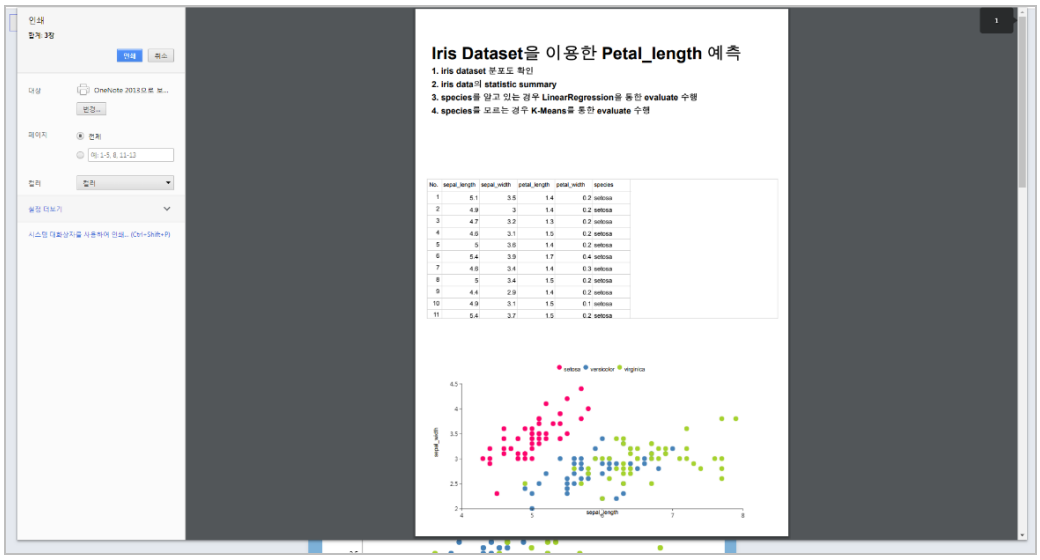


Figure 5-212 A Screen to Print PDF Report

5.5.11 Publish

Features to search / create / delete published reports are available to share modeling reports with others. Also, published reports can be shared via embedded codes or URL link.

5.5.11.1 Search a Published Report

A. Click button in the DIAGRAM EDITOR to search a published report.

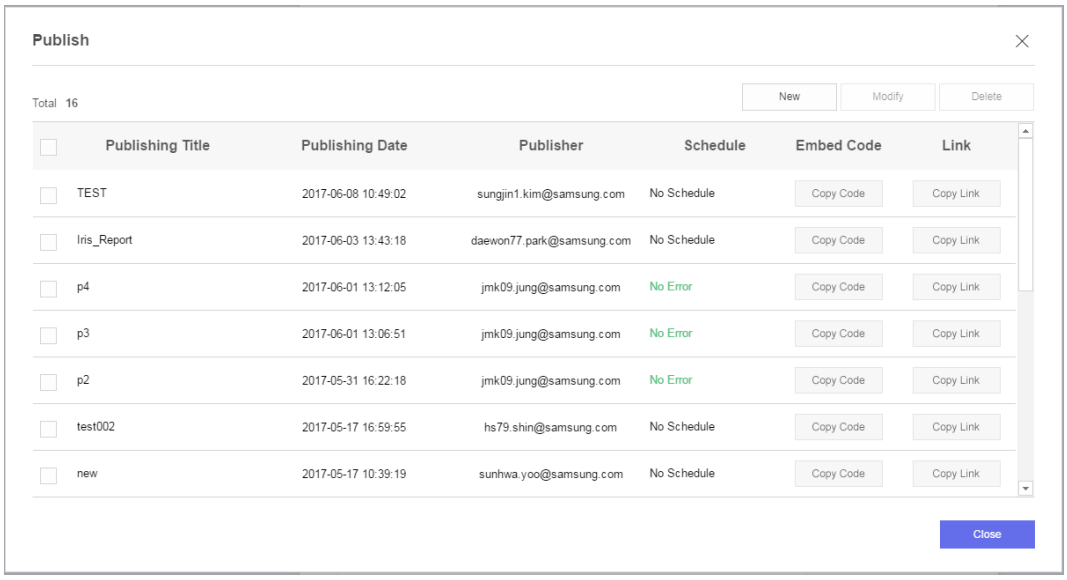


Figure 5-213 A Screen to Search a Published Report

5.5.11.2 Publish a New Report

A. Click **NEW** button in the PUBLISH screen where you can look up published reports.

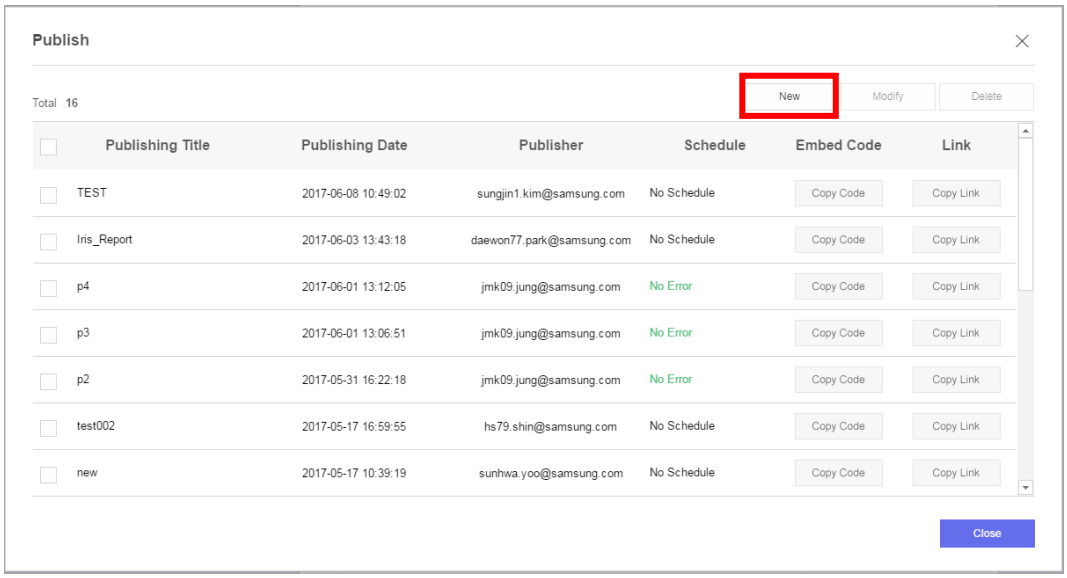


Figure 5-214 NEW Button to Publish a Report

B. Enter a PUBLISHING TITLE and click **OK** button in NEW PUBLISHING widnow.

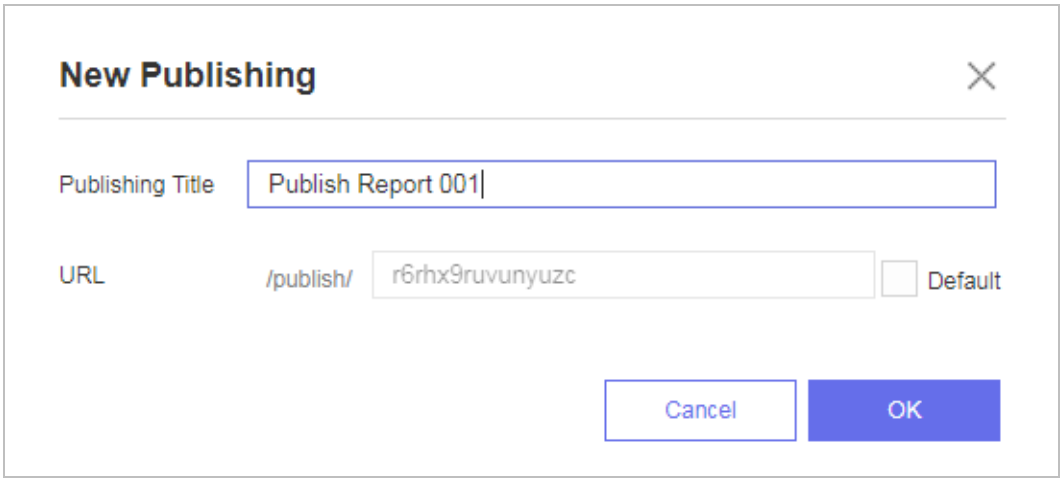


Figure 5-215 A Window to Publish a New Report

C. Check whether the new report is published properly.

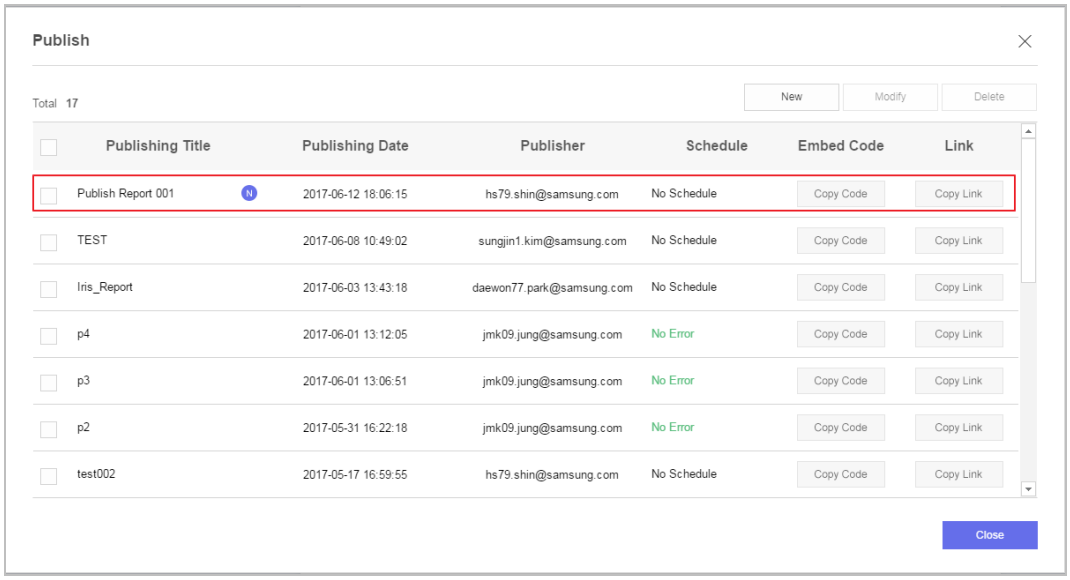


Figure 5-216 Check a Newly Published Report

5.5.11.3 Delete a Published Report

A. Choose a published report you want to delete from the list of published reports and click **DELETE** button.

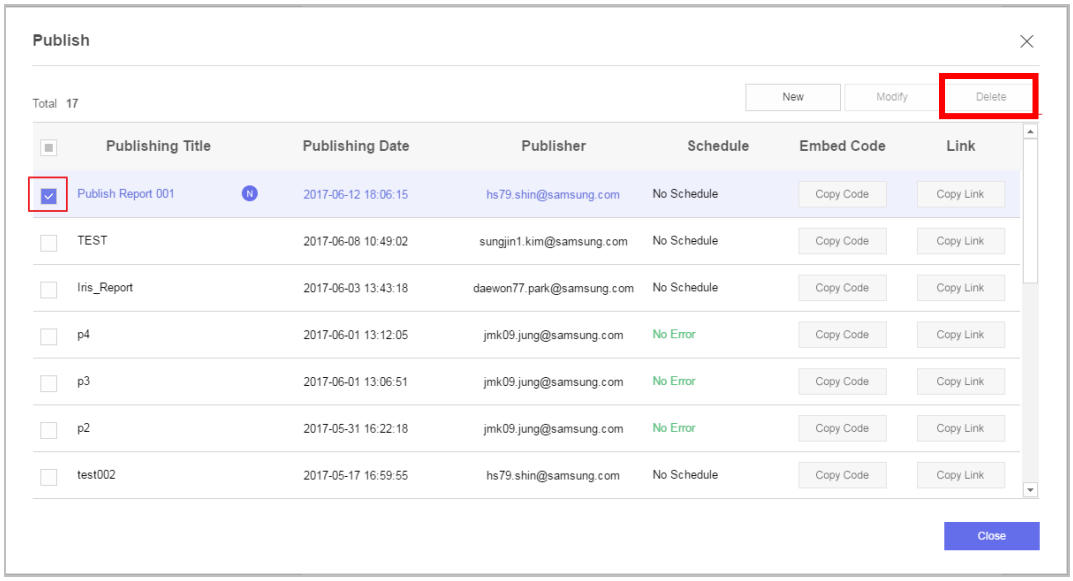


Figure 5-217 A Button to Delete a Published Report

B. Click **OK** button**,** and the published report that you chose will be deleted**.**

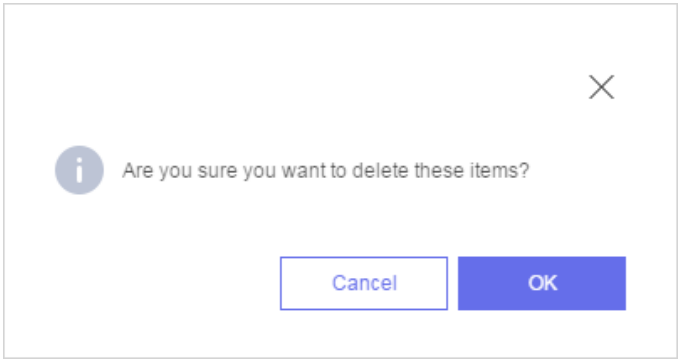


Figure 5-218 A Window to Make Sure to Delete a Published Report

5.5.11.4 Embedded Code of a Published Report

A. Click **COPY CODE** button in the EMBED CODE category of the published report that you want to share from the list of published reports.

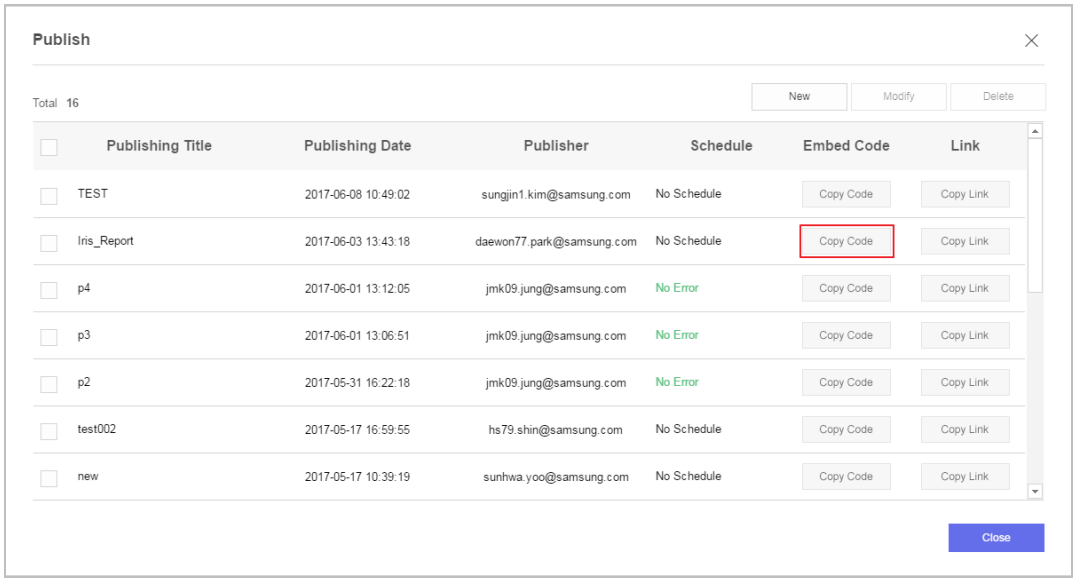


Figure 5-219 A Button to Copy Embedded Code of a Published Report

B. The embedded code in iframe format of the chosen published report is copied.

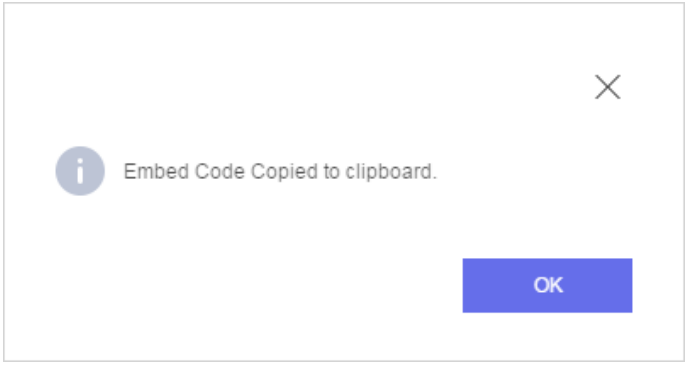


Figure 5-220 Check whether the embedded code of the published report is properly copied.

5.5.11.5 URL Link of a Published Report

A. Click **COPY CODE** button in LINK category of the published report you want to share from the list of published reports.

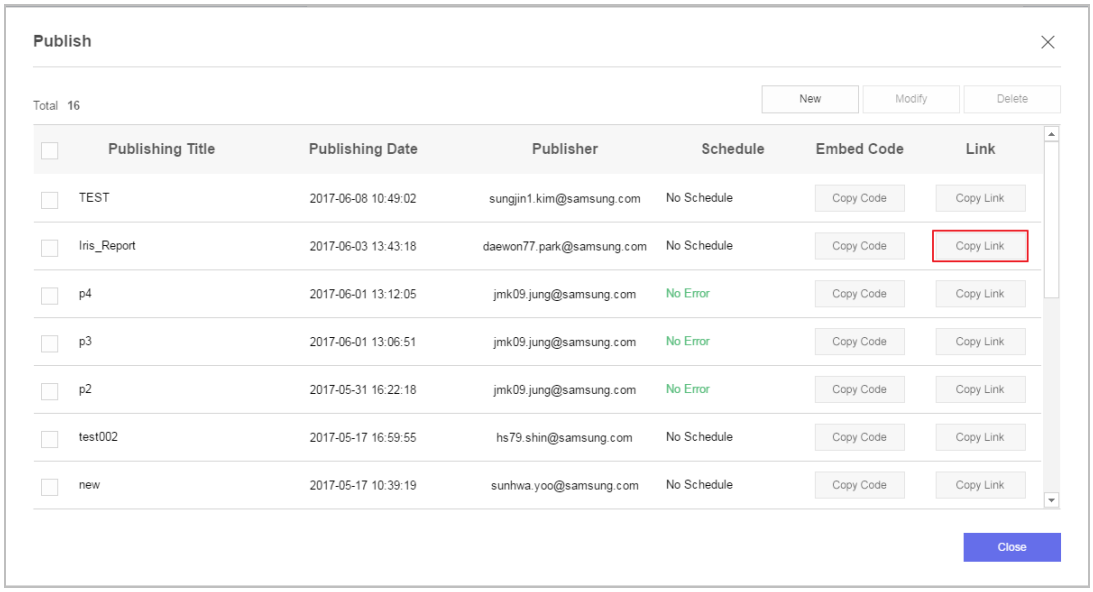


Figure 5-221 A Button to Copy the URL Link of a Published Report

B. The URL Link of the published report you chose is copied.

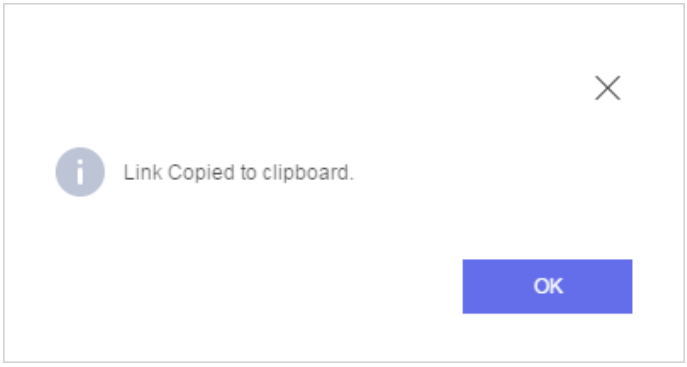


Figure 5-222 The URL Link of the Published Report is Properly Copied.

5.6 Management

MANAGEMENT menu consists of USER, NOTICE, SCHEDULE, (Spark) AGENT, DEPLOY, PUBLISH, and ROLE. Click **SETTINGS** button at the top right and then **GO** button to move to MANAGEMENT screen.

5.6.1 User

5.6.1.1 Create a User

A. Click **ADD** button in the USER management screen.

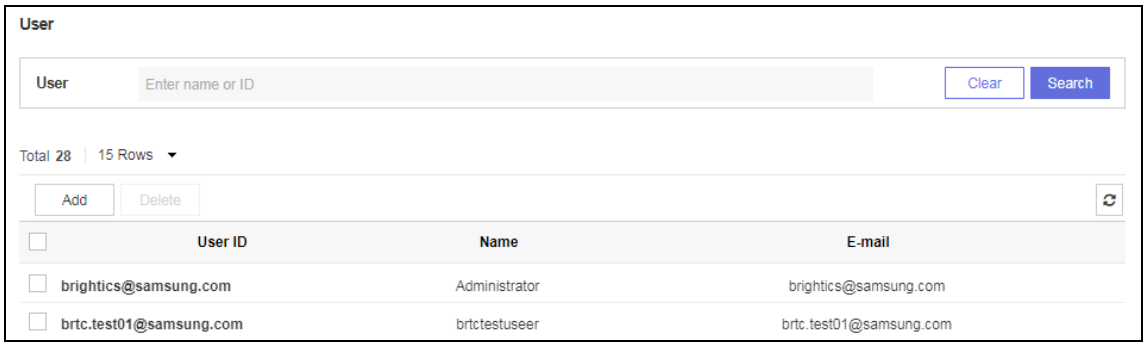


Figure 5-223 Click **ADD** Button to Move to ADD USER Screen.

B. Enter user information and click **SAVE** button.

Figure 5-224 Click **SAVE** Button to Complete User Creation.

5.6.1.2 Search a User

A. Enter a user name or ID that you are looking for in the search window of USER management screen.

Figure 5-225 A Window to Search a User

B. Click the searched user and check the corresponding user information.

Figure 5-226 User Information Detail

C. From the user list, choose the desired number of rows (15, 20 or 30) to be displayed per page which is located next to the total number.

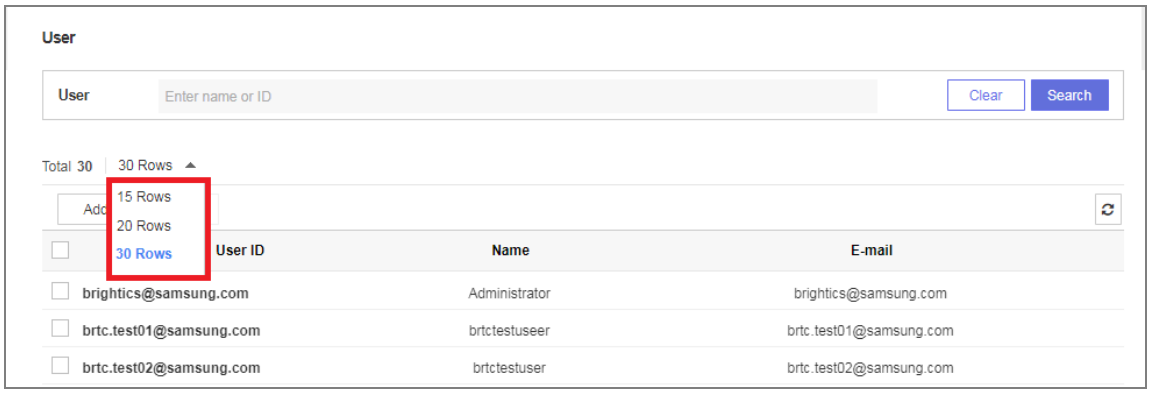


Figure 5-227 User Information List

5.6.1.3 Edit a User

A. If you choose a user row in the USER screen, it will redirect you to USER INFORMATION DETAIL window where you can click **EDIT** button.

Figure 5-228 The Screen Shown After Clicking **EDIT** Button

B. Edit a *User Name* and then click **SAVE** button.

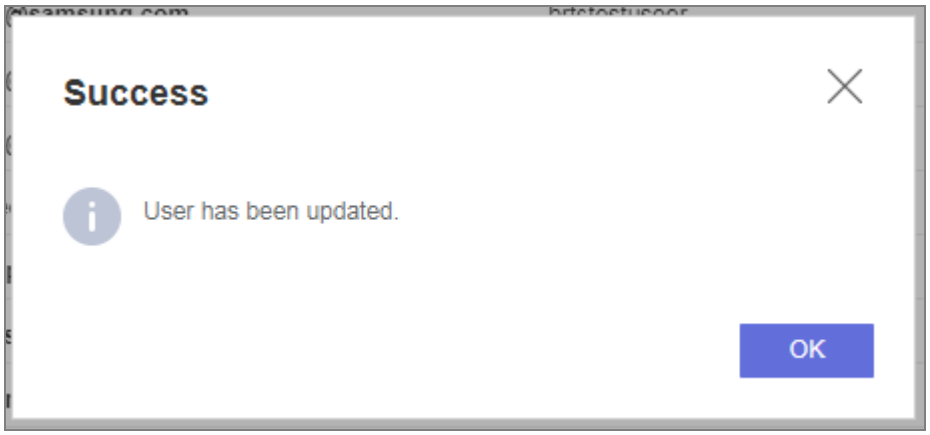


Figure 5-229 User Modification Result

5.6.1.4 Delete a User

A. Choose a user from USER screen and click **DELETE** button, the window will be displayed to make sure to delete the user.

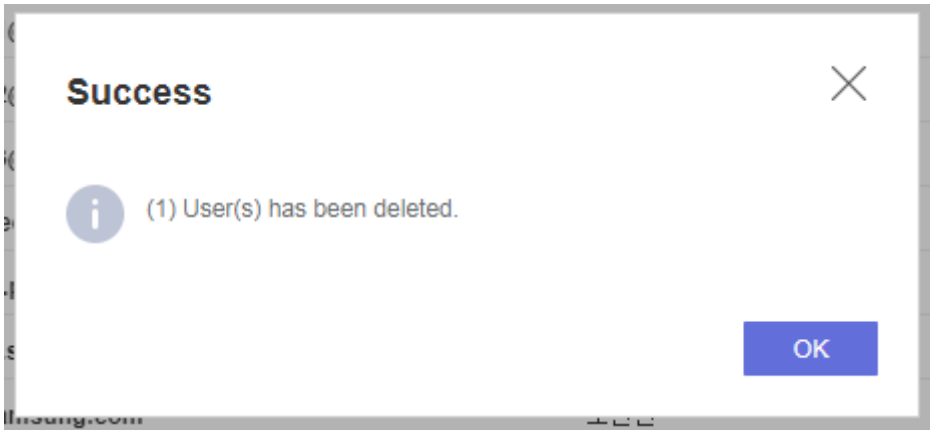


Figure 5-230 The Screen Shown After Clicking **OK** Button

B. Click **OK** button, and the corresponding user will be deleted.

5.6.2 Notice

5.6.2.1 Create a Notice

A. Click **ADD** button in the NOTICE management screen.

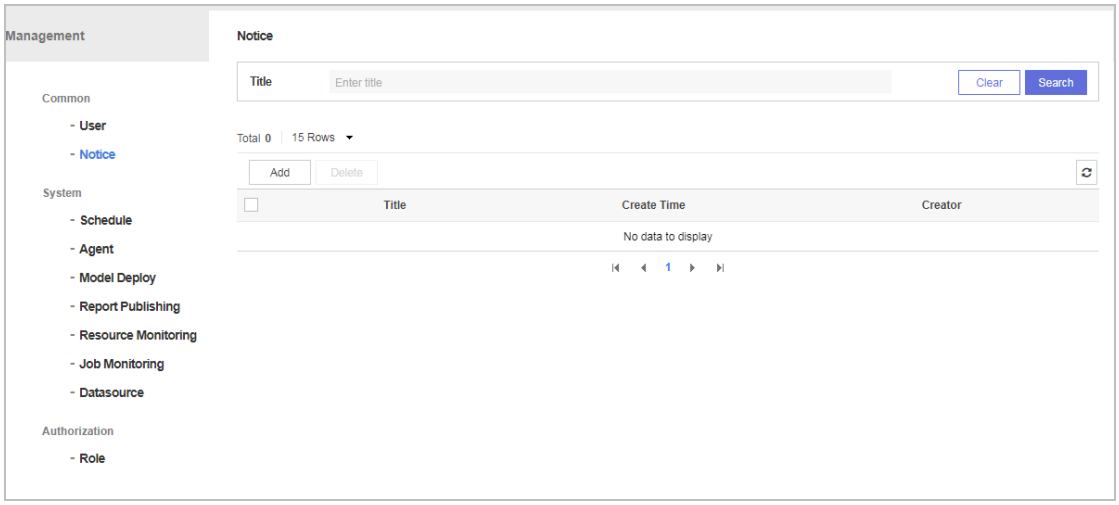


Figure 5-231 Click **ADD** Button to Move to Notice Creation Screen

B. Enter *Title* and *Content* and then click **SAVE** button.

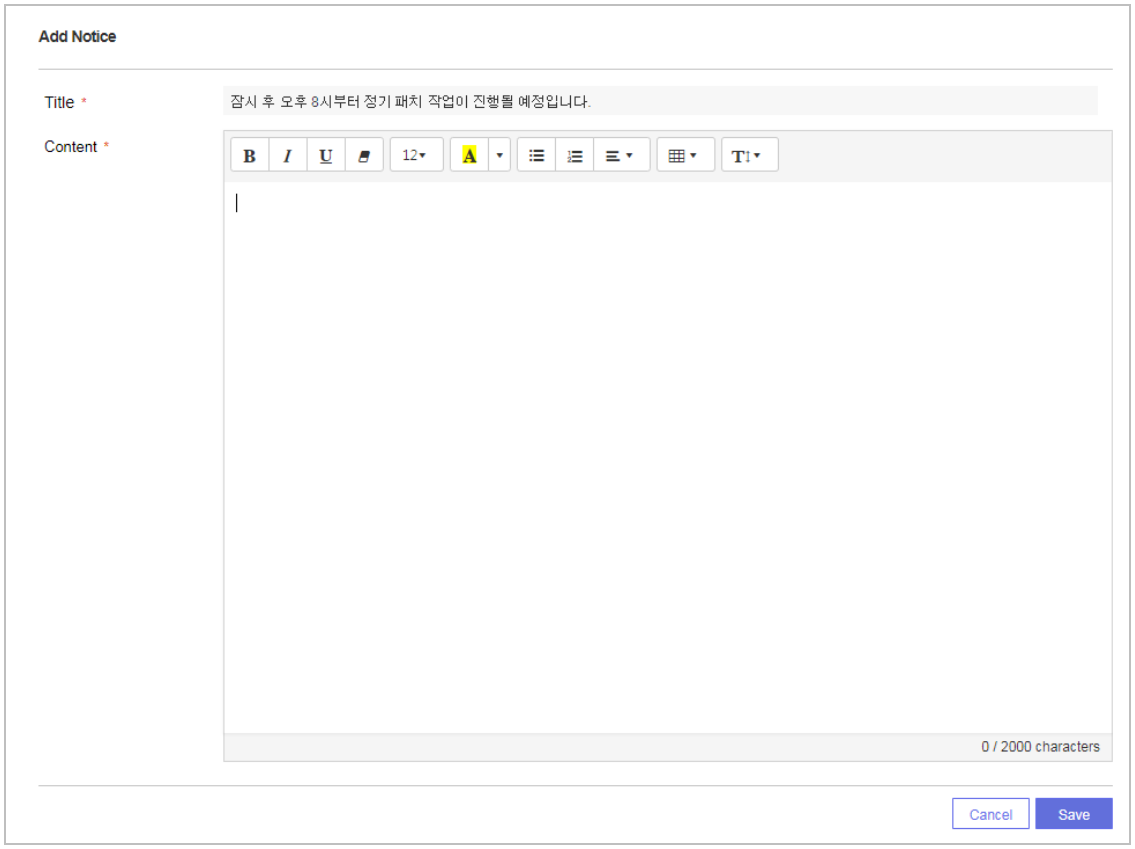


Figure 5-232 Click **SAVE** Button to Complete Notice Creation

5.6.2.2 Search a Notice

A. Enter a notice you are looking for in the search window of NOTICE management screen.

Figure 5-233 Notice Search Screen

B. Click a searched notice and see the corresponding details.

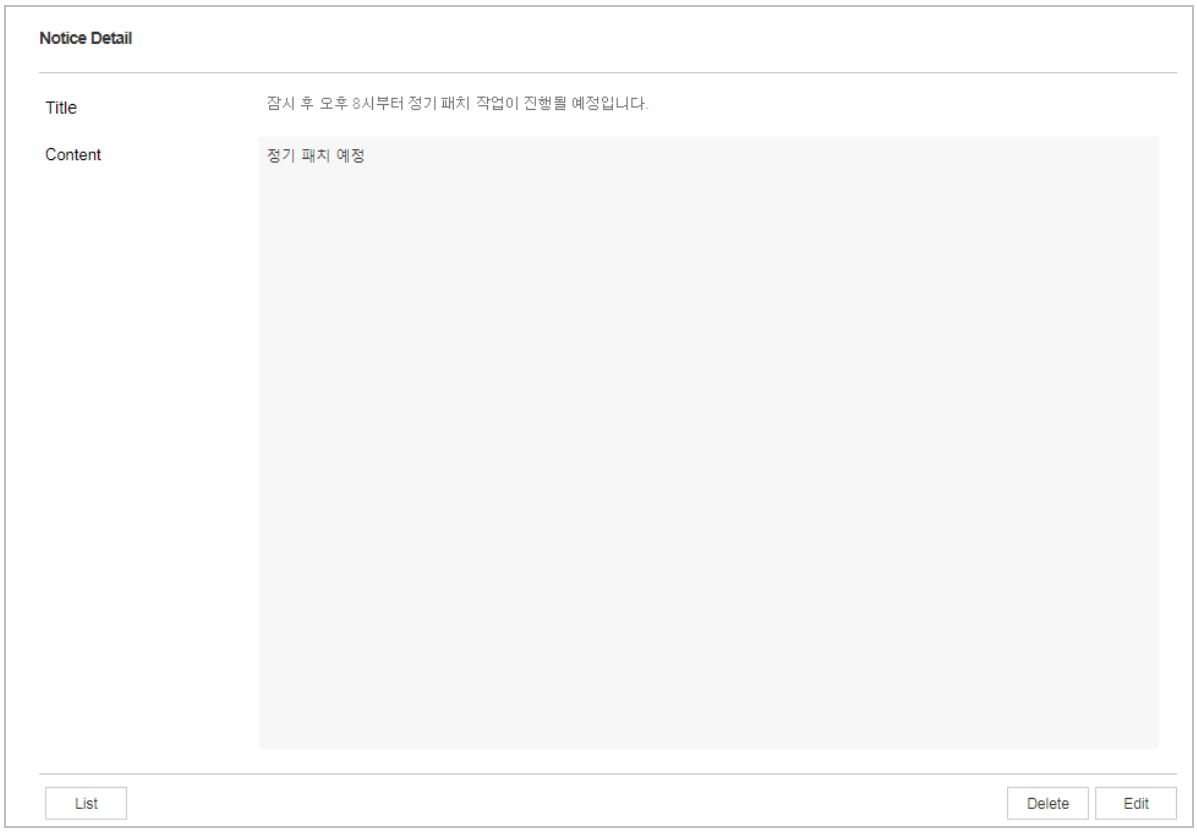


Figure 5-234 NOTICE DETAIL Screen

C. From the notice list, choose the desired number of rows (15, 20 or 30) to be displayed per page which is located next to the total number.

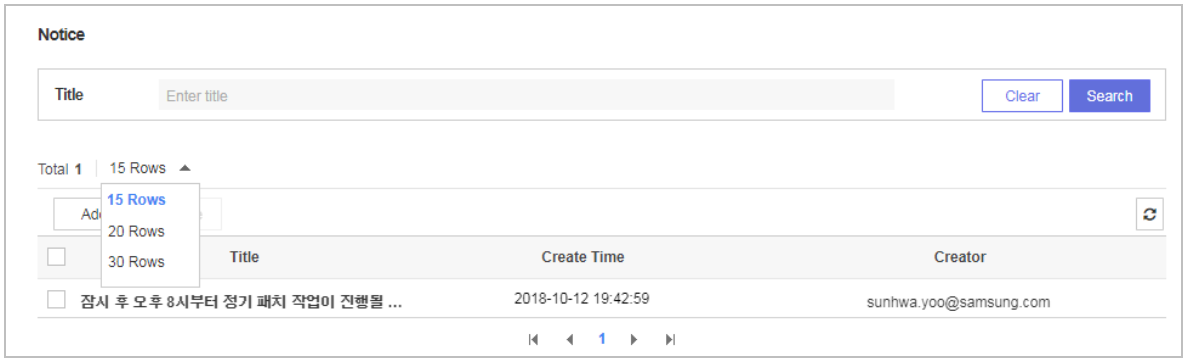


Figure 5-235 A Screen to Determine the Number of Notices to Be Displayed per Page

5.6.2.3 Modify a Notice

A. Choose a notice row from the NOTICE screen, and it will redirect you to NOTICE DETAIL screen where you can click **EDIT** button.

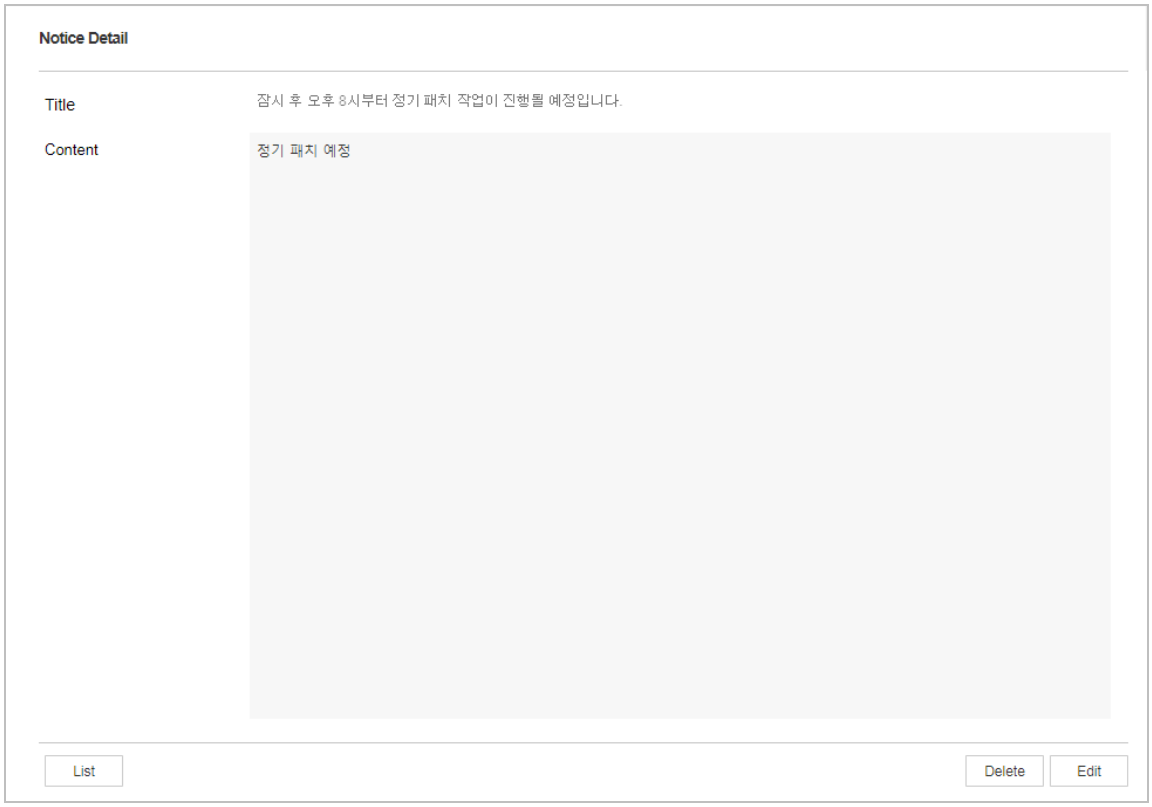


Figure 5-236 The Screen Shown After Clicking **Edit** Button

B. Edit *Notice Title* or *Content* and click **SAVE** button.

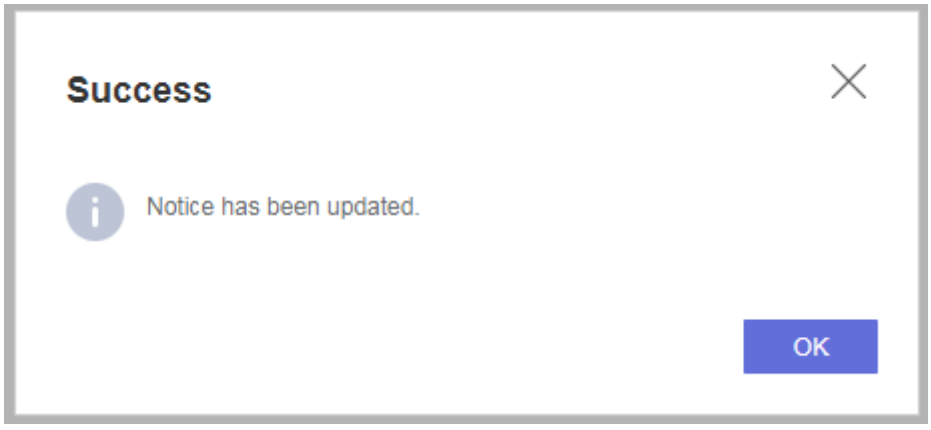


Figure 5-237 Notice Modification Result

5.6.2.4 Delete a Notice

A. Choose a notice that you want to delete from NOTICE screen.

B. Click **DELETE** button, and the window will appear to make sure to delete the notice. And if you click **OK** button, the notice will be deleted.

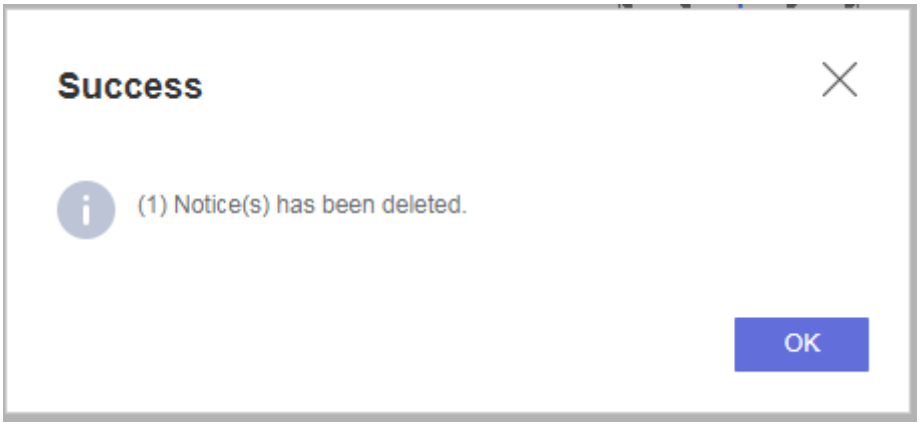


Figure 5-238 The Window Shown after Clicking **OK** Button

5.6.3 Schedule

5.6.3.1 Create a Schedule

A. Click ADD button in the SCHEDULE management screen.

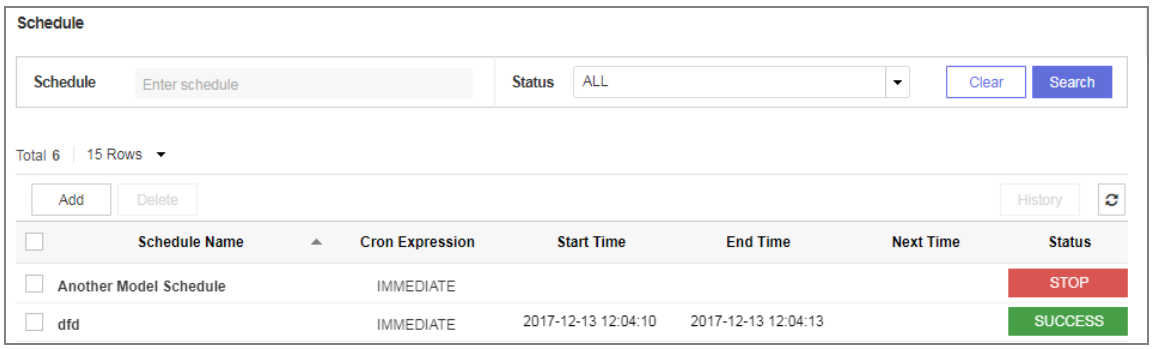


Figure 5-239 Click **ADD** Button to Move to ADD SCHEDULE Screen.

B. Enter schedule information and click **SAVE** button.

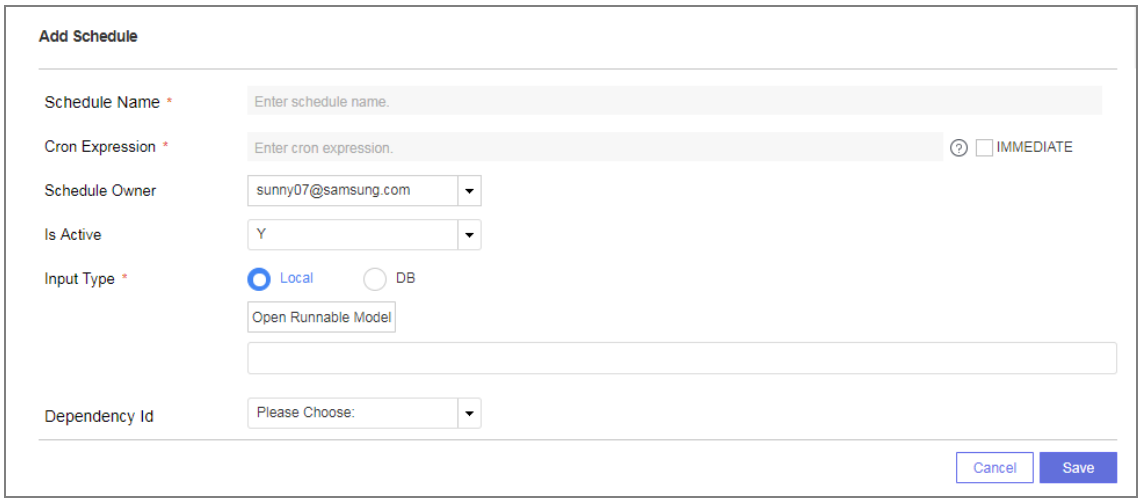


Figure 5-240 Click **SAVE** Button to Create a Schedule

5.6.3.2 Search a Schedule

A. Enter a schedule that you are looking for in the search window of SCHEDULE management screen.

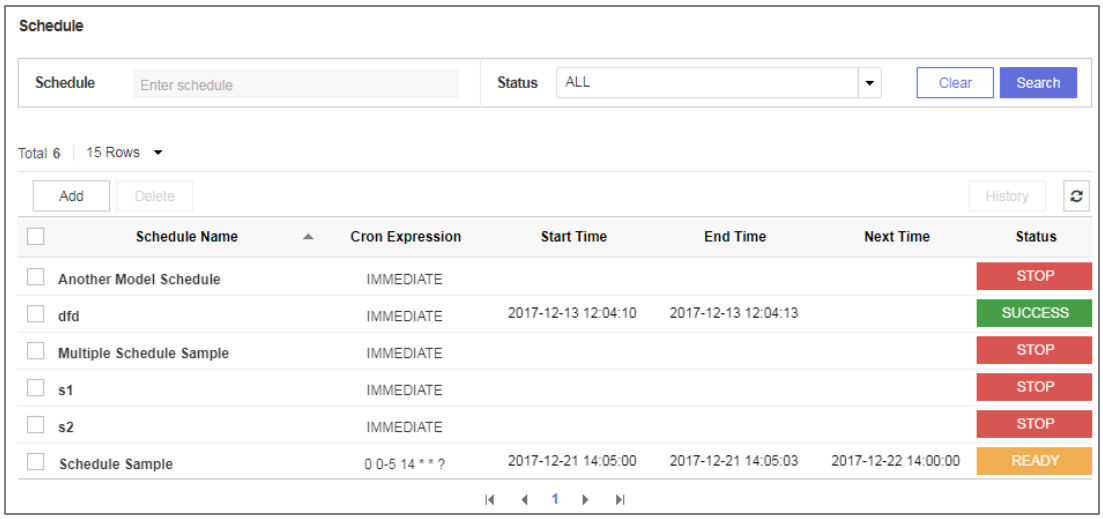


Figure 5-241 Schedule Search Screen

B. Click a searched schedule and see the details.

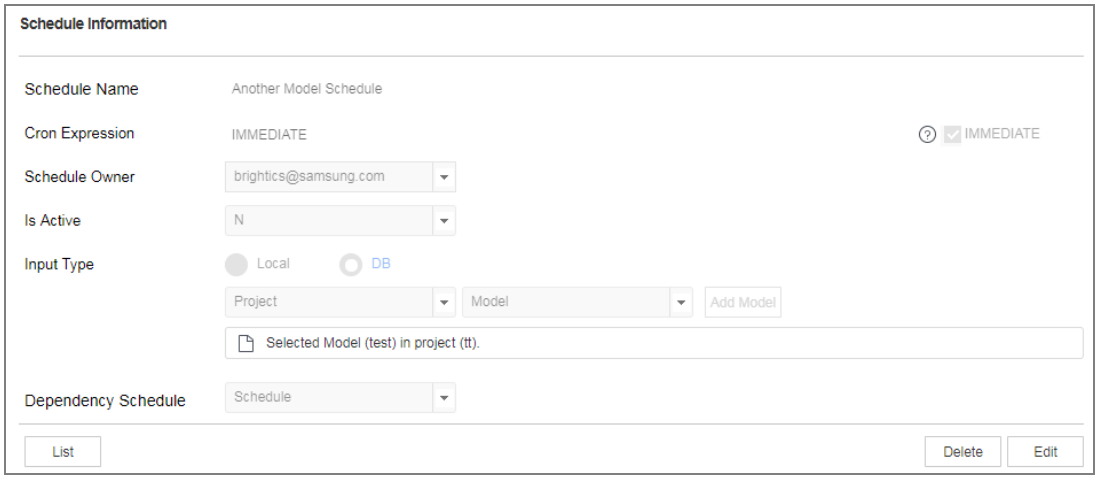


Figure 5-242 Schedule Detail Screen

C. Choose a schedule from the list and click HISTORY button.

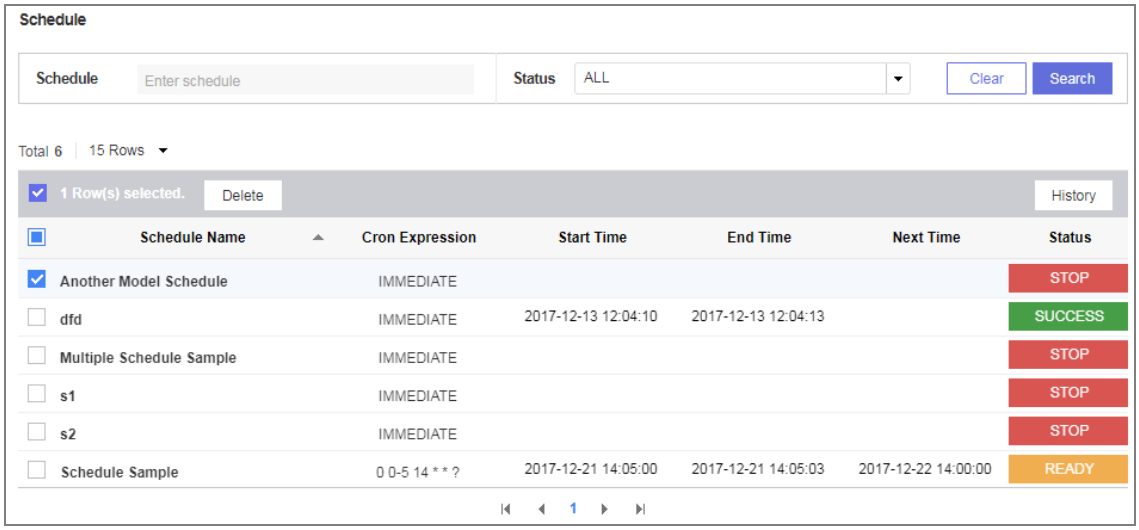


Figure 5-243 Schedule List

The change history of the corresponding schedule is displayed.

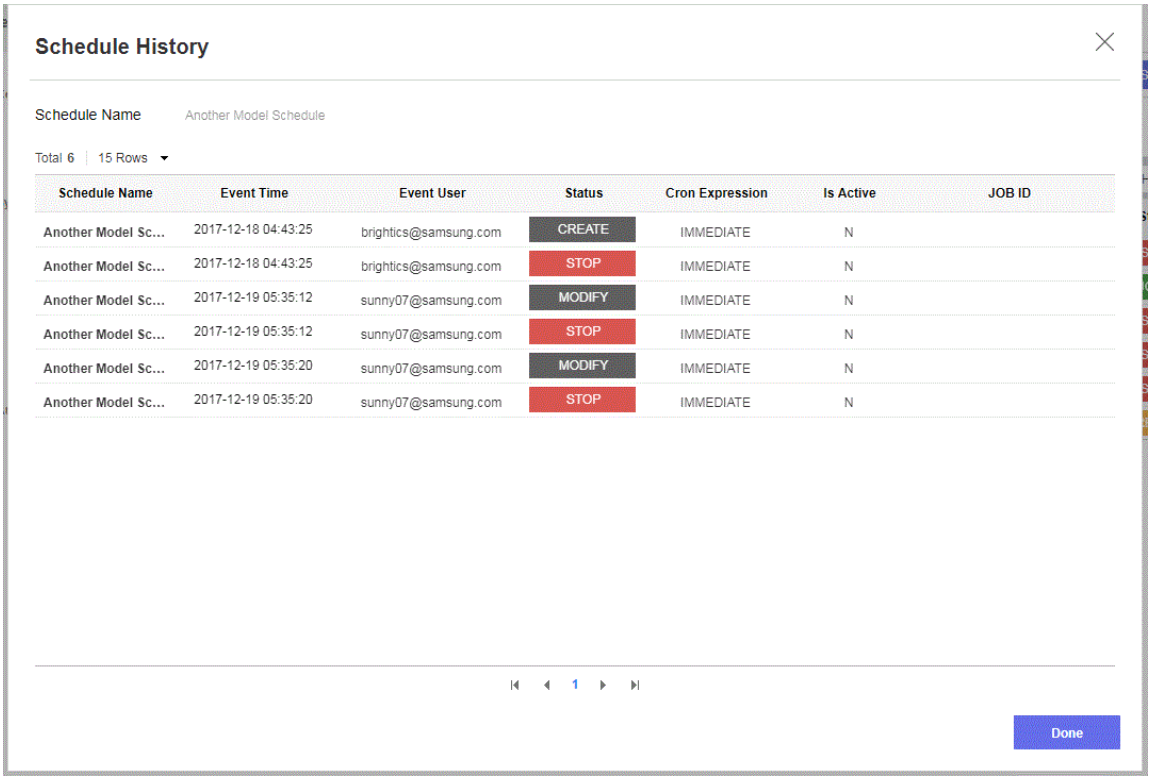


Figure 5-244 SCHEDULE HISTORY Screen

5.6.3.3 Modify a Schedule

A. Choose a schedule row from SCHEDULE screen, and it will redirect you to SCHEDULE INFORMATION screen where you can click **EDIT** button.

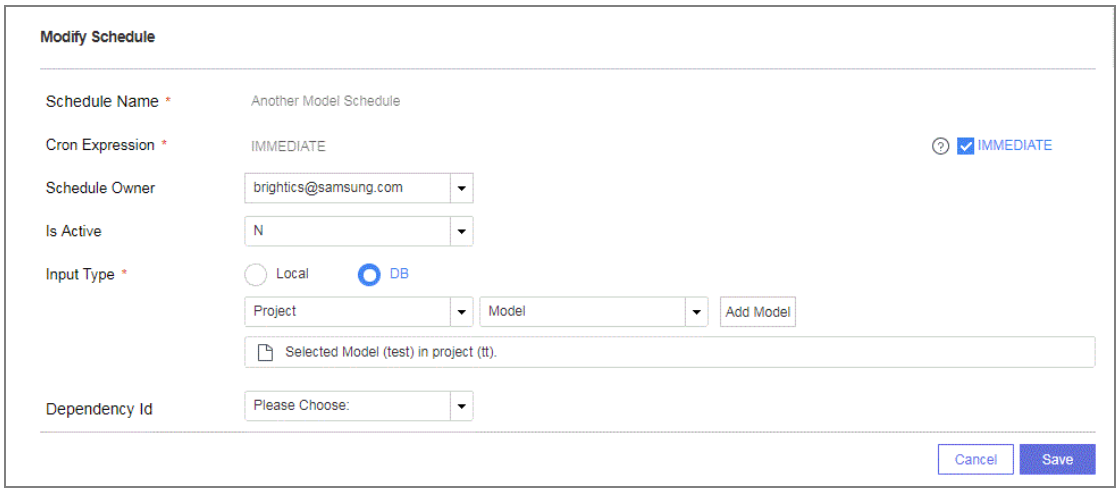


Figure 5-245 The Screen Shown after Clicking **EDIT** Button

B. Modify the content and then click **SAVE** button.

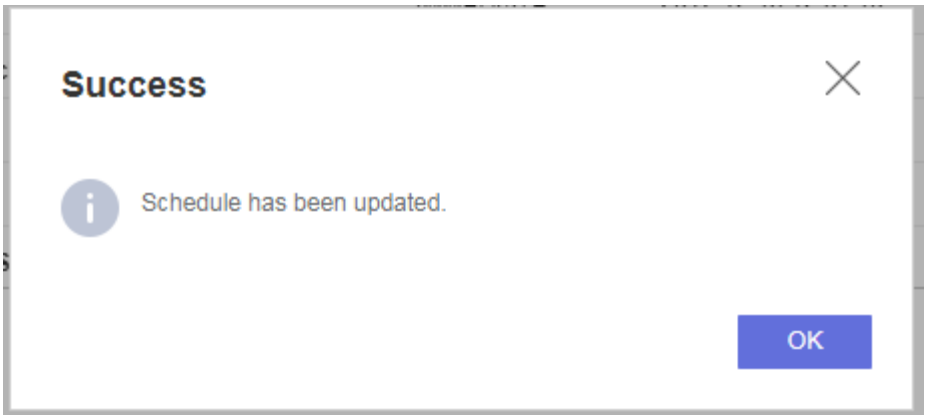


Figure 5-246 Schedule Modification Result

5.6.3.4 Delete a Schedule

A. Click the checkbox of the schedule that you want to delete from SCHEDULE screen and click **DELETE** button.

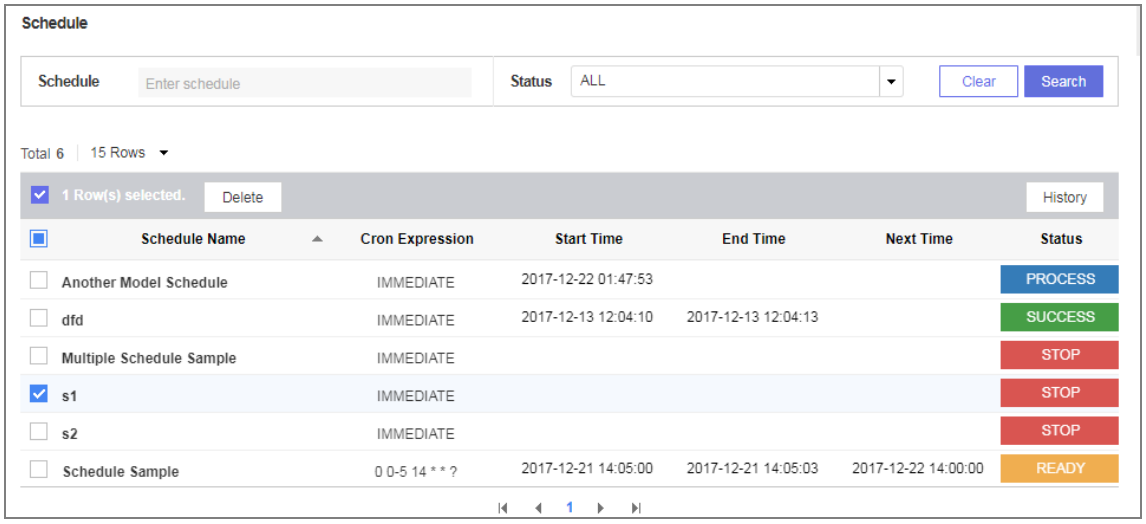


Figure 5-247 Select a Schedule to Delete and Click **DELETE** Button

B. Click **DELETE** button, and a popup will appear to make sure if you want to delete. And if you click **OK**, the schedule will be deleted.

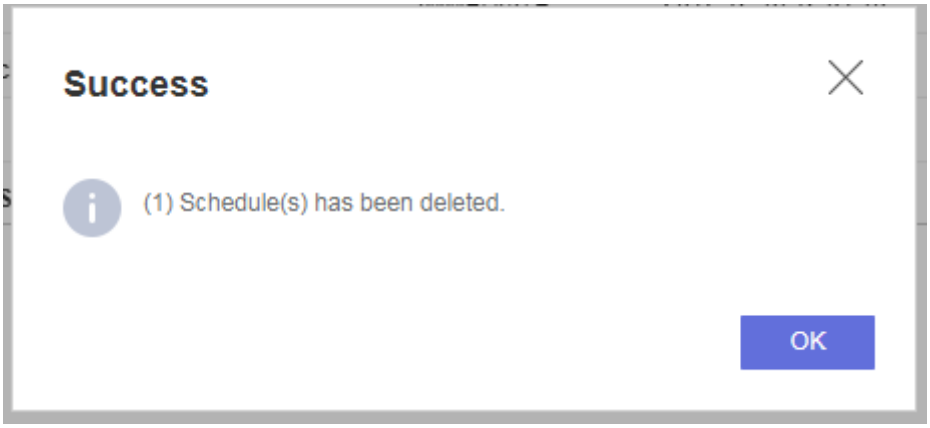


Figure 5-248 The Screen Shown After Clicking **OK** Button

5.6.4 Agent

5.6.4.1 Create an Agent

A. Click **ADD** button in the AGENT management screen.

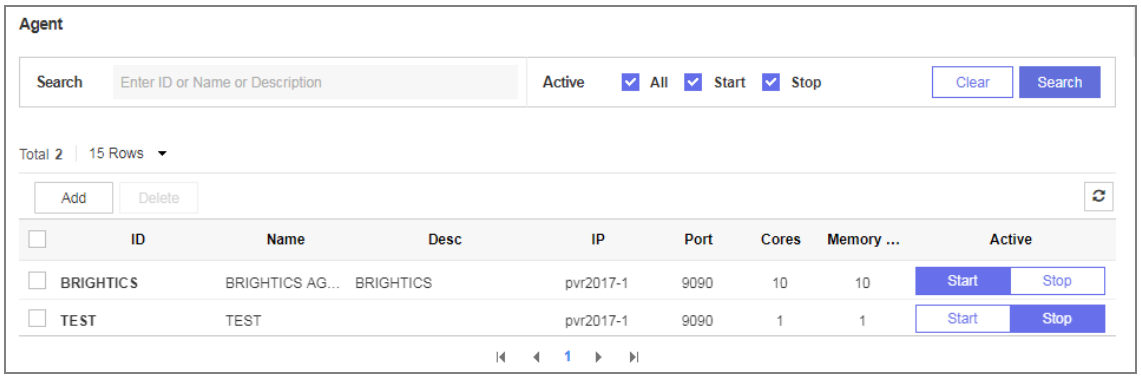


Figure 5-249 Click **ADD** Button to Move to Agent Creation Screen

B. Enter detailed agent information and click **SAVE** button.

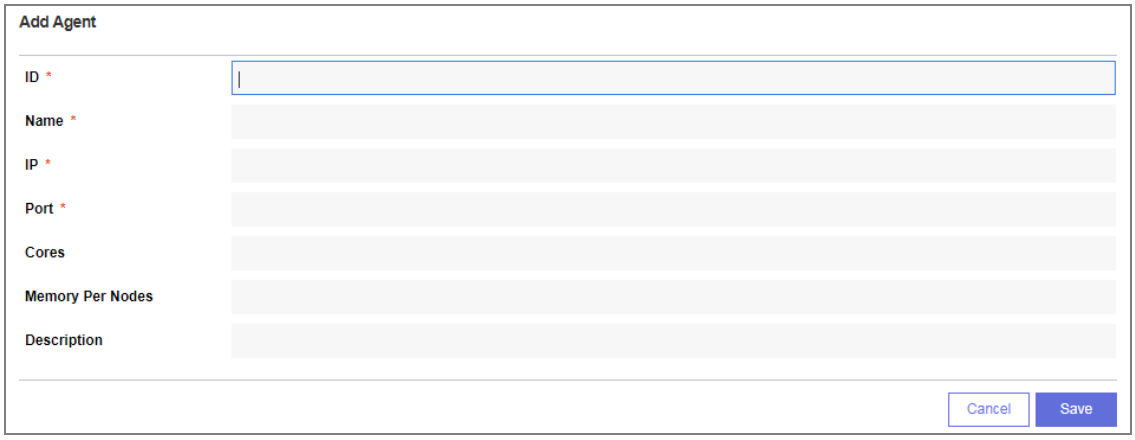


Figure 5-250 Click **SAVE** Button to Complete Agent Creation

5.6.4.2 Search an Agent

A. Enter an agent you are looking for in the search window of AGENT management screen.

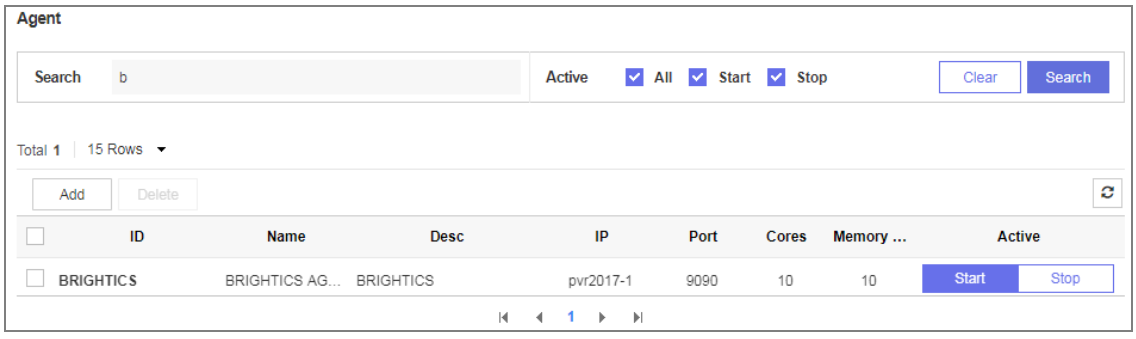


Figure 5-251 Agent Search Screen

B. Click a searched agent and check the corresponding details.

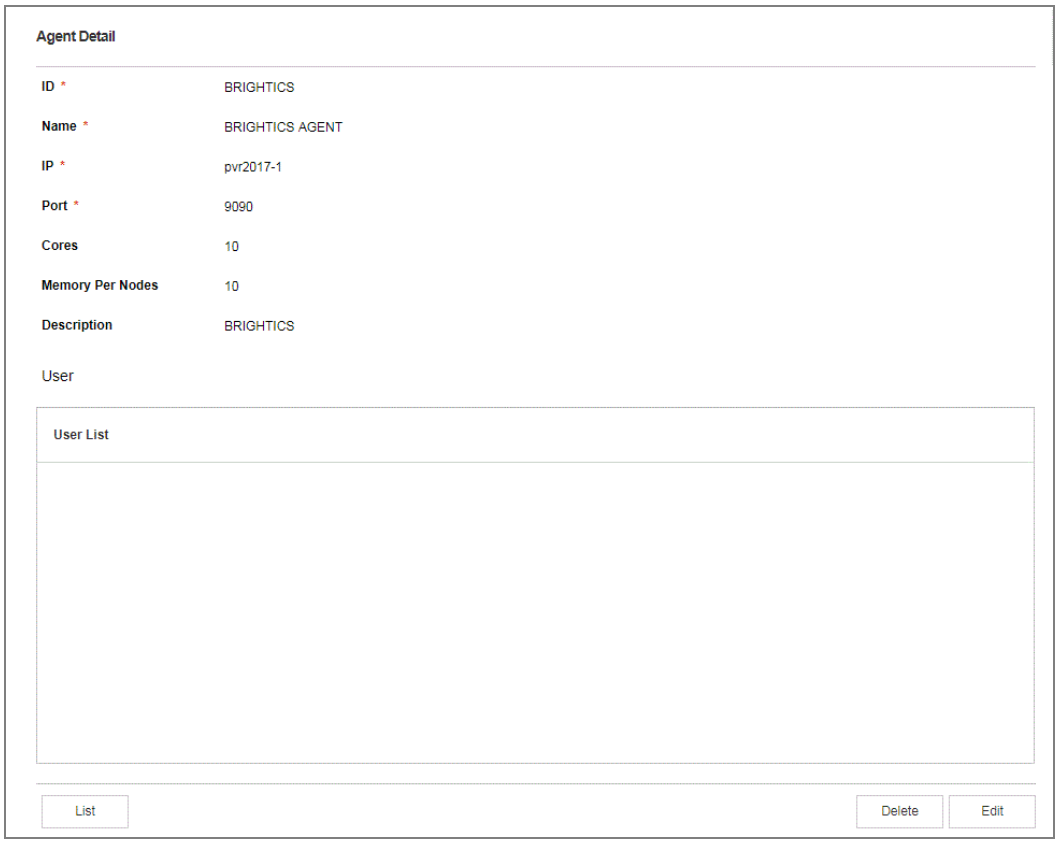


Figure 5-252 AGENT DETAIL Screen

5.6.4.3 Modify an Agent

A. Click an agent in AGENT window to move to AGENT DETAIL screen where you can click **EDIT** button. Modify the content and click **SAVE** button.

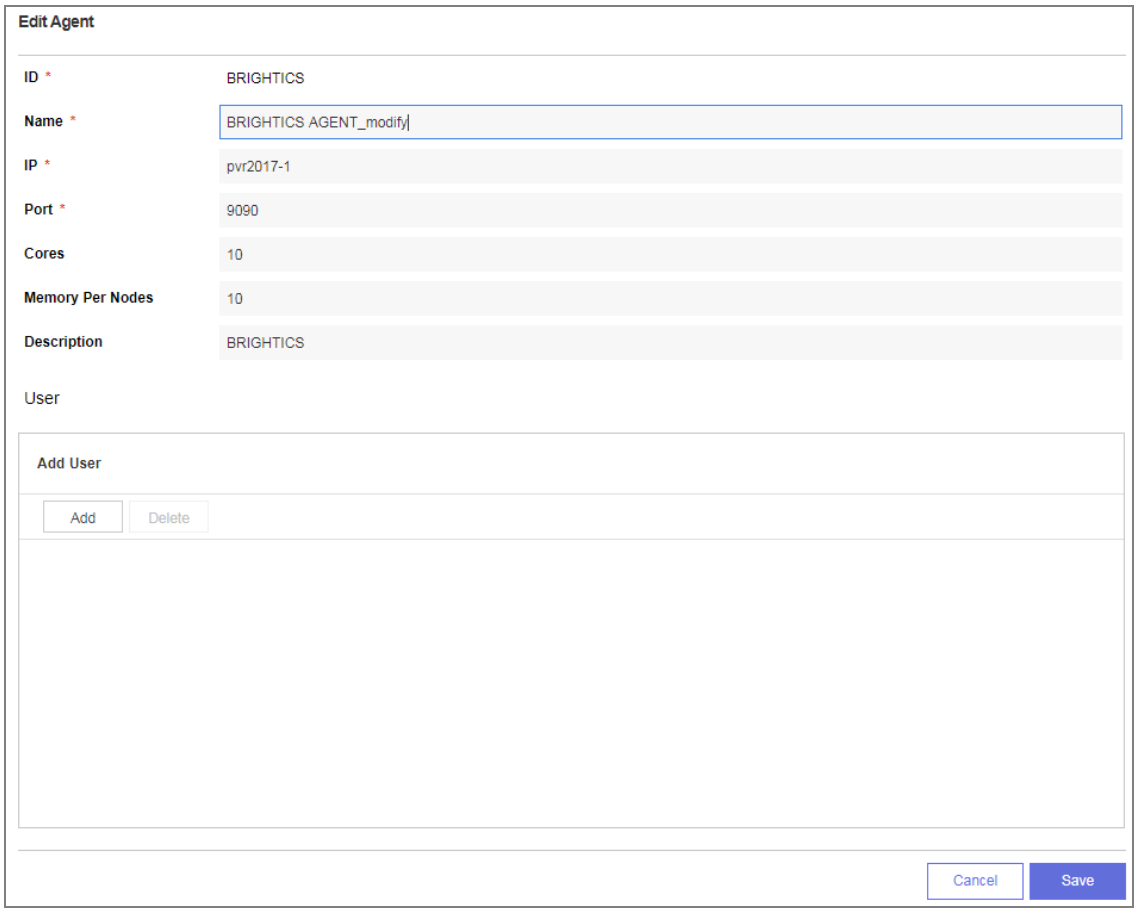


Figure 5-253 Edit Agent Window

5.6.4.4 Delete an Agent

A. Click the checkbox of the agent that you want to delete from AGENT screen and then **DELETE** button.

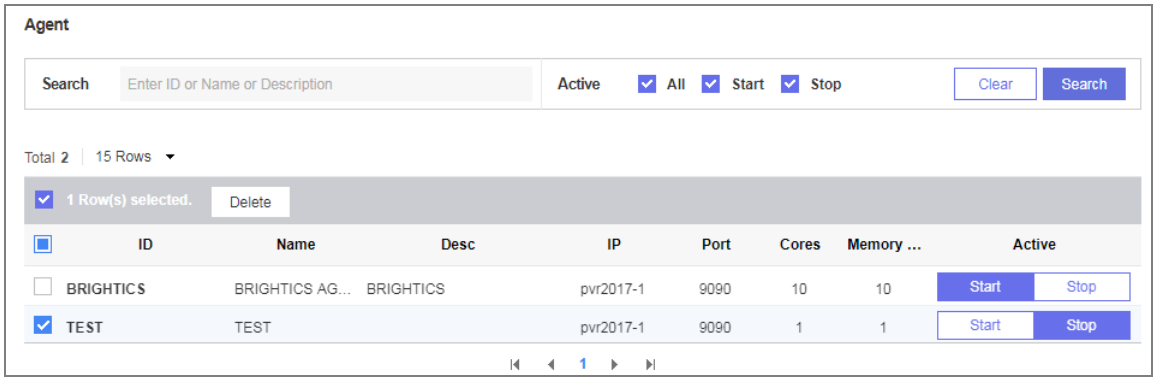


Figure 5-254 Choose an Agent You Want to Delete and Click **DELETE** Button

B. Click **DELETE** button, and a popup will appear to make sure if you want to delete. And if you click **OK** button, the agent will be deleted.

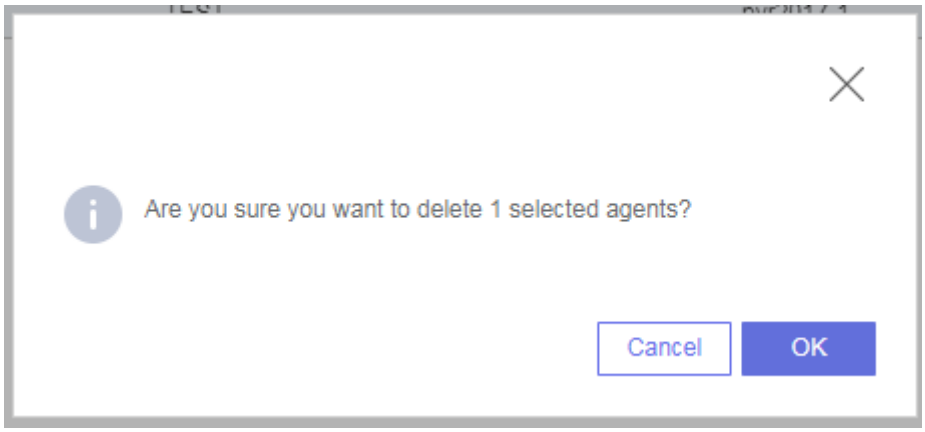


Figure 5-255 The Screen Shown After Clicking **OK** Button

5.6.4.5 Start an Agent

A. Click **START** button of the agent which is currently stopped.

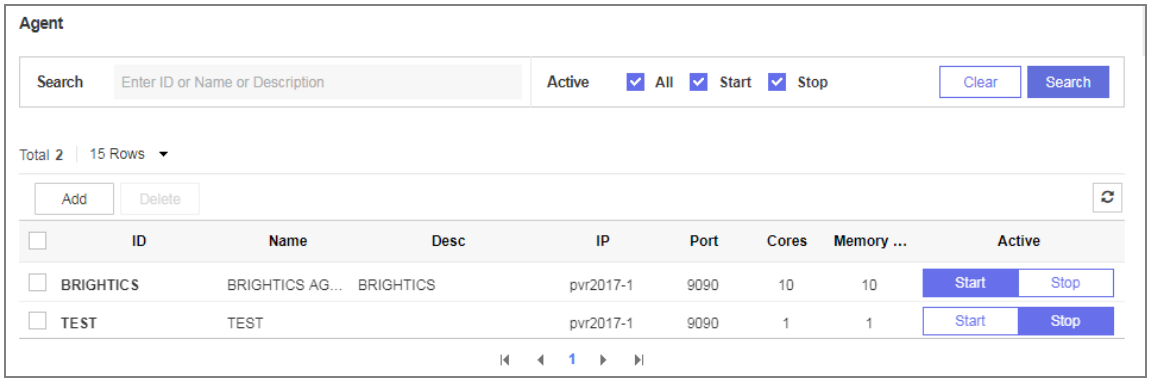


Figure 5-256 Click **START** Button

B. Click **OK** button, and the agent will start.

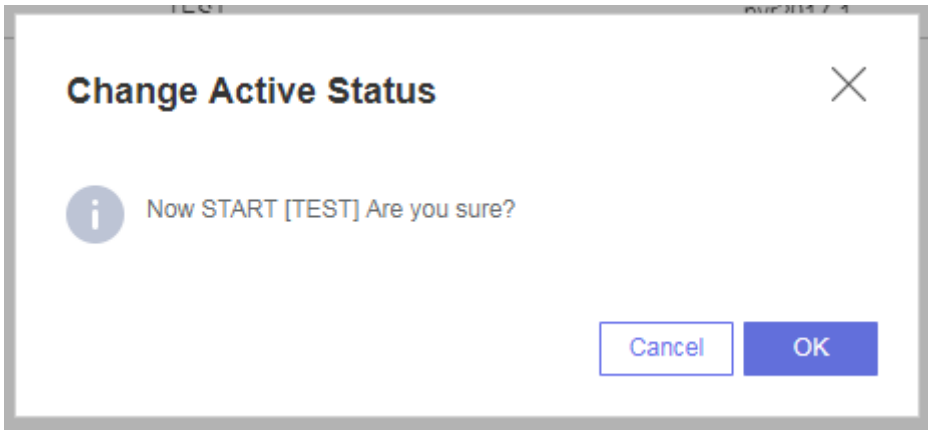


Figure 5-257 Click **OK** Button

5.6.4.6 Stop an Agent

A. Click STOP button of the agent which is currently active.

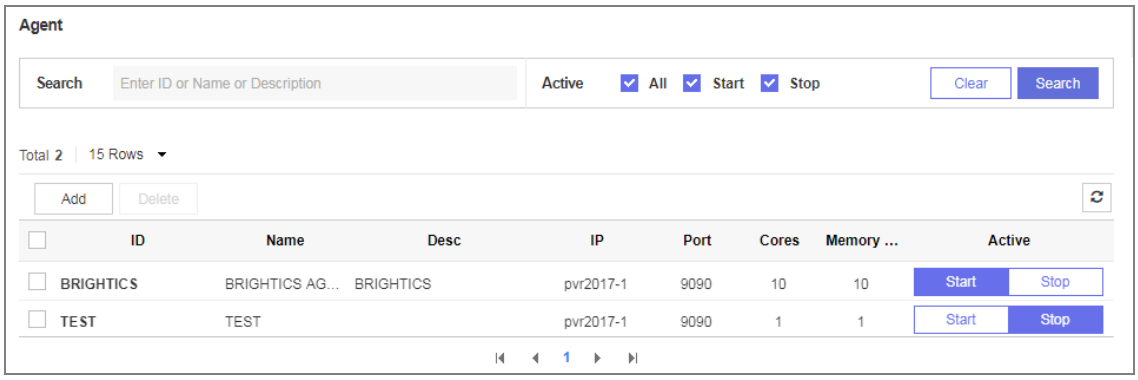


Figure 5-258 Click **STOP** Button

B. Click **OK** button, and the agent will be stopped.

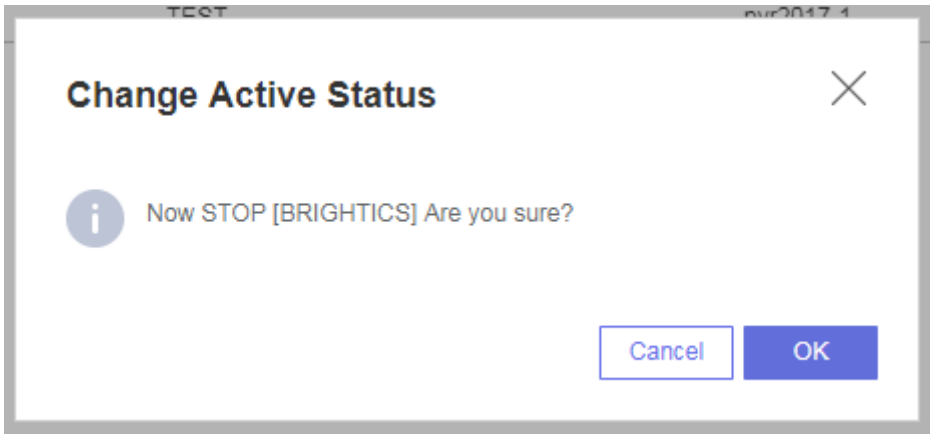


Figure 5-259 Click **OK** Button

5.6.5 Deploy a Model

5.6.5.1 Delete a Deployment

A. Click the checkbox of the deployment that you want to delete from MODEL DEPLOY screen and click **DELETE** button.

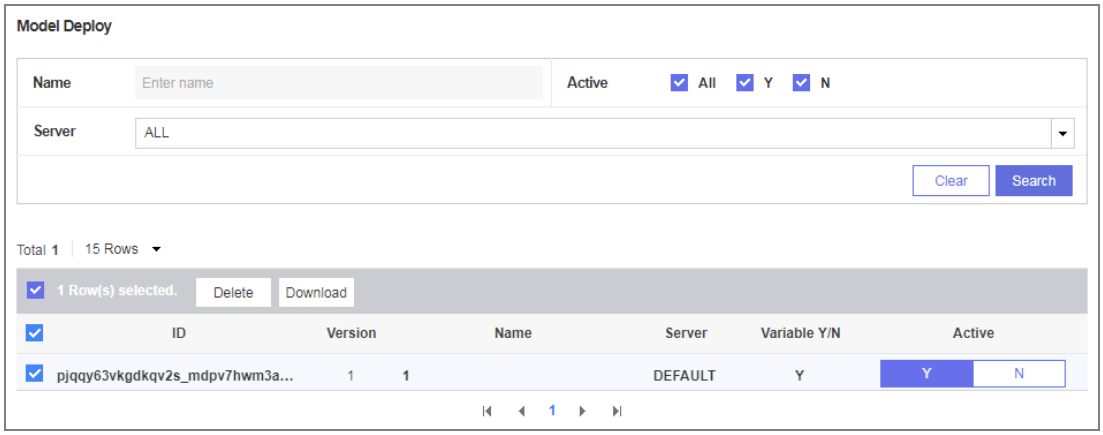


Figure 5-260 Choose a Deployment That You Want to Delete and Click **DELETE** Button

B. Click **OK** button, and the deployment will be deleted.

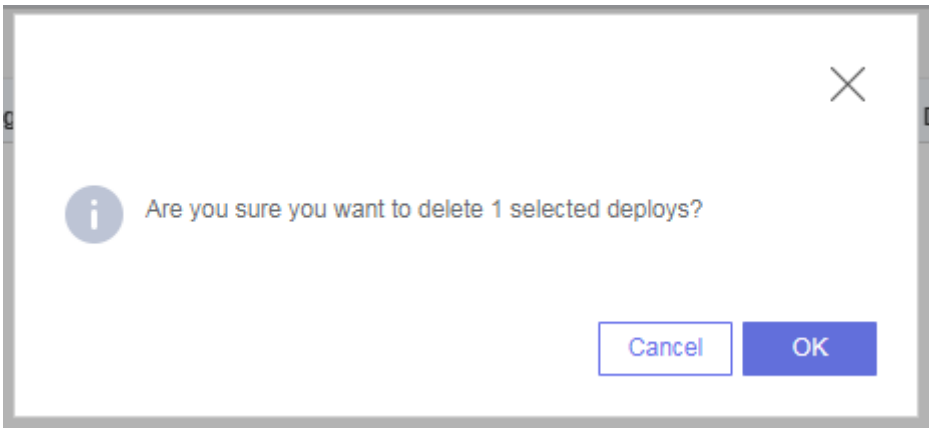


Figure 5-261 Click **OK** Button

5.6.5.2 Download a Deployment

A. Click the checkbox of the deployment you want to download from DEPLOY screen and click **DOWNLOAD** button.

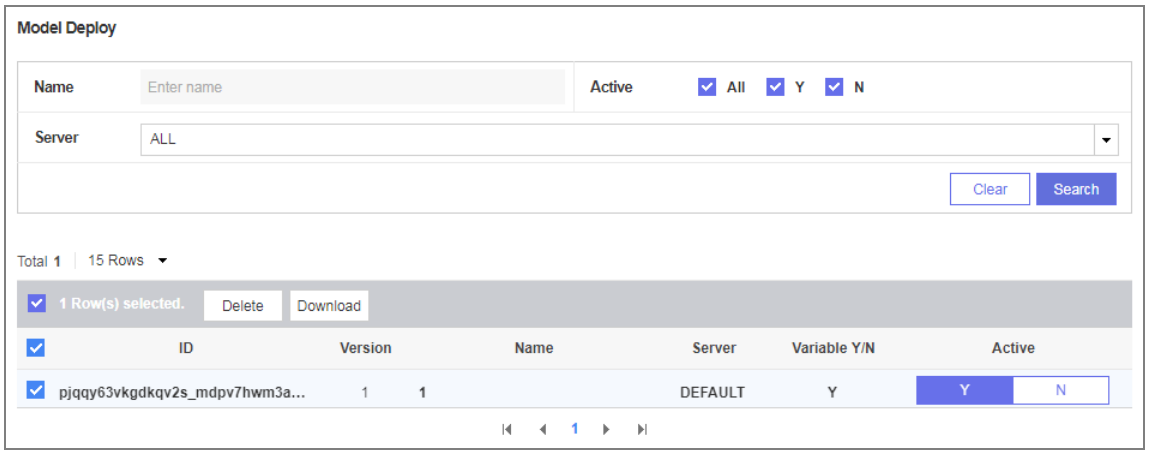


Figure 5-262 Choose the Deployment You Want to Download and Click **DOWNLOAD** Button.

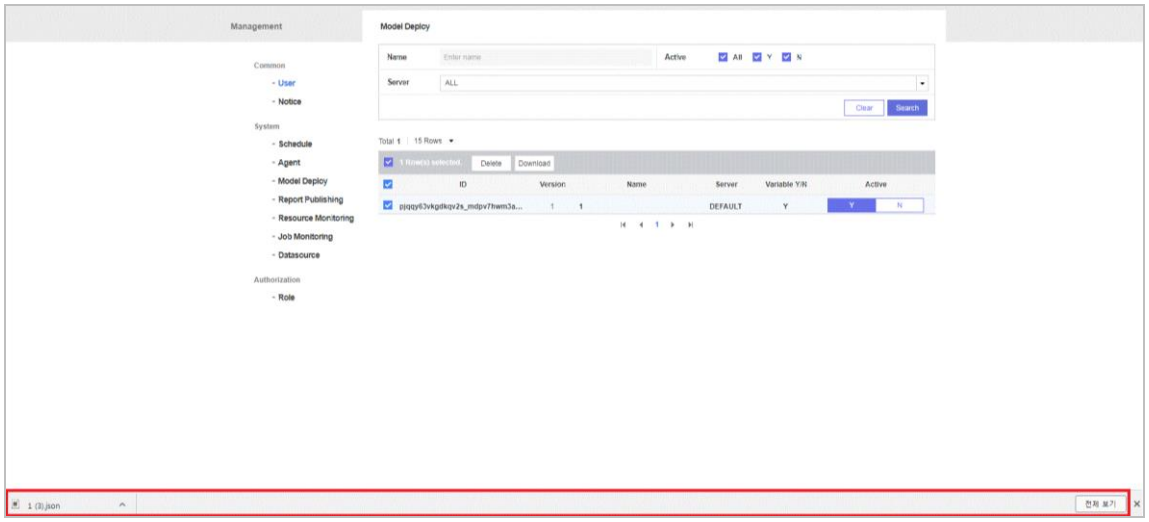


Figure 5-263 Downloaded JSON File

5.6.6 Publish

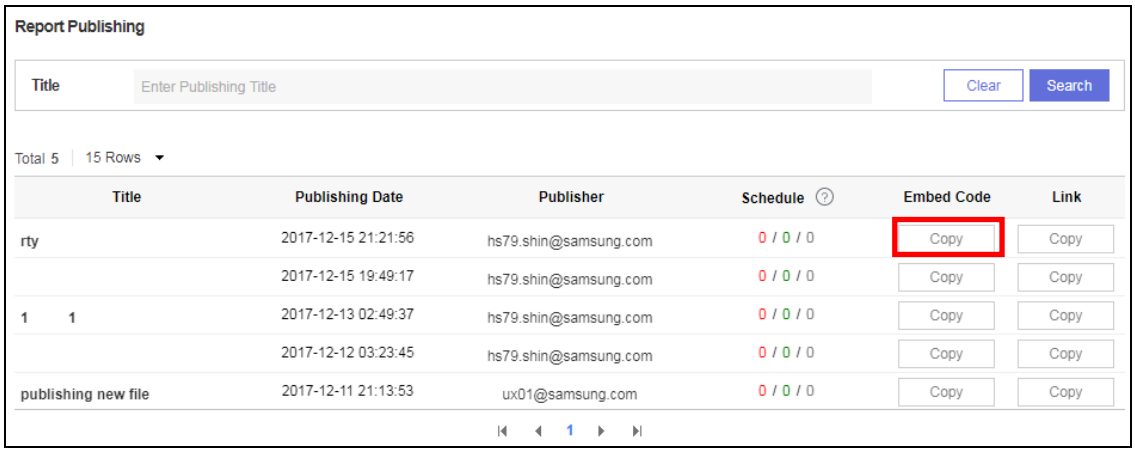


Figure 5-264 Click **COPY** Button to Copy Embedded Code in the REPORT PUBLISHING Screen

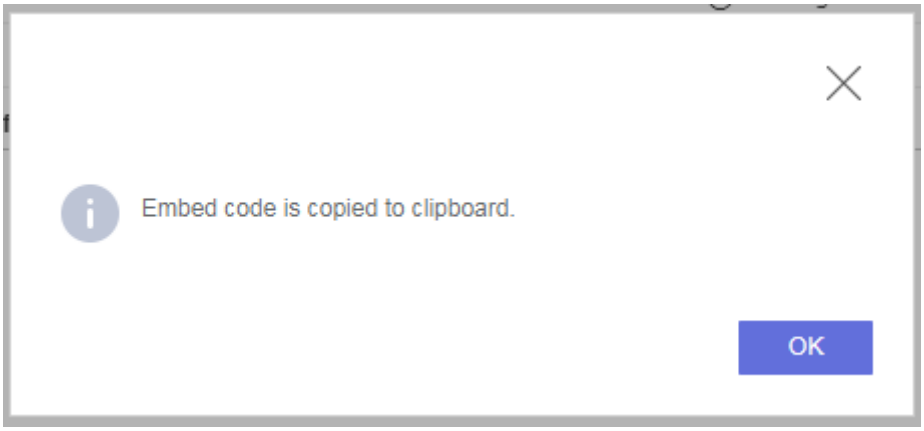


Figure 5-265 The Screen Shown After Clicking COPY Button

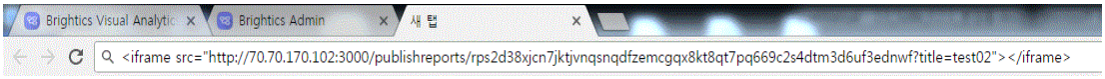


Figure 5-266 Press Ctrl + V in a New Tab or Memo Pad to Make Sure that the Embedded Code is Properly Copied to a Clipboard

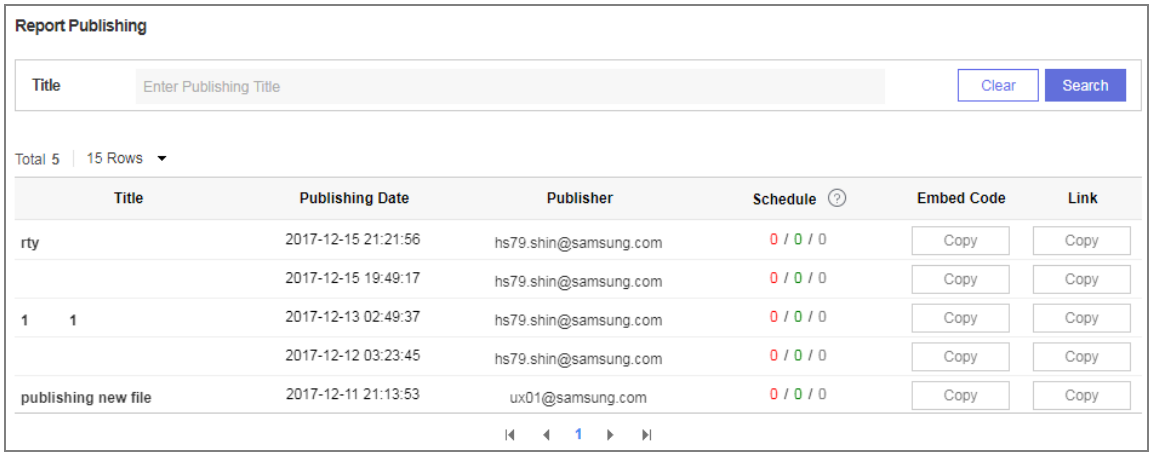


Figure 5-267 Click **LINK** Button in the REPORT PUBLISHING Screen

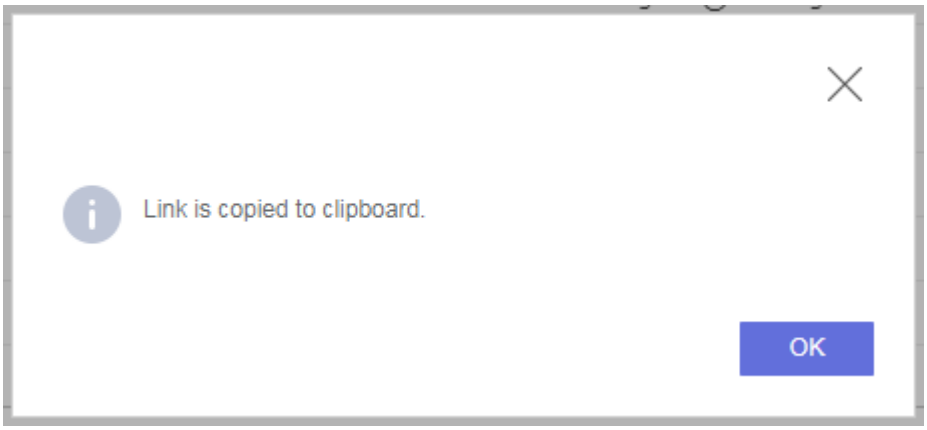


Figure 5-268 The Window to Confirm That the Link is Properly Copied

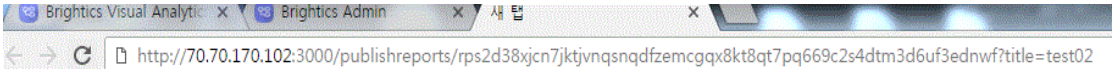


Figure 5-269 Press Ctrl + V in a New Tab to Make Sure that The Link is Properly Copied to a Clipboard

5.6.7 Resource Monitoring

You can see the CPU and memory usage of a currently active agent. (Only available for the agent which has run a job one or more times since it started).

The page is automatically refreshed when an agent starts anew or terminates.

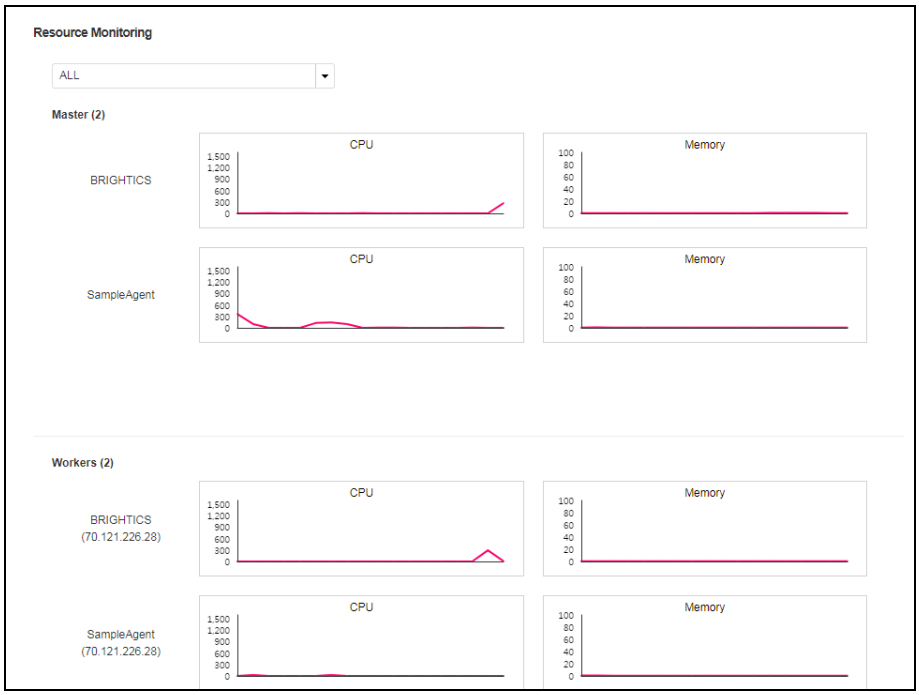
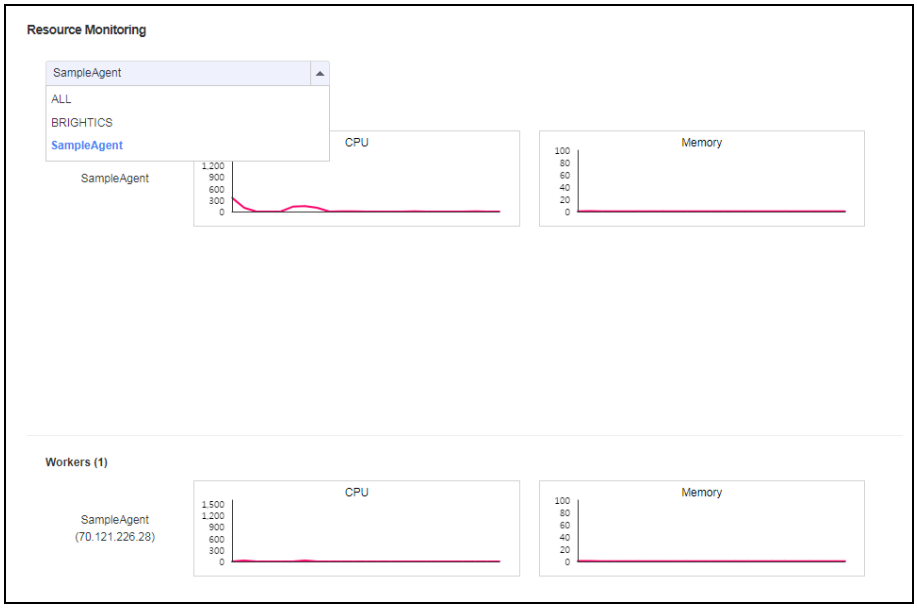


Figure 5-270 RESOURCE MONITORING Window

Monitoring by agent name is available via dropdown menu.



5.6.8 Job Monitoring

You can monitor the resource usage of the active user who is running a job.

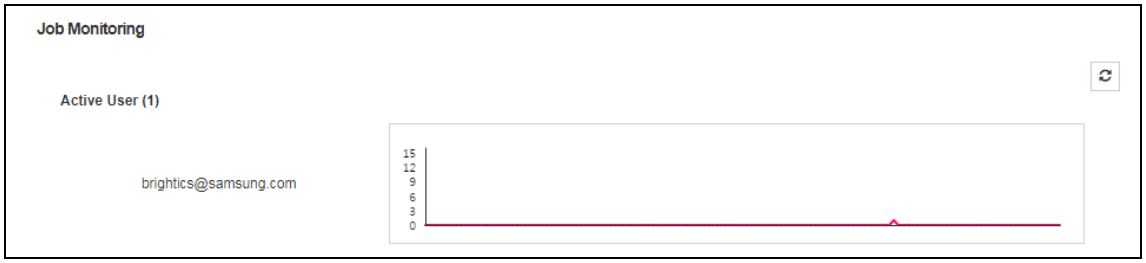


Figure 5-271 JOB MONITORING Window

The below message appears when NO user has recently executed a job for some time.
The page is NOT automatically refreshed when a job has been executed. In that case, click REFRESH icon on the right side.

Figure 5-272 An Icon to Refresh JOB MONITORING Window

5.6.9 Datasource

5.6.9.1 Create a Datasource

A. Click **ADD** buttonn in DATASOURCE management screen.

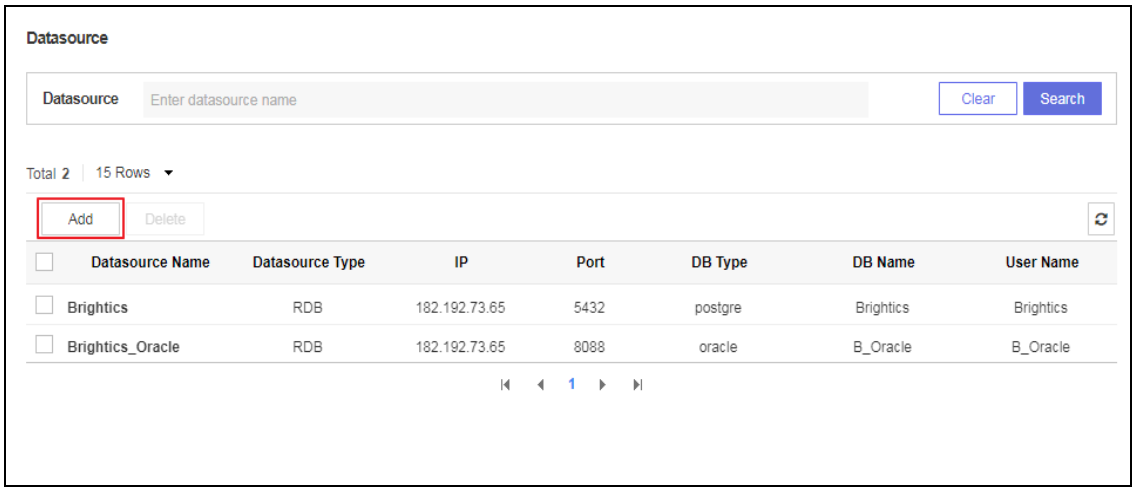


Figure 5-273 Click **ADD** Button to Move to DATASOURCE Creation Screen

B. Enter the details of the datasource and click **SAVE** button.

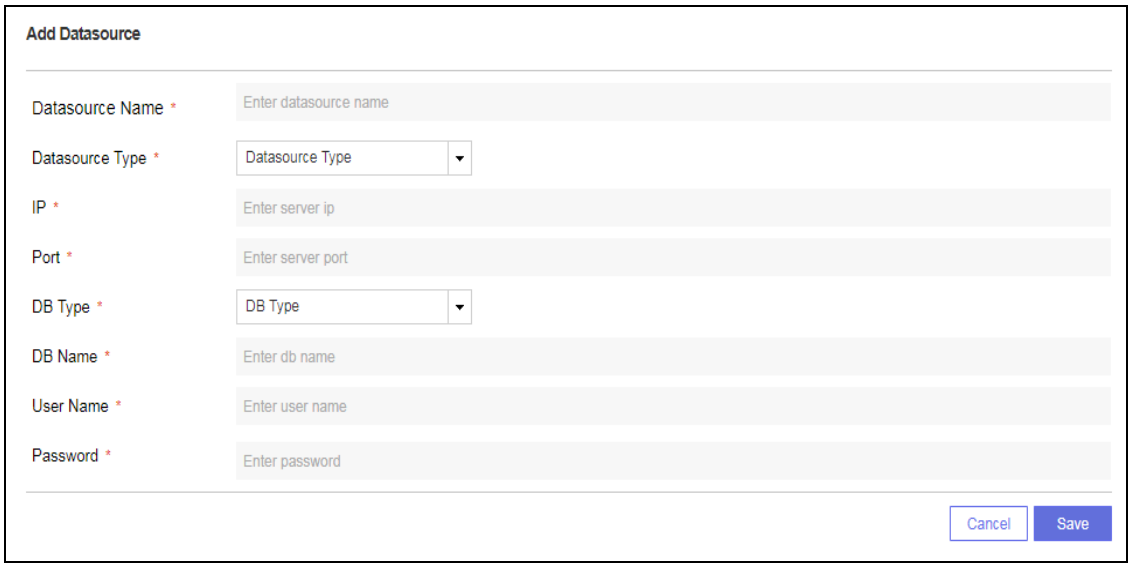


Figure 5-274 Click **SAVE** Button to Complete Datasource Creation

5.6.9.2 Search a Datasource

A. Enter the datasource you are looking for in the search window of DATASOURCE management screen.

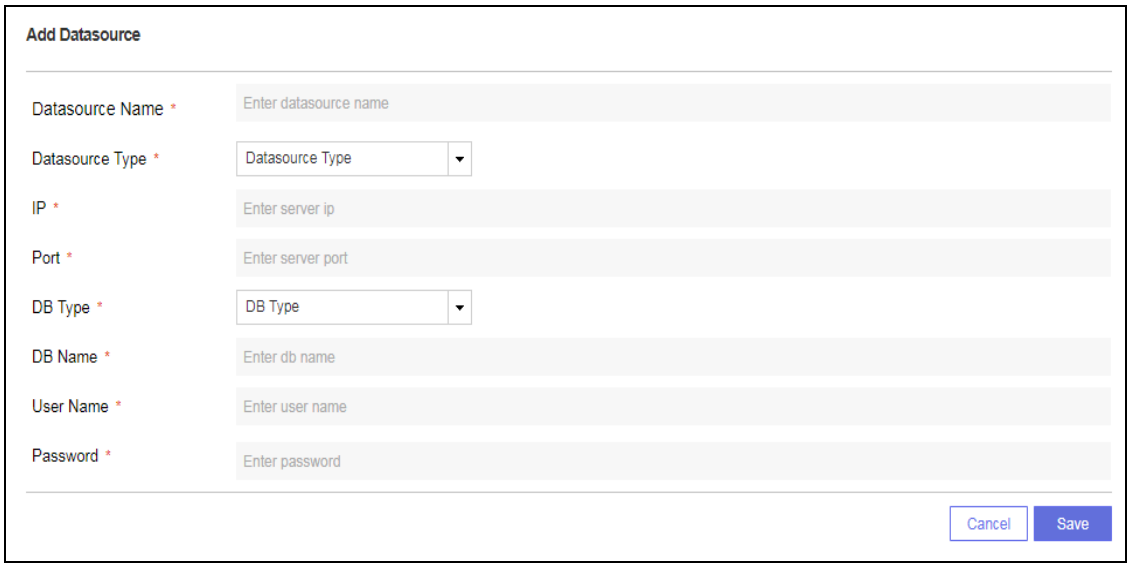


Figure 5-275 Datasource Search Window

B. Click a searched data source and see the corresponding details.

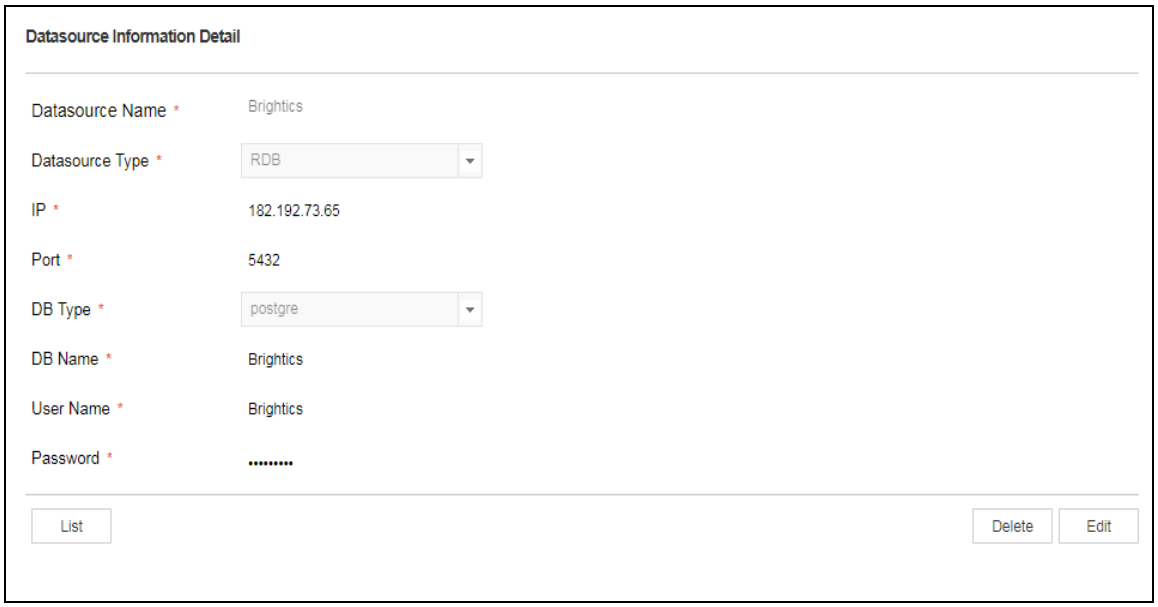


Figure 5-276 DATASOURCE INFORMATION DETAIL Screen

5.6.9.3 Modify a Datasource

A. Choose a datasource from DATASOURCE screen to move to DATASOURCE INFORMATION DETAIL screen where you can click **EDIT** button. Modify the content and click **SAVE** button.

Figure 5-277 A Screen to Edit Datasource Information

5.6.9.4 Delete a Datasource

C. Click the checkbox of the datasource that you want to delete from DATASOURCE screen and click **DELETE** button.

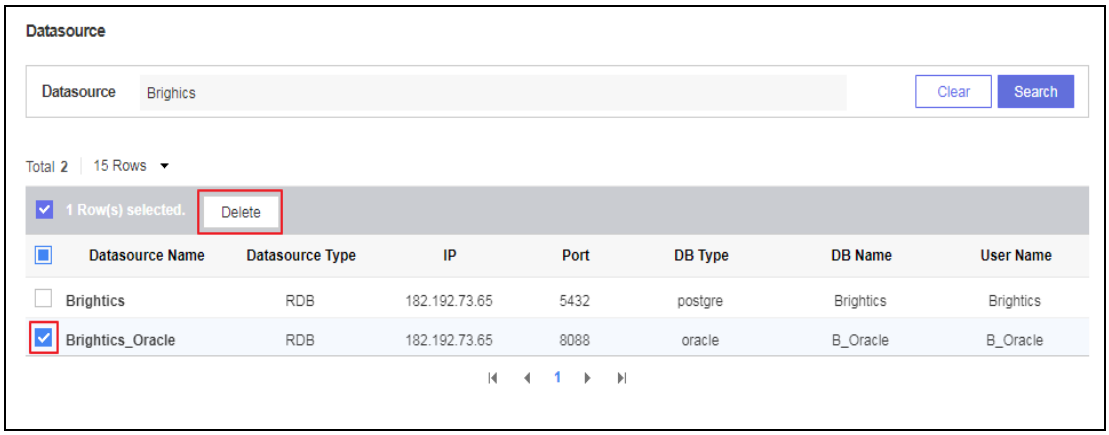


Figure 5-278 Select the Datasource That You Want to Delete and Click **DELETE** Button

D. Click **DELETE** button, and a popup will appear to make sure if you want to delete. Click **OK** button, and the datasource will be deleted.

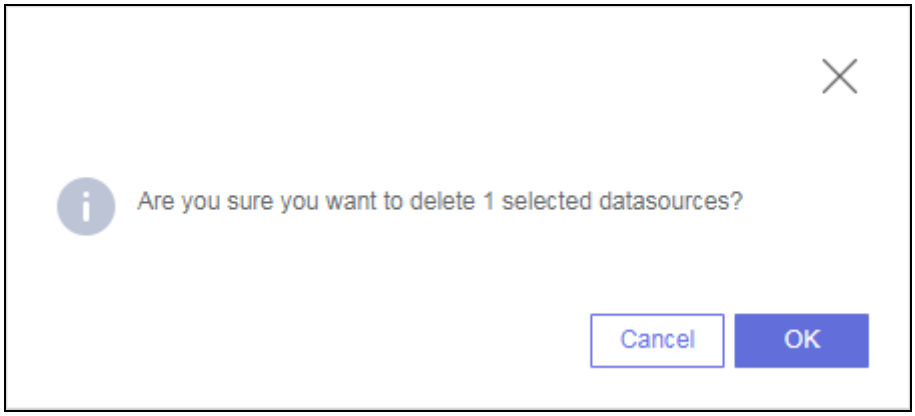


Figure 5-279 The Screen Shown When You Click **OK** Button

5.6.10 Role

5.6.10.1 Create a Role

A. Choose a role (either administrator or power user) that you want to add in the ROLE management screen.

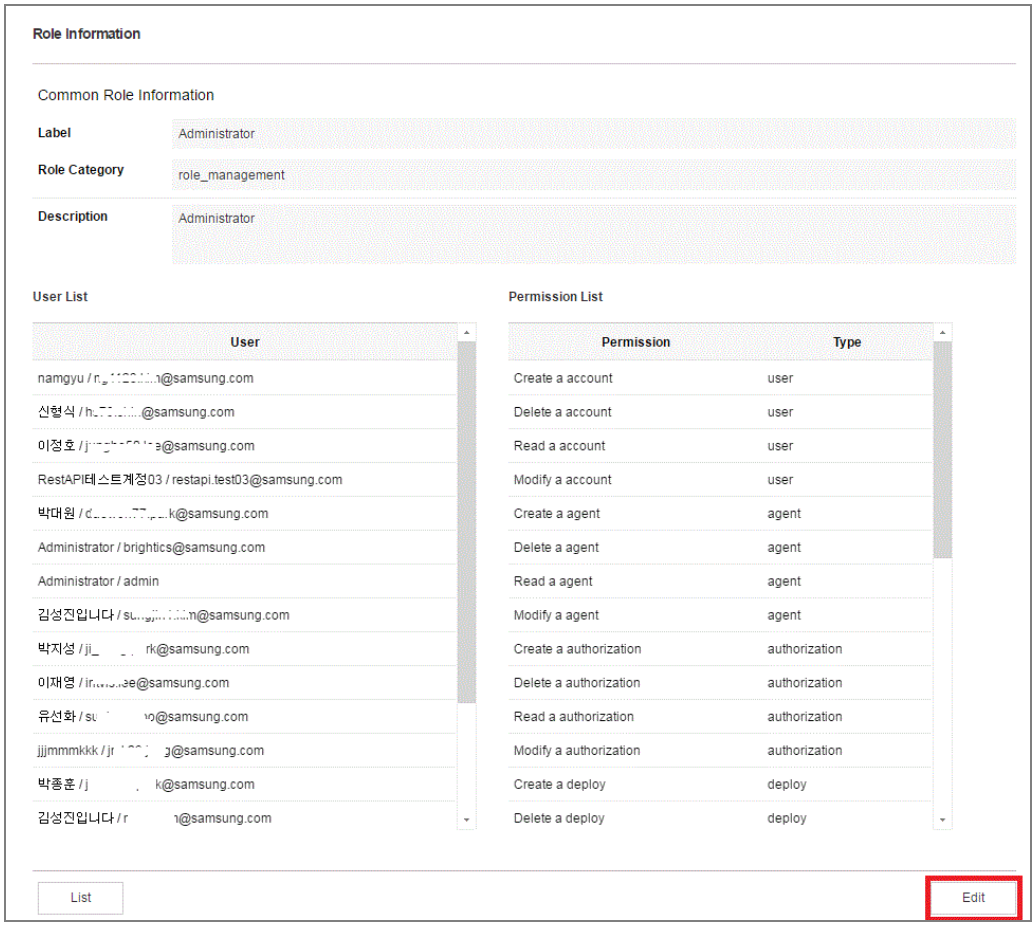


Figure 5-280 The Screen Shown When You Click Administrator in the ROLE management Window

B. Click **EDIT** button.

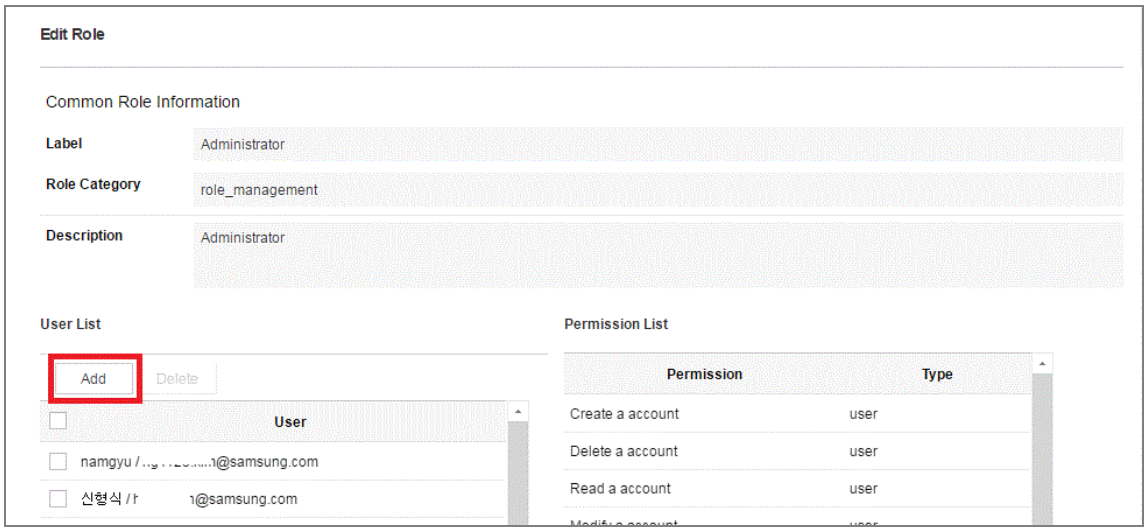


Figure 5-281 The Screen Shown When You Click **EDIT** Button

C. Click **ADD** button in the EDIT ROLE screen where you can assign an administrator role. Search a user that you want to assign the role to and click **ADD** buttton again.

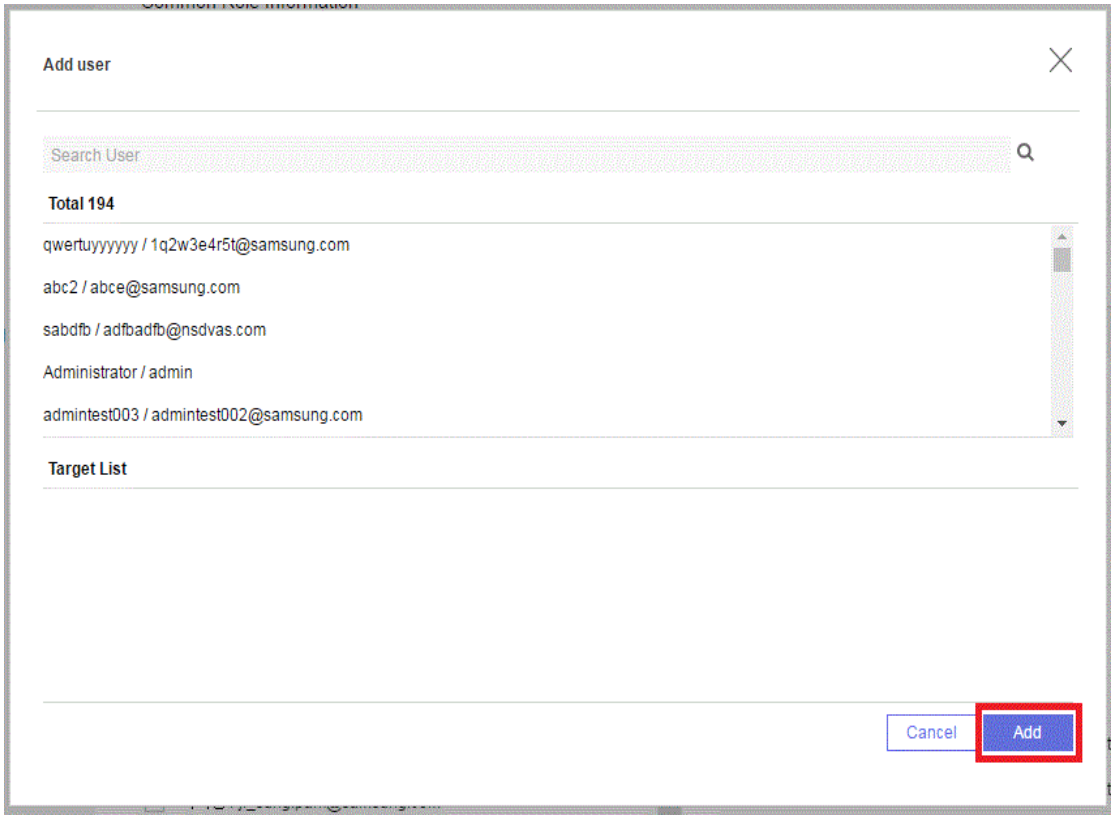


Figure 5-282 ADD USER Window

D. Click **SAVE** button, and a popop will appear to make sure that the role has been updated. Click **OK** button.

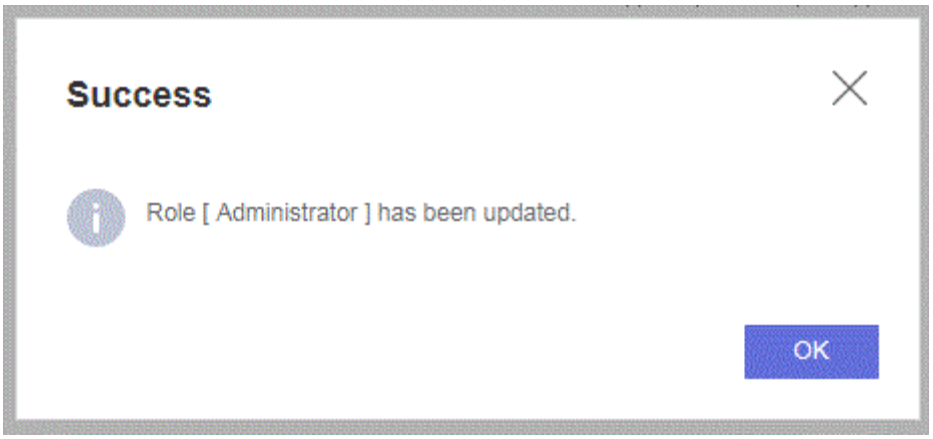


Figure 5-283 The Screen That Shows the Role Has Been Saved

Note	The way to assign a role is same for administrator / power user / general user.

5.6.10.2 Delete a Role

A. **DELETE** button is enabled when d;frksyou select a user whose role you want to delete in the EDIT ROLE window.

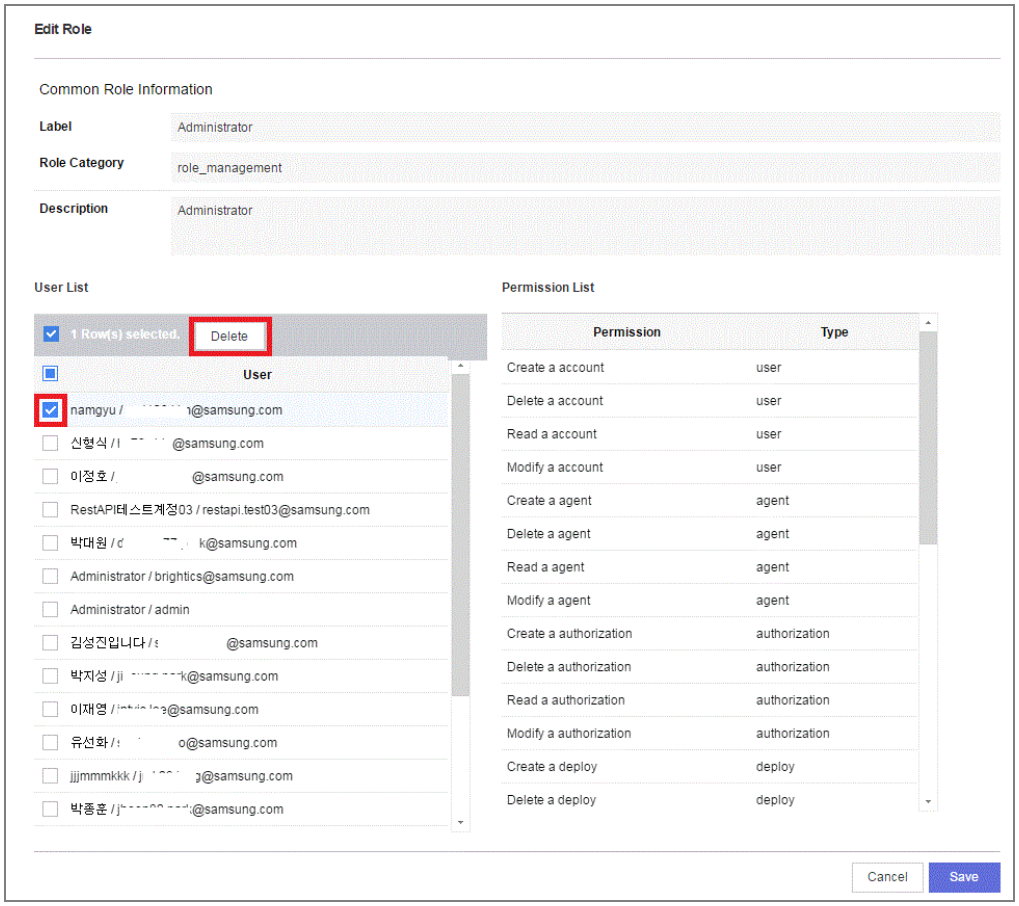


Figure 5-284 Choose a User Whose Role You Want to Delete in EDIT ROLE Window

B. After clicking **DELETE** button, push **SAVE** button to save any changes.

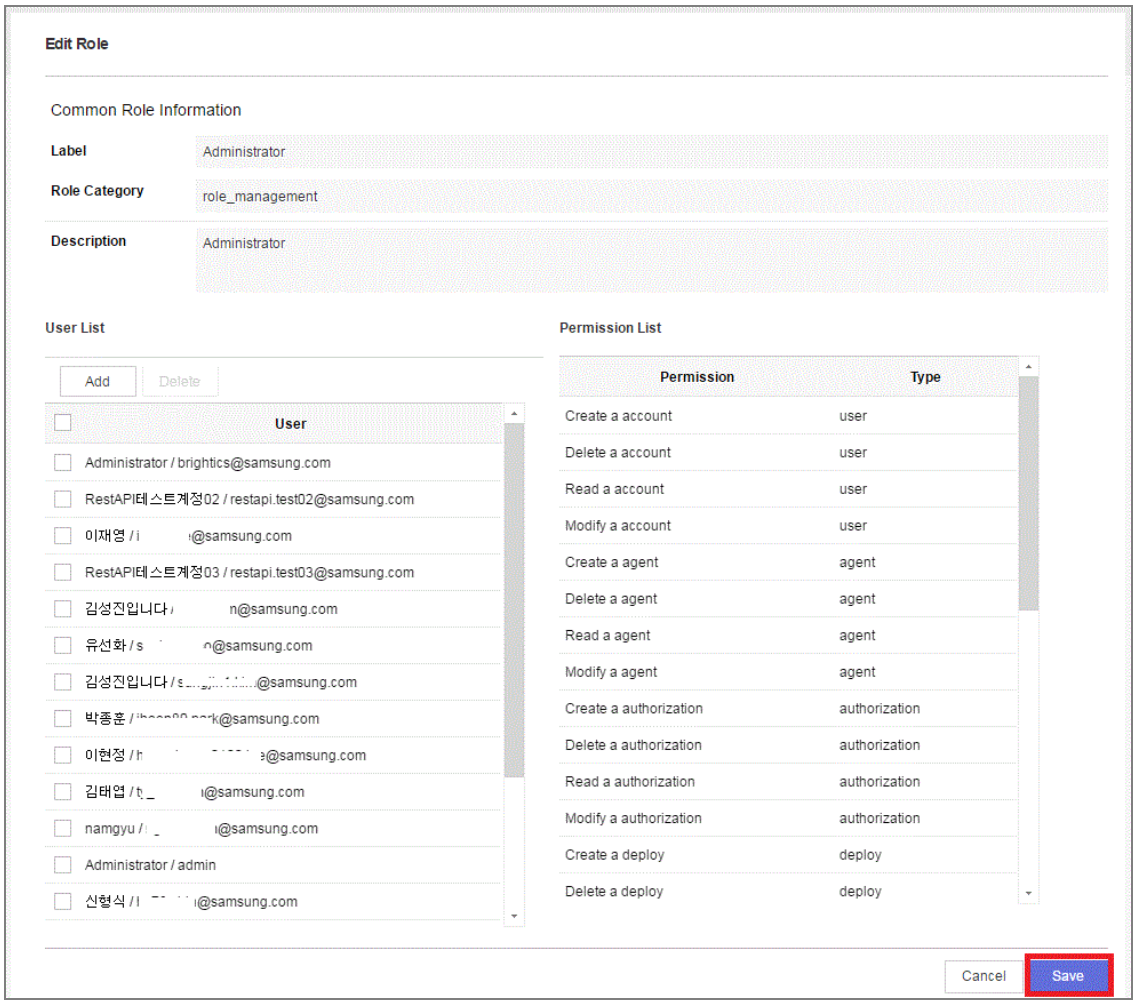


Figure 5-285 The Screen Shown When You Click **DELETE** Button

C. Make sure to click **SAVE** button so that any changes are successfully updated. When a popup appears to make sure if you want to delete, click **OK** to complete the deletion.

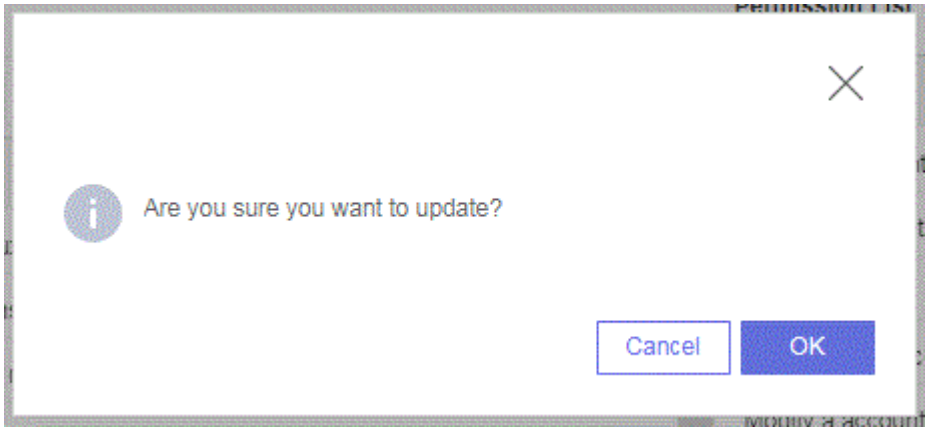


Figure 5-286 A Window to Confirm Editing

6 UDF Generator

This chapter describes how to use toolkit which is newly added to BRIGHTICS AI. Toolkit is a collection of UI supporting tools to create functions for Brightics, which is now available for UDF creation. You can access the toolkit with your Brightics account by adding /toolkit next to the Brightics URL. It supports single sign-on with Brightics.

User-defined functions can be created by using Scala / Python script in SCRIPT MODEL.

A. Click **SAVE AS UDF** button in Scala / Python Script.

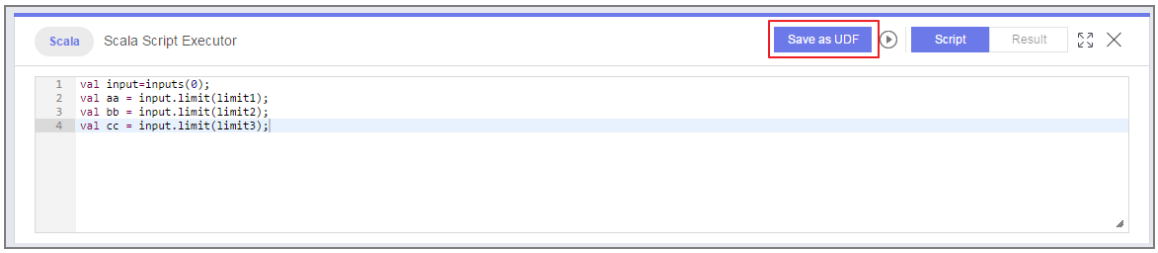


Figure 6-1 UDF Generator > New Project

B. When you click the button, the main page of the toolkit opens in a new tab.

Figure 6-2 UDF Generator Screen

6.1 UDF Generator Components

PROJECT VIEW of the toolkit offers the list of toolkit projects and functions. Here, projects are different from PROJECT VIEW of VISUAL ANALYTICS.

Below are the components of the toolkit.

Name	Icon	Description
New Project	New Project	Create a new project.
New Function	New Function	Create a new function.

Name	Icon	Description
Import JSON	Import JSON	Import JSON file.
Spec Generator	Spec Generator	Create internal parameters of PROPERTIES panel.
Help Editor	Help Editor	Offer HELP content of a function in markdown format.
Download JSON	Download JSON	Download JSON file.

Table 6-1 UDF Generator Components

6.1.1 Create a Project (New Project)

The button enables you to create a new project, allowing you to enter a project name and description.

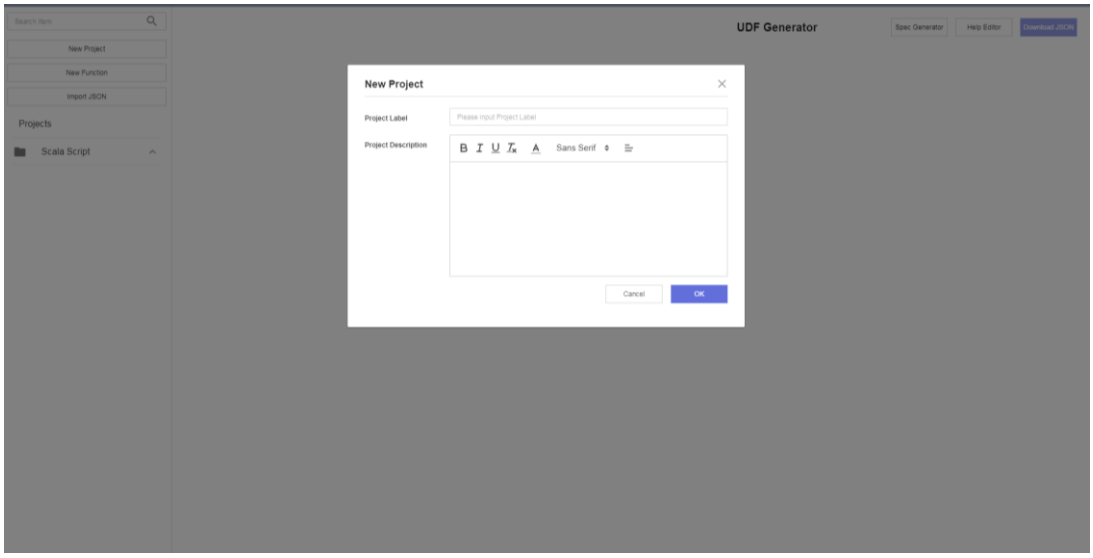


Figure 6-3 UDF Generator > New Project

6.1.2 Modify a Project

Mouse over a project that you want to modify, and EDIT button will appear. Then, click the button to modify the project name and description.

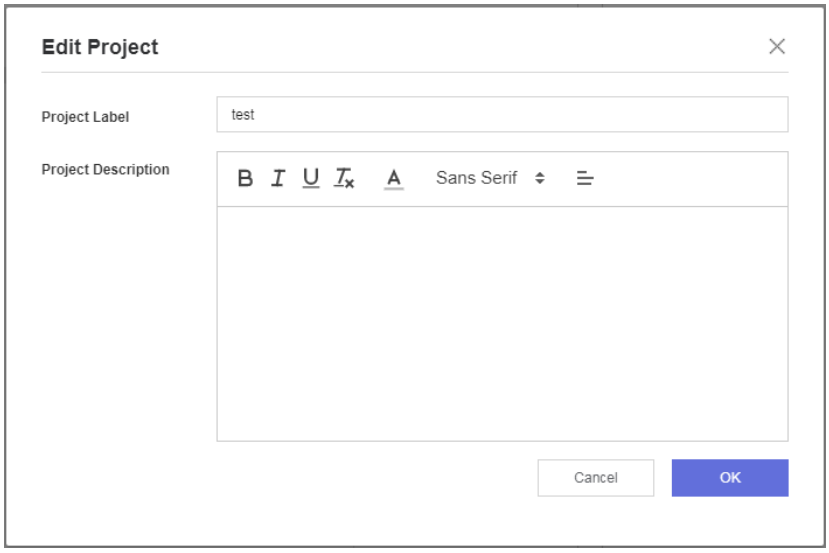


Figure 6-4 Projects > Edit Project

6.1.3 Delete a Project

Mouse over a project that you want to delete, and DELETE button will appear. You can delete the project by clicking the button. And if there are any functions in the project, the functions will be deleted together with the project.

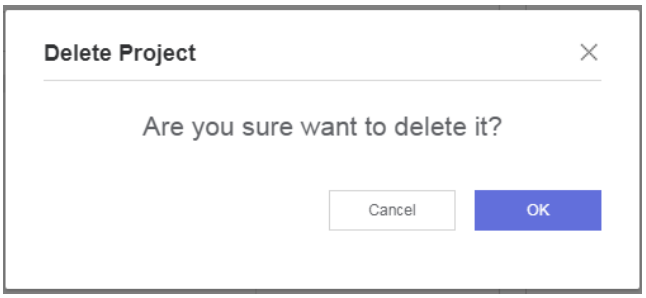


Figure 6-5 Projects > Delete Project

6.1.4 Fold - Unfold a Project

If you click a project, you can see the list of functions belonging to the project. You can fold them again by clicking it again.

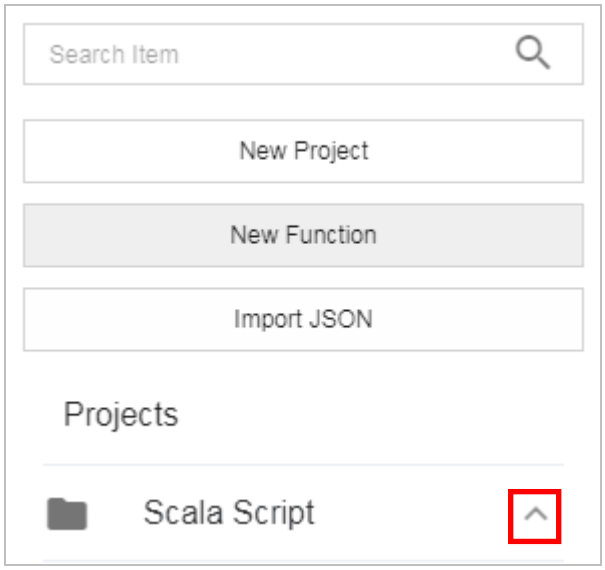


Figure 6-6 An Icon to Fold – Unfold a Project

6.1.5 Create a Function (New Function)

This button allows you to create a new function. Enter a project name and set the type of to-be-created function as UDF. And then, enter a function name and description. The function name that you have entered is set as a label by default and is editable.

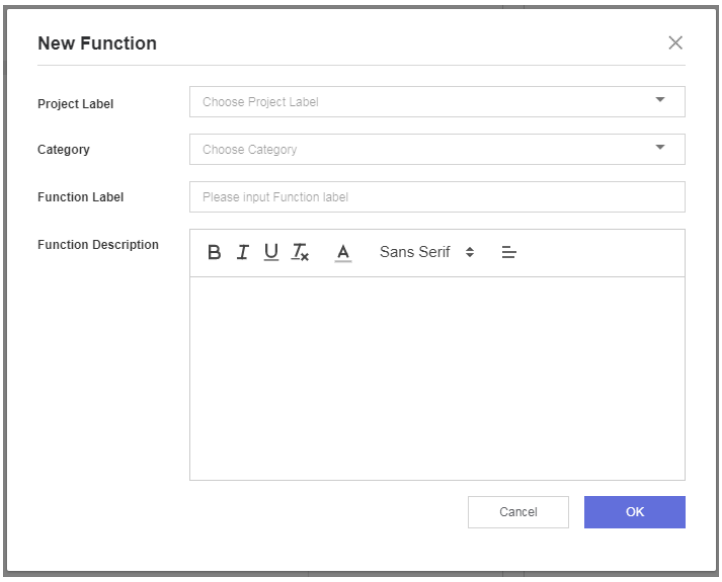


Figure 6-7 UDF Generator > New Function

6.1.6 Open a Function

Click a function to load its specification and help content which was saved beforehand.

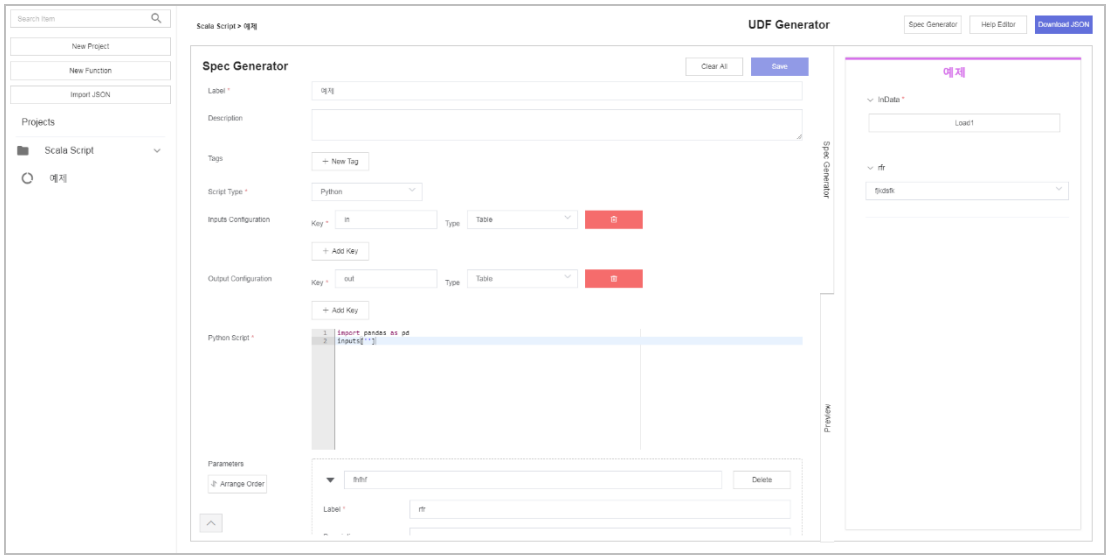


Figure 6-8 The Screen Shown When You Click an Example Function

6.1.7 Modify a Function

Mouse over a project that you want to edit, and EDIT icon will appear. You can edit its name and description by clicking the icon.

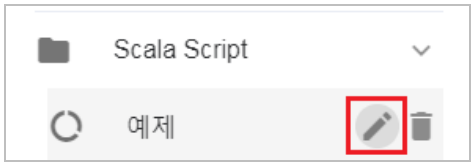


Figure 6-9 An Icon to Edit a Function

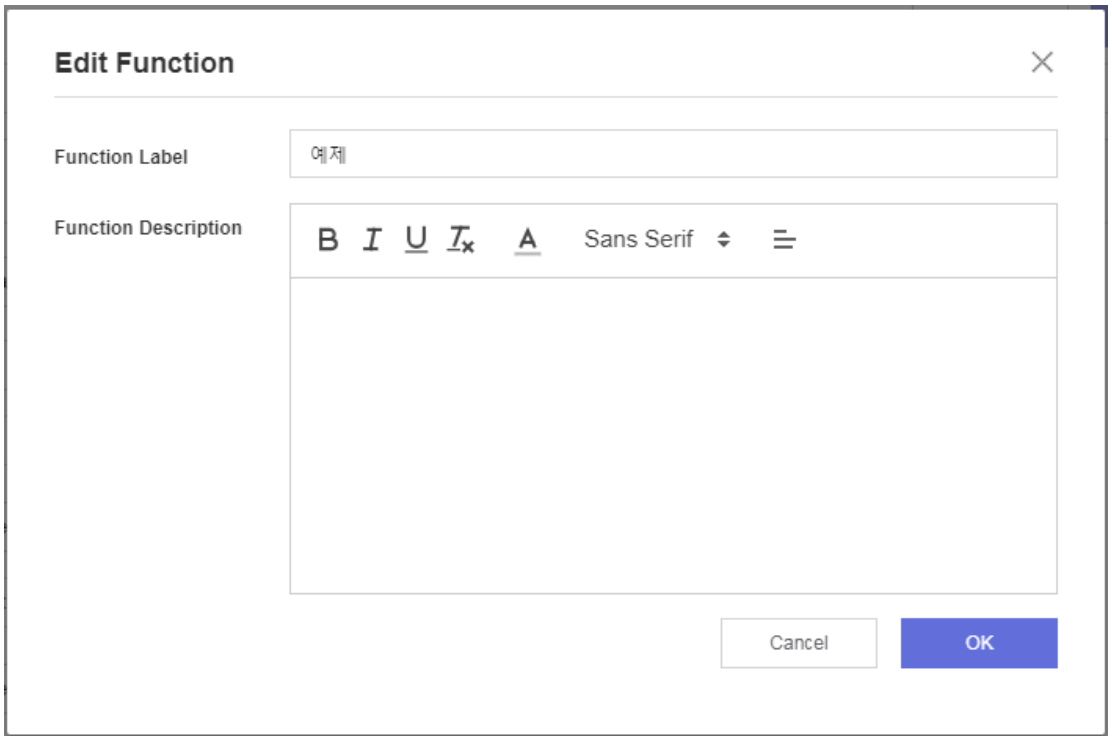


Figure 6-10 EDIT FUNCTION Screen Shown After Clicking the Icon to Edit a Function

6.1.8 Delete a Function

Mouse over a function that you want to delete, and DELETE icon will appear. You can delete the function by clicking the icon.

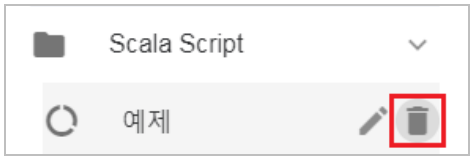


Figure 6-11 An Icon to Delete a Function

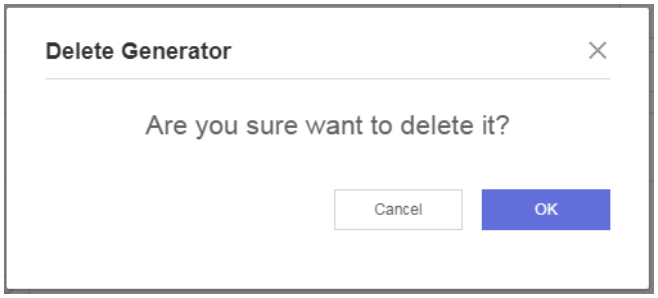


Figure 6-12 A Window Shown After Clicking DELETE Icon to Make Sure to Delete a Function

6.1.9 Import a Function

This button allows you to insert a function which was downloaded through DOWNLOAD JSON feature. Choose a project to insert, click INSERT FILE BOX, and choose JSON. Then, push IMPORT button to finally insert a function.

Figure 6-13 A Popup Shown After Clicking IMPORT JSON Icon

6.2 Configure Spec-Generator

6.2.1 General

It is required to configure label, script type, version, and script while it is optional to define description, tags, and parameters. In case of having input and output, define numbers or configuration according to a version.

6.2.2 Parameter

It is mandatory to set ID, label, and control. You can selectively add description, visible when, and validation, and additional values may be necessary according to control.

6.2.3 Visible When

Choose a parameter ID value except itself and define a value. If an assigned parameter has a pre-defined value, the parameter will be visible, and otherwise it will be invisible.

6.2.4 Validation

Validation of a parameter is configurable.

Field Name	Description	Note
Validation Code	Write a code in JavaScript and validate based on whether a returned value is true or false.	Required value
Message Code	Share basic error code of Brightics. The message code of a required value supports auto completion, and the preview of the message code is available on the right side of input field.	Required value
Message Params	Deliver the arguments of a corresponding error code.	

Table 6-2 Validation Components

6.2.5 Control

CONTROL supports input, expression, column selector, Boolean radio button, radio button, and dropdown list.

6.2.6 Input

The most basic types such as an input box, character and number can be entered.

Field Name	Description	Note
Placeholder	Shade text if it has NO value.	
Value Type	Select integer, double, or string.	Required value

Field Name	Description	Note
Max / Min	Define [a, b] range if it is integer or double type.	

Table 6-3 Input Components

6.2.7 Array Input

Multiple inputs are available. Also, a list-type input with variable length that is connected with + button is supported.

Field Name	Description	Note
Placeholder	Shade the text if it has NO value.	
Value Type	Select integer, double, or string.	Required value

Table 6-4 Array Input Components

6.2.8 Expression

This is to enter expression whose form is similar with input.

Field Name	Description	Note
Placeholder	Shade text if it has NO value.	

Table 6-5 Configuration Value

6.2.9 Column Selector

This is to enter expression whose form is similar with input.

Field Name	Description	Note
Placeholder	Shade text if it has NO value.	
Selection Mode	Select single or multiple.	Required value
Row Count	Number of rows in UI.	
Column Type(s)	Check all, integer, long, float, double, string, required value array (string), required value array (integer), array (double), date, and Boolean are available as a column type.	Required value

Table 6-6 Column Selector Components

6.2.10 Boolean Radio Button

This radio button allows to choose either true or false only.

Field Name	Description	Note
Default Value	Choose either true or false.	Required value

Figure 6-7 Configuration Value

6.2.11 Radio Button

This common type of radio button allows you to set items which can be added or deleted. But, there must be two or more items at all times.

Field Name	Description	Note
Items-Label	Choose either true or false.	Required value

Field Name	Description	Note
Items-Value	Actual value of the radio button.	Required value
Items-Default	A single value is always required for items by default.	Required value

Figure 6-8 Radio Button Components

6.2.12 Dropdown List

Dropdown list allows you to select only one value. You can set items which can be added or deleted. But, there must be two or more items at all times.

Field Name	Description	Note
Items-Label	Display value of the radio button.	Required value
Items-Value	Actual value of the radio button.	Required value
Items-Default	A single value is always required for items by default.	Required value

Figure 6-9 Dropdown List Components

6.2.13 Arrange

ARRANGE ORDER button under ORDER PARAMETERS allows you to change the order of parameters.

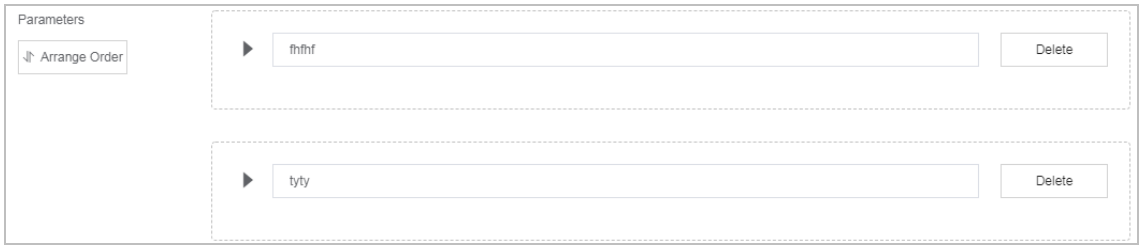


Figure 6-14 ARRANGE ORDER Button

6.2.14 Property Panel Preview

This gives you a preview of the property panel UI of saved specifications.

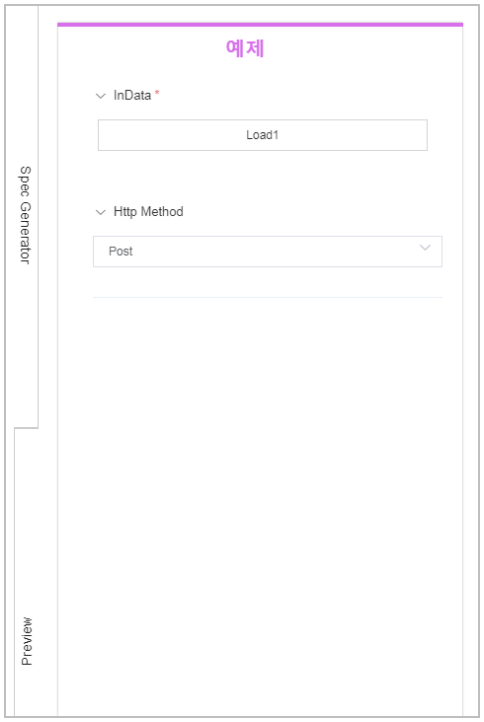


Figure 6-15 Property Panel Preview

6.2.15 Help Editor

Toolkit offers help content of a function in markdown format.

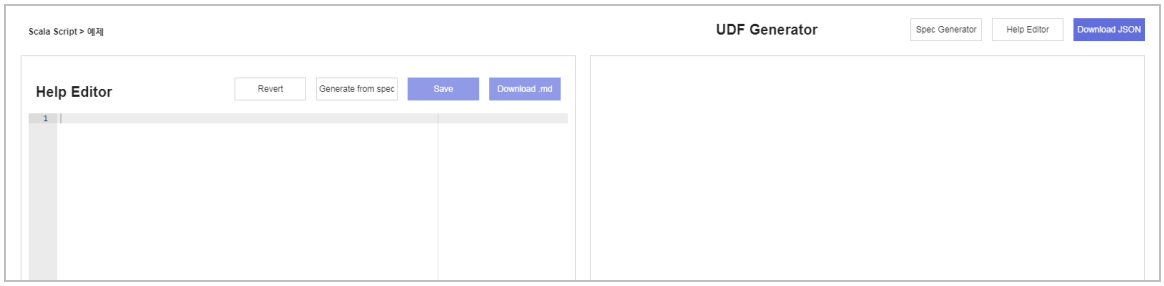


Figure 6-16 The Screen Created When You Click HELP EDITOR Button

6.2.16 Revert

Revert to the last saved md file version.

6.2.17 Clear All

Clear all the md file content you have created.

6.2.18 Generate from Spec

Create a sample .md file based on the information which was entered in SPEC GENERATOR.

※ Caution: If you click this button after editing, the existing content will be deleted.

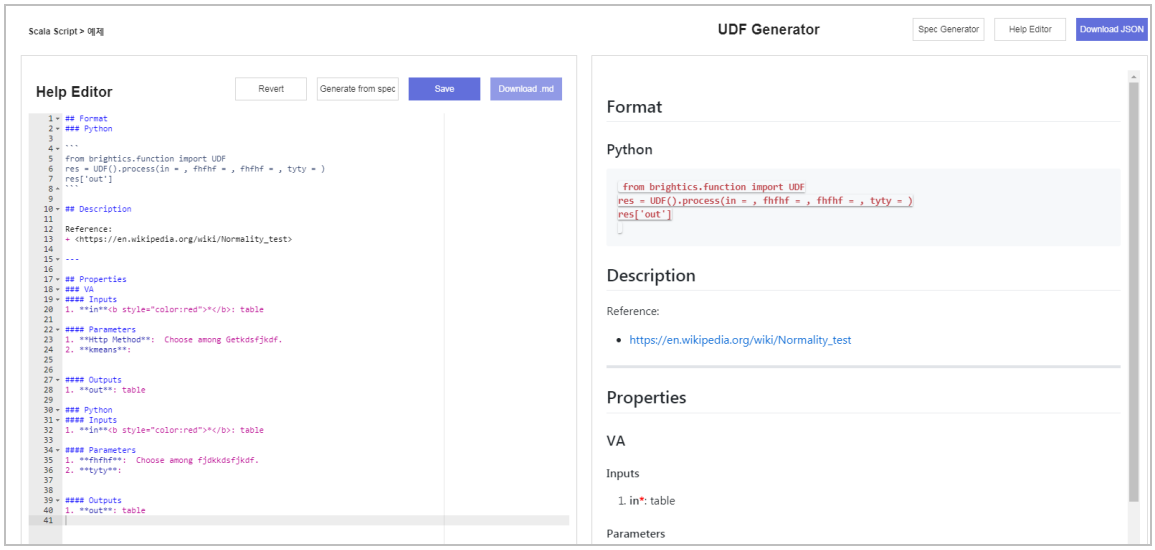


Figure 6-17 The Screen Shown When Clicking GENERATE FROM SPEC Button

6.2.19 Save

Save what you have created in the corresponding function as md file.

6.2.20 Download.md

Download md content you have been working on to my computer as a.md file.

6.2.21 Download JSON

Download the specification and help content saved through the above feature as JSON file.
This file can be used for IMPORT FUNCTION or IMPORT UDF feature of VISUAL ANALYTICS.

7 References

This chapter provides an overview of BRIGHTICS AI functions. For detailed explanation and examples, please refer to HELP content of each function. (Click button in the PROPERTY PANEL)

7.1 I/O Functions

Name	Description
Load	Load data.
Unload	Unload data.
Create Table	Create new data from input values.

Table 7-1 I/O Function List

7.2 Process Functions

Name	Description
Import Data	Import data.
Export Data	Export data.

Table 7-2 Process Function List

7.3 Control Functions

Name	Description
Condition	Execute a sub-model logic suitable for a given condition.
For Loop	Execute a sub-model logic repeatedly according to a given condition.
Flow	Execute a data flow logic in the same project.

Table 7-3 Control Function List

7.4 Manipulation Functions

Name	Description
Change Column Name	Rename a column.
Capitalize Column Name	Change a column name into capital or small letters.
Elementwise Product	Enter two matrices or one matrix along with vector for Hadamard multiplication.
Extend Datetime	If there is a discontinuation of DateTime Column values sorted in ascending order, assume a DateTime value that makes preceding and following DateTime values consecutive numbers and then fill with a new row.
Filter	Choose data that meets a condition.
Function Filter	Count the frequency of one or two-dimensional (matrix) variable.
Independent Filter	Delete columns except those which don’t have linear correlations.(e.g. duplicate column)
Length Filter	Choose data that meets string length condition.
Outlier Removal	Remove outliers.

Name	Description
Replace Missing Number	Replace missing values.(number type supported)
Replace Missing String	Replace missing values.(string type supported)
Sort	Sort columns in ascending/descending order) based on an assigned column.
String Filter	Choose data with a specific character string.
Time Series Decomposition	Extract level, trend, seasonal, and noise information from time series data.
Time Series Distance	Calculate the distance among time series data in various ways.
Update Column	For the row that meets a condition, change the value of a chosen column data into pre-defined value.

Table 7-4 Manipulation Function List

7.5 Statistics Functions

Name	Description
ANOVA	If you want to compare two or more groups, use F distribution generated by comparing intra-group variance with inter-group variance caused by the difference between grand average vs. each group's averages to validate hypothesis.
Association Rule	Analyze the relevance among items.
Bartlett's Test for Stacked	Use Bartlett's Test to test whether multiple groups have the same variance.
Bootstrap Limit	This is a non-parametric estimation method to assume a control limit using statistics of multiple sample groups. Estimate a threshold that is trustworthy in various data distribution.
Chi Square Test for Given Proportion	Test the difference of two populations' proportions and display the output.
Chi Square Test for Independence	Use Chi-Square distribution to verify whether data has a previously assumed distribution or two variables are independent of each other.
Chi Square Test for The Variance	Use a chi square statistic for testing which involves the comparison of population's variance with a particular value.
Correlation	Analyze which linear relations two variables have.
Correlation Test	Analyze correlation of two variables and generate p-value.
Cross Table	Create a cross table or contingency table.
Duncan Test	This function is used for post-mortem comparison testing to decide how the average of a particular data group is significantly different from that of other data group.
Frequency	Calculate class-specific frequency and percentage for a column assigned by GroupBy.
F Test For Stacked	Conduct F-test that compares variance of two groups.
Kernel Density Estimation	Use a kernel function for the given data to calculate probability density.
Kruskal Wallis Test	Compare the size of three or more independent groups whose normality are not assumed.
Levene's Test	Test whether two groups have the same variance
Log Likelihood Ratio Test	Use loglikelyhood value to test the accuracy of the model created by Generalized Linear Model (GLM).
Mann Whitney U Test	Test whether three or more groups whose normality are not assumed have the same average.

Name	Description
Normality Test	Test the normality of data.
One Sample T Test	Conduct T-test which compares the average of population with a particular value.
Paired T Test	Use T statistics to test and compare the difference in the average of paired samples with a particular value.
Robust ANOVA	Use a trimmed mean value to perform a One-Way ANOVA which doesn't need to assume the homogeneity of variance.
String Summary	Show the summary information of a character string column selected from table. Even non-character string column is regarded as a character string column to execute a function.
Statistic Derivation	Add the statistics of a chosen column from a table as a derived variable.
Statistic Summary	Show the summary of statistics of a select column of a table.
Two-Sample T Test For Stacked	Test to compare the difference in the average of two independent groups with a particular value.
VIF	Analyze the correlations of x variables to find an unnecessary variable.

Table 7-5 Statistics Function List

7.6 Transform Functions

Name	Description
Bind Column	Bind two tables side by side (in order to increase the number of columns) to create one table, which is similar to CBIND in R.
Bind Row	Bind n number of tables downwards (in order to increase the number of rows) to create one table which is similar to RBIND in R.
ChiSq Selection	Execute FEATURE SELECTION using chi square statistic.
Delete Missing Data	Convert abnormal values into entered values.
Distinct	Choose deduped data.
Join	Join tow tables. This feature supports inner, left_outer, right_outer, full_outer, left_exclude, and right_exclude join. The reference column used for JOIN has an alias value as a prefix and is located in the first front row.
PCA	Conduct principal component analysis (PCA) on the given data.
Pivot	Summarize data using a pivot table. It allows you to change vertically long data into a horizontally condensed type.
Power Bind Row	Bind two tables downwards (in order to increase the number of rows) to create one table. In contrast to BindRow, Power Bind Row enables to bind two tables even if they have different columns, because it makes a different column filled with null values.
QR Decomposition	Conduct QR-decomposition of the given matrix.
Random Sampling	Simple random sampling is a statistical sampling method to make each component or case of population have the same probability of being selected as a sample.
Random Split	Split data at a user-defined ratio.
Refine Data	Preprocess data using ADD COLUMN, CHANGE VALUE, SELECT COLUMN, SIMPLE FILTER, ADVANCED FILTER, SORTER, and GROUP-BY features.
Select Column	Reorganize a table in the order of columns you've entered.
Split Data	Split data at a user-defined ratio into multiple tables, in which data is randomly selected.

Name	Description
Stratified Sampling	Split population by stack to avoid duplication and then extract samples from each stack.
SVD	Conduct SVD decomposition of a given matrix.
Transpose	Transpose data frame.
Transpose Time Series	Combine the values of double columns or double array columns in a particular order into one long time-series data.
Type Cast	Change a type (string, double, integer) of a specified column.
Unpivot	Display each column as an extended table of the two columns, column name – column value.

Table 7-6 Transform Function List

7.7 Extraction Functions

Name	Description
Add Column	Define the values of a derived value according to a conditional expression and add to a new column.
Add Function Column	Define the values of a derived value according to a pre-defined formula and add to a new column.
Add Lead Lag	Offer LEAD and LAG features of SQL.
Add Row Number	Add a derived variable with ROW INDEX assigned.
Add String Length	Add the character string length of a chosen string-type column values to a derived column.
Array To Columns	Turn an array into a column.
Binarizer	Compare column values entered with a pre-defined threshold value and add 1 if bigger than the threshold or 0 otherwise as a derived variable.
Bucketizer	Use split information to change continuous data into discrete data expressed with n number of buckets.
Capitalize Variable	Rename a chosen column with upper / lower case letters.
Compare Datetime	Calculate a year / month / date / week / millisecond difference between a column with a particular datetime format and a column with a different datetime format or a column with user-defined datetime values and add as a derived variable.
Column To Array	Turn a column into an array.
Datetime Formatter	Change the datetime format of a datetime-type column.
Decompose Datetime	Extract year/month/date/hour/week values from datetime values and add as derived values.
Discretize Quantile	Sort the values of a column in ascending order and have them divided by the number of bucket-number entered and discretized.
EWMA	Calculate the exponential weighted moving average of a chosen column and add as a derived variable.
Index To Label	Inverse transformation function of LabelIndexer converts index into its original label.
Index To Label Model	Perform indexToLabel using model information.
Index To String	Reconvert a column with number index labeled into a pre-indexed string.
Label Indexer	Convert label information into numbers.
Label Indexer Model	Execute LABLE INDEXER using model information.
Moving Average	Calculate moving average values and save in a new column.

Name	Description
Normalization	Normalize the values in a chosen column and add as a derived variable.
One Hot Encoder	Change the values of index label column into a column-type binary vector in which the value of the index is 1.
One Hot Encoder Model	Execute ONE HOT ENCODER using model information.
Polynomial Expansion	Expand features to those with degree higher than the specified degree.
Shift Datetime	Shift datatime-type column values as much as the interval of entered date unit and add as a derived variable.
String Indexer	Sort strings from largest frequency and assign numbers starting from 0 and increasing by 1 to each string.
Remove String Variable	Remove a pre-defined character string in a chosen column and add a derived column.
Replace Numeric Variable	Change number-type column values according to a designated method.
Replace String Variable	Change string-type column values according to a designated method.
String Split	Split strings using delimiter and change into an array-type or multi-columns.
Trim Variable	Remove the blank in a chosen column.
Vector Indexer	Compute every ith element value of a vector as follows. If the number of ith element values is smaller or equal to a pre-defined max_category hence can be categorized according to the max_category value, the index ranging from 0 to the max_category-1 is assigned to each element. But if the number of ith element values exceeds the pre-defined max-category, this will be regarded as “continuous value” that cannot be categorized according to the max-category value, hence the element values will be displayed instead of indices.

Table 7-7 Extraction Function List

7.8 Regression Functions

Name	Description
GLM Train	Predict the relation between a dependent variable Y and one or more independent variables X using Gaussian, Binomial, and Poisson model.
GLM Predict	Predict the output using a model created from GLM Train.
Isotonic Regression Train	Create Isotonic Regression model from given data.
Isotonic Regression Predict	Predict the output using the model created from Isotonic Regression Train.
Linear Regression Train	Calculate the modeling result of linear correlations between a dependent variable Y and one or more independent (explanatory) variables X.
Linear Regression Predict	Feed the output of LinearRegressionTrain, a regression analysis method that models linear correlations between a dependent variable Y and one or more independent (explanatory) variables X for prediction.
Linear Regression Residual	Calculate the residual of a linear regression.
Polynomial Regression Train	Create a polynomial regression model with one variable.
Polynomial Regression Predict	Predict the output using the model created from Polynomial Regression Train.
Predictor (In-memory)	This function conducts GROUP BY PREDCITION for multiple functions and ensures fast execution if model data is not massive.
Stepwise Linear Regression Train	Look for a linear regression equation that uses an optimal X variable while removing an additional variable.

Name	Description
Stepwise Linear Regression Predict	Look for a linear regression equation that uses an optimal X variable while removing an additional variable.

Table 7-8 Regression Function List

7.9 Classification Functions

Name	Description
Decision Tree Train	Generate a decision making tree model using decision tree method.
Decision Tree Predict	Predict the output of new data using the model trained with decision tree.
K-nearest neighbors	K-nearest neighbors. This classification method helps you estimate which class a given feature vector belongs to. It calculates the distance between a feature vector of test data and feature vectors of all train data, looks at classes to which k number of train-feature vectors close to the test-feature vector belong, and estimates the most frequent class value as a class value of the test-feature vector.
Logistic Regression Train	Generate a model that predicts the probability of an event by using linear combination of independent variables.
Logistic Regression Predict	Predict the output of new data by using a model derived from LOGISTIC REGRESSION TRAIN.
Naive Bayes Train	Naïve Bayes Classifier is one of classification methods and estimates the class value of feature vector using the probability classifier obtained by adding the assumption that all feature vectors are mutually independent for conditional probability of Bayes' theorem. Naïve Bayes Train generates a Naïve Bayes model to be used for Naïve Bayes Test by adding train data.
Naive Bayes Predict	Estimate class values of test-feature vector by adding test data to Naïve Bayes Model generated from Naïve Bayes Train.
One vs Rest LR Classifier Train	Generate a multi-class classification model by extending logistic regression with one vs. rest method.
One vs Rest LR Classifier Predict	Classify new data by using the modeling output of One Vs Rest LR Classifier Train.
Random Forest Train	Generate multiple decision trees from given data.
Random Forest Predict	Predict the outcome using the model generated from multiple decision trees configured during training.
SVM Train	Support Vector Machine. Generate a model that determines which category a new data belongs to, based on the collection of given data.
SVM Predict	Support Vector Machine. Determine which category a new data will belong to, based on the collection of given data.

Table 7-9 Classification Function List

7.10 Clustering Functions

Name	Description
Gaussian Mixture Train	Represent the probability distribution of the whole population using multiple Gaussian distributions.
Gaussian Mixture Predict	Predict the output from the model which used multiple Gaussian distributions created during training.

Name	Description
Hierarchical Clustering	Conduct hierarchical clustering which binds nearest clusters gradually from bottom up.
Hierarchical Clustering Post Process	Based on the hierarchical clustering result, add cluster labels aligned to the desired number of clusters.
K-means	Conduct cluster analysis through K-means algorithm.
K-means Model	Create a train model of K-means.
Power Iteration Clustering	Calculate cluster values of each dot by grouping dots into similar groups based on their similarity values.

Table 7-10 Clustering Function List

7.11 Time Series Functions

Name	Description
ARIMA Train	Generate ARIMA model of the corresponding time-series data.
ARIMA Predict	Predict the next data using a generated ARIMA model.
ARX Train	Create ARX model which combines a linear regression model for a day variable with time-series AR model.
ARX Predict	Predict the outcome of data using a model generated from ARX TRAIN.
Auto ARIMA Train	Automatically generate ARIMA model of the corresponding time-series data.
Auto ARIMA Predict	Predict the next data using auto-generated ARIMA model.
AutoCorrelation	Compute ACF (Auto Correlation Function) of time series data and PACF (Partial Auto Correlation Function).
CrossCorrelation	Compute autocorrelation of disparate time-series data.
Holt-Winters Train	Create an optimal Holt-Winters model for the given time-series data.
Holt-Winters Predict	Predict the output of data using the model created from HoltWintersTrain.
Time Series Decomposition	Decompose time-series data into base, seasonal, and noise.
Time Series Smoothen	Smoothen a time-series function.

Table 7-11 Time Series Function List

7.12 Recommendation Functions

Name	Description
ALS Train	Generate recommendation models using ALS (alternating least squares) algorithm (Calculate values of latent factors).
ALS Recommend	Use ALS modeling output to recommend top-N item list by user or predict the preferences (ratings) of user-items.

Table 7-12 Recommendation Function List

7.13 Evaluation Functions

Name	Description
Evaluate Binary Classification	Evaluate the accuracy by comparing the score (probability) which is the outcome of binary classification with actual output (0/1).
Evaluate Multicalss Classification	Evaluate the accuracy by comparing categorical data which is the output of classification with actual output.

Name	Description
Evaluate Ranking Algorithm	Evaluate the output of ranking algorithm (calculate precision at K, MAP, and NDCG at K).
Evaluate Regression	Use regression analysis to predict continuous output variables from an independent variable.
Evaluate Time Series	Evaluate the output of time-series forecast using MAPE, MAD, and MSD.

Table 7-13 Evaluation Function List

7.14 Text Analytics Functions

Name	Description
Latent Dirichlet Allocation	Classify text through frequency analysis of topics in text data.
N-Gram	Extract ngram from listed strings.
Stop Words Remover	Remove general stop words in sentences through natural language processing.
TFIDF	Calculate term frequency and inverse document frequency which represent the importance of words in NLP.
Tokenizer	Split a sentence using regular expressions mainly used for NLP.

Table 7-14 Text Analytics Function List

7.15 Script Functions

Name	Description
Python Script	Write and execute Python script.
R Group By	Execute entered R script for each group data.
R Script	Write and execute R Script.
R Flat Map	Flatten grouped data or array-type data and change into a table of Scala values.
Scala Script	Write and execute Scala script.
Query Executer	Write and execute SQL.

Table 7-15 Script Function List

7.16 Autonomous Analytics Functions

Name	Description
Auto Time Series Analysis	Automatically compute input data-optimized time series analysis algorithm and corresponding parameters and predict the outcome of next time-series data.
Auto Classification Train	Generate a classification model by automatically computing input data-optimized time series analysis algorithm and corresponding parameters.
Auto Classification Predict	Predict the output of new data using the model generated from AUTO CLASSIFICATION TRAIN.
Auto Data Cleansing	Fill missing values using diverse types of machine learning functions and remove columns which are dependent or filled with 0.
Auto Feature Selection For Classification	Automatically select features which are critical to solving classification problems.
Auto Feature Selection For Regression	Automatically select features which are critical to solving regression problems.
Auto Bisecting Kmeans	Automatically select the optimal number of Bisecting Kmeans clusters.

Name	Description
Auto Kmeans	Automatically select the optimal number of Kmeans clusters.
Auto Regression Train	Generate a regression model by automatically computing input data-optimized regression algorithm and corresponding parameters.
Auto Regression Predict	Predict the output of new data using a model generated from AUTO REGRESSION TRAIN.
Auto Decision Tree Train For Classification	Generate a decision tree classification model that automatically computes input data-optimized parameters.
Auto Decision Tree Predict For Classification	Predict the output of new data using a model generated from AUTO DECISION TREE TRAIN FOR CLASSIFICATION.
Auto Decision Tree Train For Regression	Generate a decision tree regression model that automatically computes input data-optimized parameters.
Auto Decision Tree Predict For Regression	Predict the output of new data using a model generated from AUTO DECISION TREE TRAIN FOR REGRESSION.
EDA	Classify input data into continuous or categorical type for EDA (Exploratory data analysis) and offer visualization and summary information of each type.
Auto GBT Train For Classification	Generate GBC classification model which automatically calculates input data-optimized parameters.
Auto GBT Predict For Classification	Predict the outcome of new data using the model generated from AUTO GBT TRAIN FOR CLASSIFICATION.
Auto GBT Train For Regression	Generate GBC regression model which automatically calculates input data-optimized parameters.
Auto GBT Predict For Regression	Predict the outcome of new data using the model generated from AUTO GBT TRAIN FOR REGRESSION.
Auto Random Forest Train For Classification	Generate Random Forest classification model which automatically calculates input data-optimized parameters.
Auto Random Forest Predict For Classification	Predict the outcome of new data using the model generated from AUTO RANDOM FOREST TRAIN FOR CLASSIFICATION.
Auto Random Forest Train For Regression	Generate RANDOM FOREST regression model which automatically calculates input data-optimized parameters.
Auto Random Forest Predict For Regression	Predict the outcome of new data using the model generated from AUTO RANDOM FOREST TRAIN FOR REGRESSION.
Symbolic Regression Train	Generate a model that shows a dependent variable, Y using mathematical expressions of independent variables, Xs.
Auto Multilayer Perceptron Train For Classification	Train a neural network that will solve classification problems.
Auto Multilayer Perceptron Predict For Classification	Predict classification output using the model trained with AUTO MULTILAYER PERCEPTRON TRAIN FOR CLASSIFICATION.
Auto One Vs Rest LR Train For Classification	Apply one vs. rest method to logistic regression to train a model that can solve multiclass classification problems.
Auto One Vs Rest LR Predict For Classification	Predict classification output using the model trained with AUTO ONE VS. REST LR TRAIN FOR CLASSIFICATION.
Symbolic Regression Predict	Predict the outcome of the new data using the model generated from SYMBOLIC REGRESSION TRAIN.
Auto Linear Regression Predict	Predict the outcome of the new data using the model generated from AUTO LINEAR REGRESSION TRAIN.
Auto Linear Regression Train	Generate auto linear regression train model which automatically calculates input data-optimized parameters.

Name	Description
Auto Logistic Regression Predict	Predict the outcome of new data using the model generated from AUTO LOGISTIC REGRESSION TRAIN.
Auto Logistic Regression Train	Generate auto logistic regression train model which automatically calculates input data-optimized parameters.

Table 7-16 Autonomous Analytics Functions List

7.17 Deep Learning Functions

Name	Description
DL Predict	Generate the output of data you want to predict by using training output of deep learning model, for which the deep learning model should be trained in advance.

Table 7-17 Deep Learning Function List

7.18 Deep Learning Parameters

Name	Description
Loss	Decide a type of loss function that will calculate an error between a model-predicted value vs. observed value.
Metrics	Choose a function that will measure the performance of a model.
Batch Size	Decide a batch size to be used for model training.
Epochs	Decide the number of rounds of model training.
Optimizer	Choose an optimizer to find a model parameter that minimizes the values of a loss function.
Checkpoint Group Name	Name a checkpoint where training result will be saved. The checkpoint file is saved whenever each sub-folder epoch terminates. If the same checkpoint name already exists, a current date is added to the name.

Table 7-18 Deep Learning Parameters List

7.19 Deep Learning I/O Functions

Name	Description
DL Load	Enter data to be used for training. Make sure to enter train data and label respectively as well as the shape of train data.

Table 7-19 Deep Learning I/O Function List

7.20 Deep Learning Core Layer

Name	Description
Dense	Add a fully-connected layer.
Activation	Decide an activation function to be applied to the output of a preceding layer. If you choose NONE, the input values will become output values.
Dropout	Add dropout layer. Rate refers to the drop rate of a layer where you can enter a value between 0 and 1.
Flatten	Flatten input data, which becomes one-dimensional data after going through flatten layer.
Python Script	Enter user-desired Python script which will be applied to the final script.

Table 7-20 Deep Learning Core Layer List

7.21 Deep Learning Convolutional Layer

Name	Description
Convolution 2D	Apply a convolution layer to 2D input data.

Table 7-21 Deep Learning Convolutional Layer List

7.22 Deep Learning Pooling Layer

Name	Description
Max Pooling 2D	Apply max pooling layer to 2D input data.

Table 7-22 Deep Learning Pooling Layer List

7.23 Deep Learning Recurrent Layer

Name	Description
GRU	Gated Recurrent Unit Layer. Apply GRU layer to input data.
LSTM	Long Short Term Memory Layer. Apply LSTM layer to input data.

Table 7-23 Deep Learning Recurrent Layer List

7.24 Deep Learning Embedding Layer

Name	Description
Embedding	Apply embedding layer that maps positive number data to vector data.

Table 7-24 Deep Learning Embedding Layer List

Appendix A

Constraint Definition

Below are the constraints on Brightics AI.

Restriction on Special Characters

Brightics AI does NOT allow the use of special characters (except for @, *, (,) , _ , + , ~ , / , ‘ , ‘) and space bar in all cases except for particular function.

Restriction on Hangul, the Korean Alphabet

Entering Hangul in parameter input field of functions for I/O, Manipulation, Validation, Statistics, Transform, Extraction, Regression, Classification and Evaluation is NOT allowed in Brightics AI.

Appendix B

Glossary

Users must familiarize themselves with the following terms to understand this manual.

Brightics AI

Brightics AI provides advanced business insights by predicting the situation through collection/analysis of massive data sets and by making information required for decision making.

Big Data

Big data refers to a massive amount of data which is difficult to collect, store, search and analyze with traditional methods due to its excessively large scale in terms of data volume, velocity, and variety generated.
In this regard, big data is dubbed as 3Vs (Volume, Variety and Velocity) or 4V including the 4th characteristic, Value.

Hadoop

Hadoop is an open-source software of Apache License, Version 2.0 developed for large-scale data processing. Hadoop was developed from 2006 funded by Yahoo, and currently its development is being led by the Apache Software Foundation.

HDFS (Hadoop Distributed File System)

HDFS, an abbreviation of Hadoop Distributed File System has Master/Slave architecture. Master (Name node) manages metadata of files, and actual data is distributed and stored across multiple Slaves (Data nodes).

Spark

Apache Spark is a general-purpose, high-performance cluster computing system. Spark offers advanced APIs written in Java, Scala, and Python, and is an optimal engine that supports general execution graphs.

Alluxio

Alluxio is an open-source in-memory distributed storage system. Alluxio can be used in a variety of open-source storage systems such as Spark, MapReduce, Flink, and Presto.

JSON (JavaScript Object Notation)

JSON is an open standard format that uses human readable texts to deliver data objects with attribute-value pairs. It is a key data format for asynchronous browser/server communications (AJAJ) and replacing XML (used for AJAX) at large. In particular, it is known as a method for representing documents being exchanged over the internet. There is no special restriction on document type, and especially it is suitable for describing variables of computer programs.

Function

Function refers to a unit of functions for analysis. Parameters can be set for each function.

Analytics Model

Analytics Model refers to a group of analytics functions that you have modelled, such as Data Flow and Script Model.

Data Flow

Data Flow represents a flow of data inputs and outputs between respective sub-tasks performed to execute a single task.

Data Flow Model Editor

Brightics Data Flow Model Editor is equipped with a modeling functionality to create/validate analytics models with Data Flow to help effectively develop complex data analytics models.

Script Model

Script Model refers to an analytics model written based on scripts.

Script Model Editor

Brightics Script Model Editor offers functionalities to write/test Scala scripts, create user-defined functions and write/test SQL scripts for advanced users.

Deep Learning Model

Deep Learning Model is an analytics model written based on deep learning.

Deep Learning Model Editor

Deep Learning Model Editor offers Modeling functionality to create/validate analytics models with Data

Flow to help effectively develop complex deep learning analytics models.

Report

Report represents the outcome of integrating data generated from Brightics Analytics Model.

Report Editor

Brightics Report Editor is equipped with a modeling functionality to help easily write a report using data generated from analysis.

Toolkit

Toolkit is a collection of tools that support the creation of UIs to make functions within Brightics. Currently it supports the creation of user-defined functions.