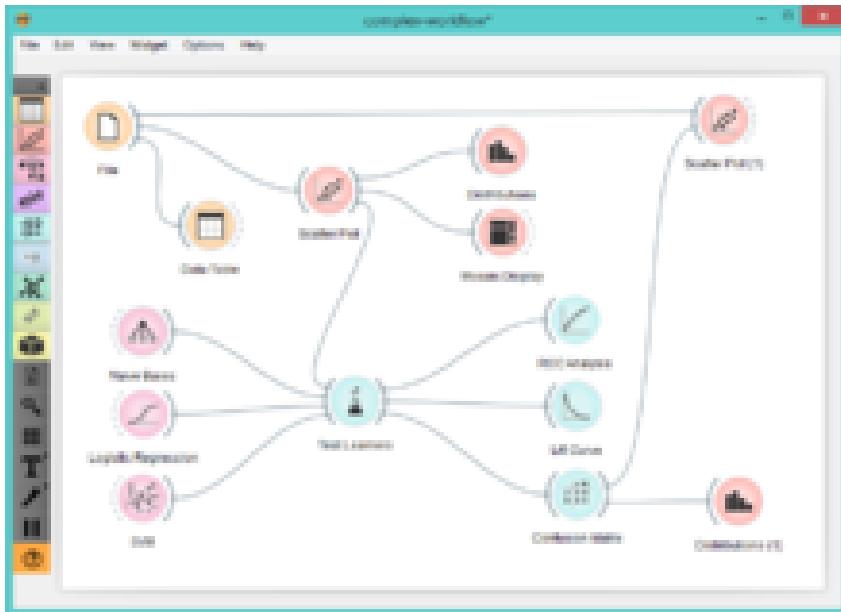


Aula Prática

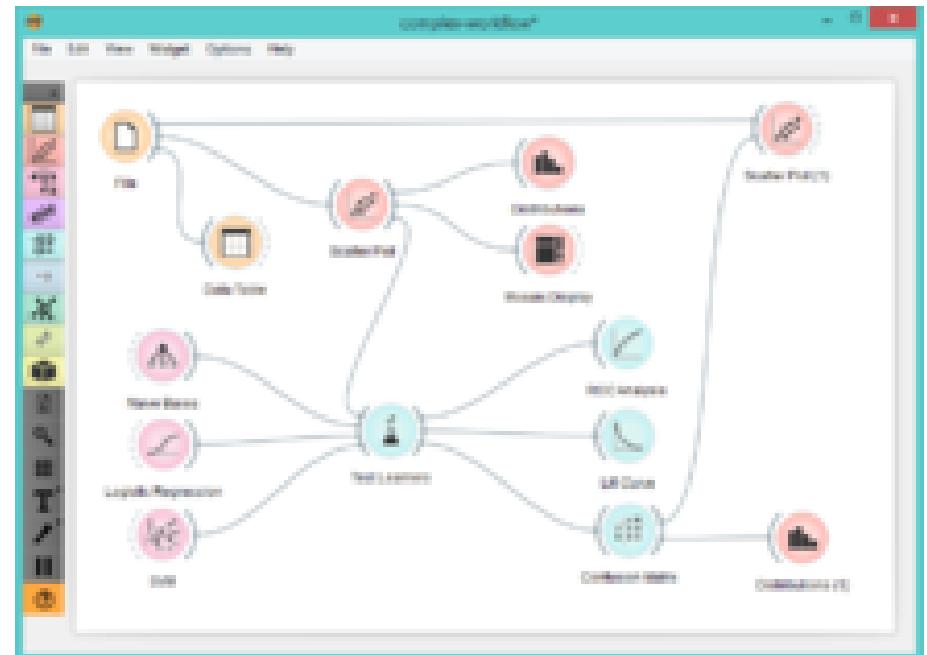
MLP com uso do Orange





Quando usar o Orange?

- Análise inicial.
- Comparação rápida de métodos.
- Requer a interação.





BEM VINDO AO ORANGE



Ambiente Orange

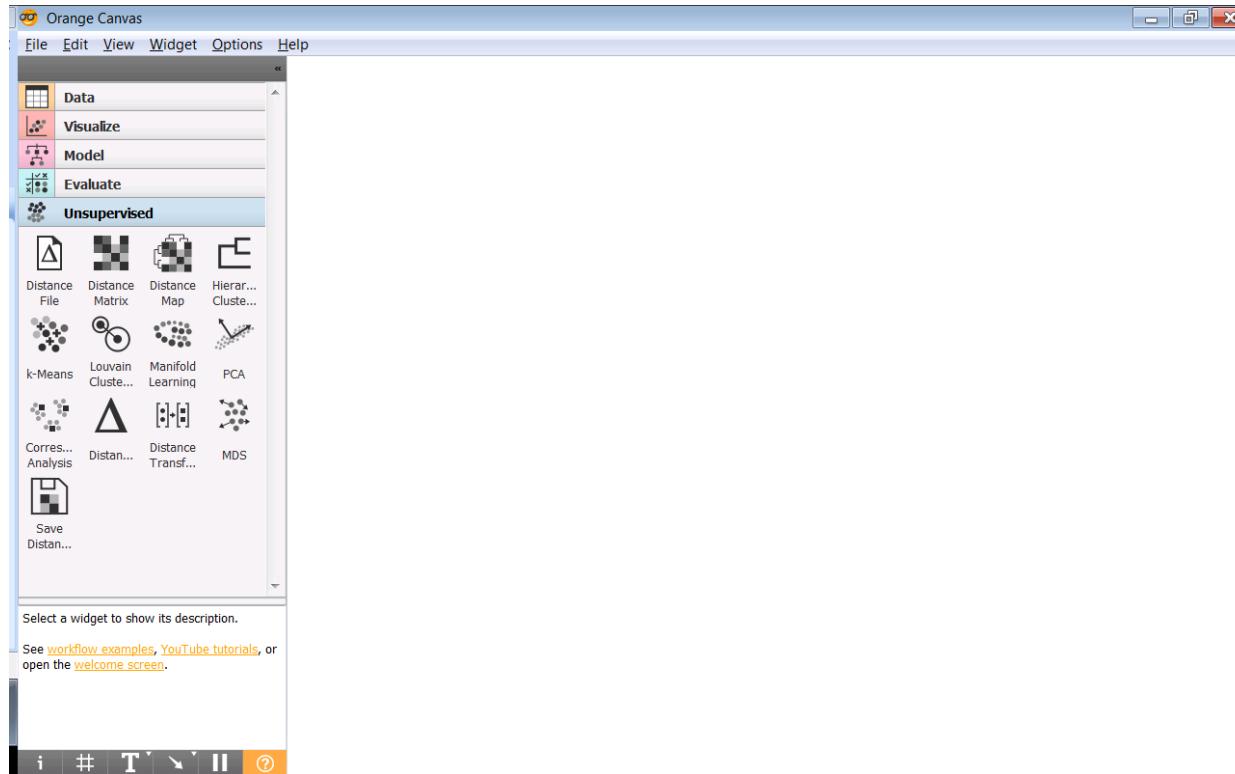
<https://orange.biolab.si/widget-catalog/>

The screenshot shows the Orange Data Mining software interface. On the left, there is a vertical toolbar titled "Data" containing various data manipulation and analysis icons. Below this is a message: "Select a widget to show its description. See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#)." At the bottom of the toolbar is a row of small icons: a magnifying glass, a hash symbol, a T, a checkmark, a double arrow, a double bar, and a question mark. The main window is titled "Welcome to Orange Data Mining". It features six circular icons with labels: "New" (document icon), "Open" (folder icon), "Recent" (clock icon), "Tutorials" (play button icon), "Examples" (network icon), and "Get Started" (www icon). At the bottom of this window are two buttons: "Show at startup" (with a checked checkbox) and "Help us improve!". The overall interface has a clean, modern look with a blue and white color scheme.



Ambiente Orange

- Aqui começa toda a magia e a magia acontece através dos Widgets.
- Os Widgets são as unidades computacionais de Orange.





Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Dados

The screenshot shows the Orange data mining software interface. At the top is a menu bar with File, Edit, View, Widget, Options, and Help. Below the menu is a toolbar with icons for Undo, Redo, Cut, Copy, Paste, and others. On the left is a vertical palette titled "Unsupervised" which is currently selected. The palette contains several icons for different unsupervised learning methods: Distance File, Distance Matrix, Distance Map, Hierar... Cluste..., k-Means, Louvain Cluste..., Manifold Learning, PCA, Corres... Analysis, Distan..., Distance Transf..., and MDS. At the bottom of the palette is a "Save" button. A red arrow points from the word "Dados" to the "Distance Matrix" icon in the palette. The main workspace below the palette is empty, with a message "Select a widget to show its description." and instructions to see workflow examples or open the welcome screen.



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data Visualize Model Evaluate Unsupervised

Distance File Distance Matrix Distance Map Hierar... Cluste...

k-Means Louvain Cluste... Manifold Learning PCA

Corres... Analysis Distan... Distance Transf... MDS

Save Distan...

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

i # T ↻ || ?

Visualização

The screenshot shows the Orange data mining software interface. The title bar reads "Orange Canvas". The menu bar includes "File", "Edit", "View", "Widget", "Options", and "Help". On the left, a sidebar has tabs for "Data", "Visualize", "Model", "Evaluate", and "Unsupervised". The "Unsupervised" tab is selected, highlighted in blue. Below it, there are several icons representing different unsupervised learning methods: Distance File, Distance Matrix, Distance Map, Hierarchical Clustering, k-Means, Louvain Clustering, Manifold Learning, PCA, Correspondence Analysis, Distance Transformation, and MDS. At the bottom of the sidebar, there is a "Save" button and a "Distance..." button. A red arrow points from the word "Visualização" to the "Unsupervised" tab. A message at the bottom says "Select a widget to show its description. See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#)".



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Modelos

Data Visualize Model Evaluate Unsupervised

Distance File Distance Matrix Distance Map Hierar... Cluste...

k-Means Louvain Cluste... Manifold Learning PCA

Corres... Analysis Distan... Distance Transf... MDS

Save Distan...

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

i # T ↻ || ?

The screenshot shows the Orange data mining software interface. At the top is a menu bar with File, Edit, View, Widget, Options, and Help. Below the menu is a toolbar with icons for Undo, Redo, Cut, Copy, Paste, and others. On the left is a vertical palette titled 'Widget palette' containing tabs for Data, Visualize, Model, Evaluate, and Unsupervised. The Unsupervised tab is selected, indicated by a blue background. Below the tabs are several categories of widgets with their corresponding icons and names: Distance File, Distance Matrix, Distance Map, Hierarchical Clustering, k-Means, Louvain Clustering, Manifold Learning, PCA, Correspondence Analysis, Distance Transformation, and MDS. At the bottom of the palette is a note: 'Select a widget to show its description.' followed by a link to workflow examples and YouTube tutorials, and a link to the welcome screen.



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data Visualize Model Evaluate Unsupervised

Distance File Distance Matrix Distance Map Hierar... Cluste...

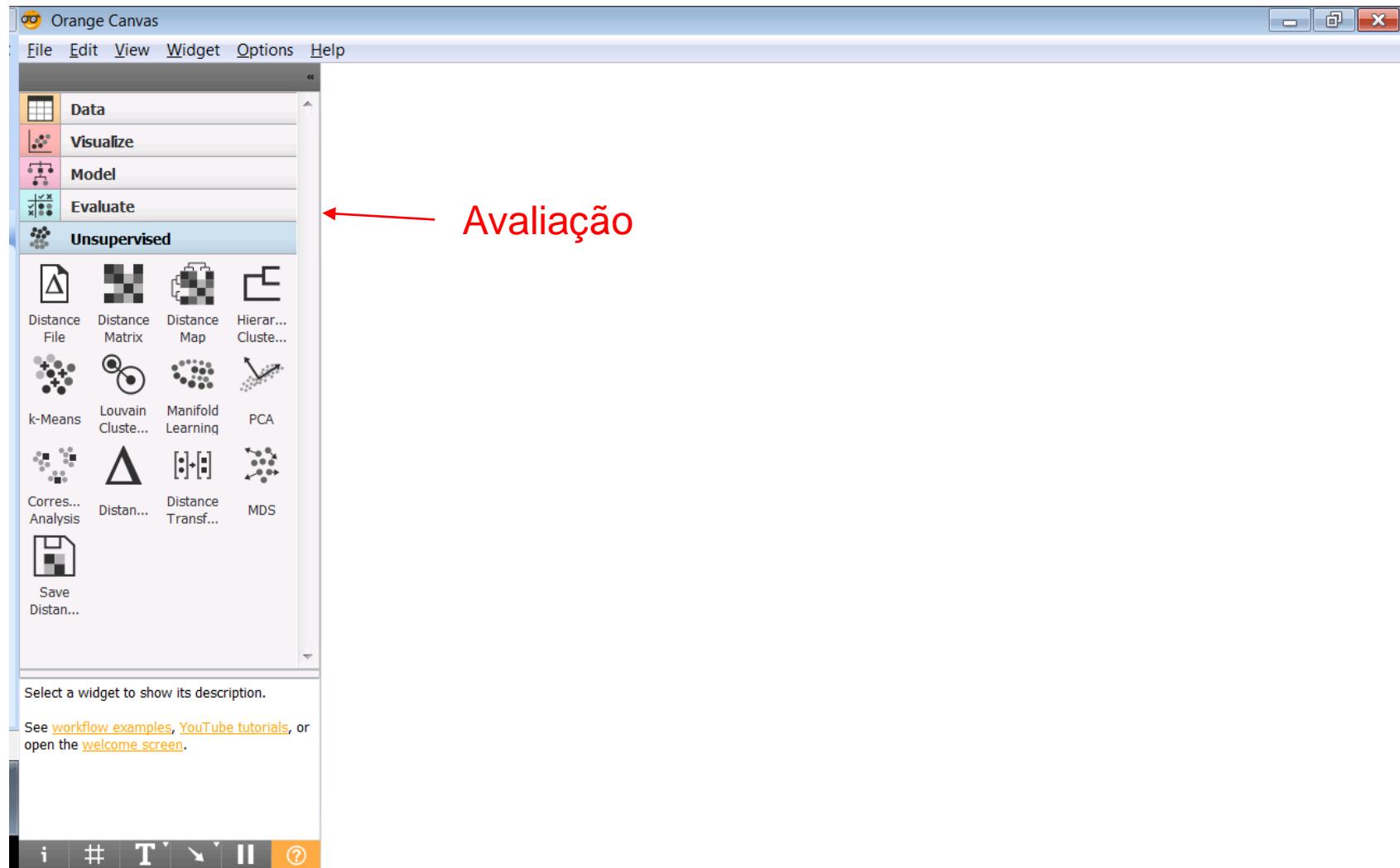
k-Means Louvain Cluste... Manifold Learning PCA

Corres... Analysis Distan... Distance Transf... MDS

Save Distan...

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

A red arrow points from the text "Avaliação" to the "Evaluate" tab in the top navigation bar.





Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data Visualize Model Evaluate Unsupervised

Distance File Distance Matrix Distance Map Hierar... Cluste...

k-Means Louvain Cluste... Manifold Learning PCA

Corres... Analysis Distan... Distance Transf... MDS

Save Distan...

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

i # T ↻ || ?

Não supervisionado

The screenshot shows the Orange data mining software interface. The title bar reads "Orange Canvas". The menu bar includes "File", "Edit", "View", "Widget", "Options", and "Help". The toolbar has icons for "Data", "Visualize", "Model", "Evaluate", and "Unsupervised". The "Unsupervised" tab is highlighted with a blue background. The main workspace is currently empty. On the left, there is a sidebar with various unsupervised learning widgets: Distance File, Distance Matrix, Distance Map, Hierarchical Clustering, k-Means, Louvain Clustering, Manifold Learning, PCA, Correspondence Analysis, Distance Transformation, MDS, and a Save button. Below the sidebar, a message says "Select a widget to show its description." and provides links to workflow examples, YouTube tutorials, and the welcome screen. At the bottom, there are additional toolbar icons: i, #, T, ↻, ||, and ?.



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Dados

Carregar arquivos, banco de dados
Visualizar Tabela
Amostrar dados
Selecionar colunas
Selecionar linhas
Fazer junção de dados
Concatenar dados
Transpor
Colocar em ordem aleatória
Pré-processar...

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or
open the [welcome screen](#).

The screenshot shows the Orange data mining software interface. At the top is a menu bar with File, Edit, View, Widget, Options, and Help. Below the menu is a toolbar with icons for various operations like File, Datasets, SQL Table, and Data Table. On the left is a palette titled 'Data' containing a grid of icons for data manipulation tasks such as Paint Data, Data Info, Data Sampler, Select Columns, Select Rows, Rank, Merge Data, Conca..., Select by Dat..., Trans..., Rando..., Prepro..., Impute, Outliers, Edit Domain, Python Script, Color, Contin..., Create Class, and Discrete... A red arrow points from the word 'Dados' to the 'Select Columns' icon. At the bottom of the interface are several small control buttons.



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data

The screenshot shows the Orange data mining software interface. On the left, there is a toolbar titled "Data" containing various icons for data manipulation and analysis. A workflow diagram is visible in the center, consisting of three nodes: "File" (represented by a document icon), "Data Table" (represented by a grid icon), and "Distributions" (represented by a bar chart icon). Arrows labeled "Data" connect the "File" node to the "Data Table" node and the "Data Table" node to the "Distributions" node. At the bottom of the screen, there is a toolbar with icons for selection, text, table, and other functions.

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data Visualize Model Evaluate Unsupervised

Tree Viewer Box Plot Distrib... Scatter Plot

Sieve Diagram Mosaic Display FreeViz Linear Projec...

Radviz Heat Map Venn Diagram Silhou... Plot

Pythag... Tree Pythag... Forest CN2 Rule V... Nomo...

Select a widget to show its description.

See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

i # T ↻ II ?

Visualização

Árvore de decisão
Distribuições
Mapa de Calor
Projeção...



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

Data Visualize Model

Constant CN2 Rule I... kNN Tree

Random Forest SVM Linear Regre... Logistic Regre...

Naive Bayes AdaBo... Neural Network Stoch... Gradie...

Save Model Load Model

Evaluate Unsupervised

Select a widget to show its description.

See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

Modelos

Rede Neural
Adaboost – Algoritmo de aprendizado de máquina
Knn – vizinho mais próximo
Árvore
Random Forest
SVM – Suport Vector Machine
Regressão Linear
Regressão Logística
Naive Bayes – classificador probabilístico
Stochastic Gradient Descent – minimiza função objetivo



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

■ Data
■ Visualize
■ Model
Evaluate

Test & Score Predic... Confu... Matrix ROC Analysis
Lift Curve Calibr... Plot

Unsupervised

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

Avaliação

←

Teste dos algoritmos
Predição dos dados
Análise Roc

i # T ↻ II ?



Ambiente Orange

Orange Canvas

File Edit View Widget Options Help

—

Data
Visualize
Model
Unsupervised

Distance File Distance Matrix Distance Map Hierar... Cluste...
k-Means Louvain Cluste... Manifold Learning PCA
Corres... Analysis Distan... Distance Transf... MDS
Save Distan...

Não supervisionado

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

i # T ↺ II ?

**Agrupamento k-médias
PCA – Análise de Componentes Principais
Agrupamento hierárquico**



Add-ons

Screenshot of a software interface showing the 'Data' tab selected and the 'Options' menu open. The 'Add-ons...' option is highlighted in the menu.

The interface includes a toolbar with icons for File, CSV File Import, Datasets, SQL Table, Data Table, Paint Data, Data Info, Data Sampler, Select Columns, Select Rows, Pivot Table, Rank, Correlati..., Merge Data, Concate..., Select by Data Ind..., Transpose, Randomize, Preproc..., Apply Domain, and a Help icon.

The main area displays a message: "Select a widget to show its description. See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#). "

The bottom navigation bar includes icons for back, forward, search, and help.



Add-ons

Filter Add more...

	Name	Version	Action
<input checked="" type="checkbox"/>	Associate	1.1.5	
<input type="checkbox"/>	Bioinformatics	4.0.0	
<input checked="" type="checkbox"/>	Educational	0.2.1	Install
<input type="checkbox"/>	Geo	0.2.4.post1	
<input checked="" type="checkbox"/>	Image Analytics	0.3.1	
<input checked="" type="checkbox"/>	Network	1.4.2	
<input type="checkbox"/>	Prototypes	0.12.0	
<input type="checkbox"/>	Single Cell	1.3.0	
<input type="checkbox"/>	Spectroscopy	0.4.6	

Orange3-Associate

Orange add-on for enumerating frequent itemsets and association rules mining.

Documentation: <http://orange3-associate.readthedocs.org/>

OK Cancel



CARREGANDO OS DADOS



Preparação dos Dados

- A tarefa mais importante em Mineração de dados é a preparação dos dados.
- Orange pode ler vários formatos de dados, como Excel, tab e arquivos separados por vírgula (.csv)
- Os dados são geralmente uma tabela, em que registros de dados estão em linhas e os atributos de dados estão em colunas.

Preparação dos Dados

Exemplo



- A partir de um grupo de pessoas prever o gênero baseado nas suas características físicas.
- Na tabela deve conter:
 - Nome, Gênero, peso, altura, cor dos olhos e cor do cabelo.
- Criar no Excel uma tabela parecida com:



Planilha do Excel

Screenshot of Microsoft Excel showing a data table:

	A	B	C	D	E	F
1	Nome	Gênero	Peso	Altura	Cor dos Olhos	Cor do Cabelo
2	Karine	Feminino	55	1.65	Azul	Loiro
3	Luciana	Feminino	49	1.60	Preto	Preto
4	Lineu	Masculino	85	1.78	Preto	Preto
5	Sostenes	Masculino	75	1.82	Preto	Preto
6	Murilo	Masculino	76	1.80	Marrom	Preto
7	Ana Paula	Feminino	60	1.7	Marrom	Marrom
8	Aline	Feminino	53	1.62	Verde	Marrom
9						
10						
11						
12						
13						
14						
15						

The Excel interface includes the ribbon bar with tabs like Arquivo, Página, Inserir, Layout, Fórmula, Dados, Revisão, Exibição, and various toolbars for font, alignment, numbers, styles, and cells.



Inserindo os dados

S * File Edit View Widget Options Help

Data

File CSV File Import Datasets SQL Table

Data Table Paint Data Data Info Data Sampler

Select Columns Select Rows Pivot Table Rank

Data Table

View the dataset in a spreadsheet.

[more...](#)

File Data Data Table

The screenshot shows the KNIME interface with the 'Data' node selected. On the left, the 'Data' tab of the toolbar is highlighted. Below it, various data-related nodes are listed: File, CSV File Import, Datasets, SQL Table, Data Table, Paint Data, Data Info, Data Sampler, Select Columns, Select Rows, Pivot Table, and Rank. On the right, a diagram shows a connection from a 'File' node (represented by a document icon) to a 'Data Table' node (represented by a grid icon). The word 'Data' is written above the connection line.



Escolhendo o Arquivo

File 

File: Exemplo_Aula10.xlsx  Reload

Sheet Plan1

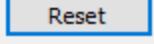
URL:

Info

7 instance(s)
5 feature(s) (no missing values)
Data has no target variable.
1 meta attribute(s)

Columns (Double click to edit)

	Name	Type	Role	Values
1	Gênero	C categorical	feature	Feminino, Masculino
2	Peso	N numeric	feature	
3	Altura	N numeric	feature	
4	Cor dos Olhos	C categorical	feature	Azul, Marrom, Preto, Verde
5	Cor do Cabelo	C categorical	feature	Loiro, Marrom, Preto
6	Nome	S text	meta	

Browse documentation datasets  



Dados

- Orange assumiu que a primeira coluna com os nomes contém nossos metas atributos.
- 7 instancias
- 5 características

Data Table

	Nome	Gênero	Peso	Altura	Cor dos Olhos	Cor do Cabelo
1	Karine	Feminino	55.0	1.65	Azul	Loiro
2	Luciana	Feminino	49.0	1.60	Preto	Preto
3	Lineu	Masculino	85.0	1.78	Preto	Preto
4	Sostenes	Masculino	75.0	1.82	Preto	Preto
5	Murilo	Masculino	76.0	1.80	Marrom	Preto
6	Ana Paula	Feminino	60.0	1.70	Marrom	Marrom
7	Aline	Feminino	53.0	1.62	Verde	Marrom

Info
7 instances (no missing values)
5 features (no missing values)
No target variable.
1 meta attribute (no missing values)

Variables
 Show variable labels (if present)
 Visualize numeric values
 Color by instance classes

Selection
 Select full rows

Restore Original Order
 Send Automatically

Browse documentation datasets | Reset | Apply

Selecionando as Colunas



The screenshot shows the KNIME Data Explorer interface. On the left, the 'Data' tab is selected, displaying various data management tools: File, CSV File Import, Datasets, SQL Table, Data Table, Paint Data, Data Info, Data Sampler, Select Columns (highlighted with a yellow arrow), Select Rows, Pivot Table, and Rank.

In the center, a process diagram illustrates the 'Select Columns' workflow. A 'File' node connects to a 'Data Table' node, which then connects to a 'Select Columns' node.

The 'Select Columns' dialog box is open on the right. It lists available variables: Gênero, Peso, Altura, Cor dos Olhos, and Cor do Cabelo. The 'Target Variable' is set to Nome. The 'Meta Attributes' section contains a checkbox for Nome. A 'Send Automatically' checkbox is also present at the bottom.

The bottom of the interface features a toolbar with icons for search, filter, sort, and other data manipulation functions.

Selecionando a Variável de Destino



The image shows two side-by-side "Select Columns" dialog boxes from a software interface, illustrating the process of selecting a target variable for a machine learning model.

Left Dialog (Initial State):

- Available Variables:** Empty.
- Features:** Contains:
 - Gênero (Gender)
 - Peso (Weight)
 - Altura (Height)
 - Cor dos Olhos (Eye Color)
 - Cor do Cabelo (Hair Color)
- Target Variable:** Empty.
- Meta Attributes:** Contains:
 - Nome (Name)
- Buttons:** Up, >, Down, Reset, Send Automatically (unchecked).

A large yellow arrow points from the "Features" section towards the "Target Variable" section.

Right Dialog (Final State):

- Available Variables:** Empty.
- Features:** Contains:
 - Peso (Weight)
 - Altura (Height)
 - Cor dos Olhos (Eye Color)
 - Cor do Cabelo (Hair Color)
- Target Variable:** Contains:
 - Gênero (Gender)
- Meta Attributes:** Contains:
 - Nome (Name)
- Buttons:** Up, >, Down, Reset, Send Automatically (checked).



Visualizando os Dados

Screenshot of a data visualization software interface.

File Edit View Widget Options Help

Data

- File
- CSV File Import
- Datasets
- SQL Table
- Data Table
- Paint Data
- Data Info
- Data Sampler
- Select Columns
- Select Rows
- Pivot Table
- Rank

Data Table

View the dataset in a spreadsheet.

[more...](#)

Diagram illustrating data flow:

```
graph LR; File((File)) -- Data --> DataTable1((Data Table)); DataTable1 -- Data --> SelectColumns((Select Columns)); SelectColumns -- Data --> DataTable1_1((Data Table (1)))
```

The diagram shows a flow from a "File" node to a "Data Table" node, which then branches to a "Select Columns" node, and finally to a "Data Table (1)" node.



Visualizando os Dados

Data Table (1)

Info

7 instances (no missing values)
4 features (no missing values)
Discrete class with 2 values (no missing values)
1 meta attribute (no missing values)

Variables

Show variable labels (if present)
 Visualize numeric values
 Color by instance classes

Selection

Select full rows

Restore Original Order

Send Automatically

	Gênero	Nome	Peso	Altura	Cor dos Olhos	Cor do Cabelo
1	Feminino	Karine	55.0	1.65	Azul	Loiro
2	Feminino	Luciana	49.0	1.60	Preto	Preto
3	Masculino	Lineu	85.0	1.78	Preto	Preto
4	Masculino	Sostenes	75.0	1.82	Preto	Preto
5	Masculino	Murilo	76.0	1.80	Marrom	Preto
6	Feminino	Ana Paula	60.0	1.70	Marrom	Marrom
7	Feminino	Aline	53.0	1.62	Verde	Marrom



Salvando o Arquivo

EXEMPLO2 - aula 10.ows*

File Edit View Widget Options Help

Feature Constr... Feature Statistics Neighbors Purge Domain

Save Data

Visualize Model Evaluate Unsupervised

Select a widget to show its description.
See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

Diagram:

```
graph LR; File((File)) -- Data --> DT1[Data Table]; DT1 -- Data --> SC[Select Columns]; SC -- Data --> DT2[Data Table (1)]; DT2 -- Data --> SD[Save Data]
```

The screenshot shows the Orange data mining software interface. The title bar reads "EXEMPLO2 - aula 10.ows*". The menu bar includes "File", "Edit", "View", "Widget", "Options", and "Help". On the left, there's a toolbar with icons for Feature Construction, Feature Statistics, Neighbors, Purge Domain, and a Save Data button. Below the toolbar is a sidebar with categories: Visualize, Model, Evaluate, and Unsupervised. A message at the bottom says "Select a widget to show its description. See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#)". The main area displays a workflow diagram: File → Data Table → Select Columns → Data Table (1) → Save Data. Each step is represented by an orange circle with a specific icon (file, grid, etc.) inside. A large orange arrow points to the "Save Data" button on the toolbar.



Formato .tab

- Ao salvar no formato .tab do orange, já salva com as anotações de cabeçalhos para atributos.

The screenshot shows the Orange data editor interface. The title bar reads "C:\Users\apac\Dropbox\2019_IA\2019_IFSP_IA\EXEMPLO - ORANGE - AULA10\Exemplo2_Au...". The menu bar includes Arquivo, Editar, Localizar, Visualizar, Formatar, Linguagem, Configurações, Ferramentas, Macro, Executar, Plugins, Janela, and ?.

The toolbar contains various icons for file operations like Open, Save, Print, and Data manipulation.

The main window displays a table titled "Exemplo2_Aula10.tab". The table has 11 rows and 7 columns. The columns are labeled: Peso, Altura, Cor dos Olhos, Cor do Cabelo, Gênero, and Nome. The first three columns are continuous, while the last three are discrete. The fourth column is labeled "class" and the fifth is "meta".

	Peso	Altura	Cor dos Olhos	Cor do Cabelo	Gênero	Nome
1	continuous	continuous	discrete	discrete	discrete	string
2	55.0	1.65	Azul	Loiro	Feminino	Karine
3	49.0	1.6	Preto	Preto	Feminino	Luciana
4	85.0	1.78	Preto	Preto	Masculino	Lineu
5	75.0	1.82	Preto	Preto	Masculino	Sostenes
6	76.0	1.8	Marrom	Preto	Masculino	Murilo
7	60.0	1.7	Marrom	Marrom	Feminino	Ana Paula
8	53.0	1.62	Verde	Marrom	Feminino	Aline
9						
10						
11						

At the bottom, status bars show "length : 407 lines : 11 Ln : 11 Col : 1 Sel : 0 | 0", "Windows (CR LF)", "UTF-8", and "INS".

Definindo dados Localmente



- Tipo de variável no primeiro
 - c para atributos numéricos (Contínuo)
 - d para atributos discretos
 - s para valores de texto (String)
- Tipo de atributo no segundo
 - Classe para o gênero
 - Meta para atributos que fornecem alguma informação extra

Definindo dados Localmente



Screenshot of Microsoft Excel showing a local dataset named "classe".

The dataset contains the following data:

	A	B	C	D	E	F	G
1	Nome	Gênero	Peso	Altura	Cor dos Olhos	Cor do Cabelo	
2	s	d	c	c	d	d	
3	meta	classe					
4	Karine	Feminino	55	1.65	Azul	Loiro	
5	Luciana	Feminino	49	1.60	Preto	Preto	
6	Lineu	Masculino	85	1.78	Preto	Preto	
7	Sostenes	Masculino	75	1.82	Preto	Preto	
8	Murilo	Masculino	76	1.80	Marrom	Preto	
9	Ana Paula	Feminino	60	1.7	Marrom	Marrom	
10	Aline	Feminino	53	1.62	Verde	Marrom	
11							
12							



EXEMPLO - IRIS



Exemplo

Screenshot of the Orange data mining software interface, showing the Data tab selected.

Data Tab:

- File:** File, Edit, View, Widget, Options, Help
- Data:** Data icon
- Buttons:** File, CSV File Import, Datasets, SQL Table
- File (from Orange3) description:** Read data from an input file or network and send a data table to the output.
- No inputs:** No inputs listed.
- Outputs:** Data
- Tools:** Select Columns, Select Rows, Pivot Table, Rank

File Tab:

Read data from an input file or network and send a data table to the output.

Bottom navigation bar:

- i, #, T, ?, II

Exemplo



The screenshot shows the KNIME Analytics Platform interface. The top bar includes the KNIME logo, window control buttons (minimize, maximize, close), and a menu bar with File, Edit, View, Widget, Options, and Help. The main area has a title bar "Data". A floating context menu is visible in the center-right, featuring a large orange circular icon with a white file symbol and the word "File" below it. The left sidebar contains several tabs: Data (selected), File, CSV File Import, Datasets, SQL Table, Data Table, Paint Data, Data Info, Data Sampler, Select Columns, Select Rows, Pivot Table, and Rank. Below the sidebar, a message says "Select a widget to show its description. See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#). The bottom navigation bar includes icons for information, hashtag, text, search, and help.



Exemplo

This screenshot shows a software interface for data manipulation, likely KNIME, with a yellow background and a central workspace.

The top menu bar includes: File, Edit, View, Widget, Options, and Help.

The left sidebar, titled "Data", contains the following icons and their corresponding labels:

- File
- CSV File Import
- Datasets
- SQL Table
- Data Table
- Paint Data
- Data Info
- Data Sampler
- Select Columns
- Select Rows
- Pivot Table
- Rank

The central workspace displays a node titled "File". A tooltip for this node provides the following details:

- File
- No inputs
- Outputs:
 - Data

The bottom navigation bar includes icons for: i, #, T, ↘, II, and ?.

The "File" section in the sidebar also contains the following text:

Read data from an input file or network and send a data table to the output.
[more...](#)



Exemplo

File Edit View Widget Options Help

Data

File CSV File Import Datasets SQL Table

Data Table Paint Data Data Info Data Sampler

Select Columns Select Rows Pivot Table Rank

File

Read data from an input file or network and send a data table to the output.

more...

iris.tab

Iris flow

150 instance(s)
4 feature(s) (no missing values)
Classification; categorical class with 3 values (no missing values)
0 meta attribute(s)

Columns (Double click to edit)

	Name	Type	Role	Values
1	sepal length	N numeric	feature	
2	sepal width	N numeric	feature	
3	petal length	N numeric	feature	
4	petal width	N numeric	feature	
5	iris	C categorical	target	Iris-setosa, Iris-versicolor, Iris-virginica

Browse documentation datasets

Reset Apply



Exemplo

Screenshot of a software application window titled "Data". The menu bar includes File, Edit, View, Widget, Options, and Help. The toolbar contains icons for File, CSV File Import, Datasets, SQL Table, Data Table, Paint Data, Data Info, Data Sampler, Select Columns, Select Rows, Pivot Table, and Rank. A diagram on the right shows a connection between a "File" icon and a "Data Table" icon, labeled "Data".

Data Table

View the dataset in a spreadsheet.

[more...](#)

Toolbar icons: i, #, T, ↗, ↘, ||, ?



Exemplo – Data Table

- 150 tipos de Iris de Flores do Famoso conjunto de dados do Fischer.

Data Table

Info
150 instances (no missing values)
4 features (no missing values)
Discrete class with 3 values (no missing values)
No meta attributes

Variables
 Show variable labels (if present)
 Visualize numeric values
 Color by instance classes

Selection
 Select full rows

Restore Original Order

Send Automatically

	iris	sepal length	sepal width	petal length	petal width
1	Iris-setosa	5.1	3.5	1.4	0.2
2	Iris-setosa	4.9	3.0	1.4	0.2
3	Iris-setosa	4.7	3.2	1.3	0.2
4	Iris-setosa	4.6	3.1	1.5	0.2
5	Iris-setosa	5.0	3.6	1.4	0.2
6	Iris-setosa	5.4	3.9	1.7	0.4
7	Iris-setosa	4.6	3.4	1.4	0.3
8	Iris-setosa	5.0	3.4	1.5	0.2
9	Iris-setosa	4.4	2.9	1.4	0.2
10	Iris-setosa	4.9	3.1	1.5	0.1
11	Iris-setosa	5.4	3.7	1.5	0.2
12	Iris-setosa	4.8	3.4	1.6	0.2
13	Iris-setosa	4.8	3.0	1.4	0.1
14	Iris-setosa	4.3	3.0	1.1	0.1
15	Iris-setosa	5.8	4.0	1.2	0.2
16	Iris-setosa	5.7	4.4	1.5	0.4
17	Iris-setosa	5.4	3.9	1.3	0.4
18	Iris-setosa	5.1	3.5	1.4	0.3
19	Iris-setosa	5.7	3.8	1.7	0.3
20	Iris-setosa	5.1	3.8	1.5	0.3
21	Iris-setosa	5.4	3.4	1.7	0.2
22	Iris-setosa	5.1	3.7	1.5	0.4
23	Iris-setosa	4.6	3.6	1.0	0.2



WORKFLOWS DE DADOS



Exemplo

EXEMPLO - aula 10.ows*

File Edit View Widget Options Help

Data Visualize

Tree Viewer Box Plot Distribution Scatter Plot

Line Plot Sieve Diagram Mosaic Display FreeViz

Scatter Plot

Interactive scatter plot visualization with intelligent data visualization enhancements.

more...

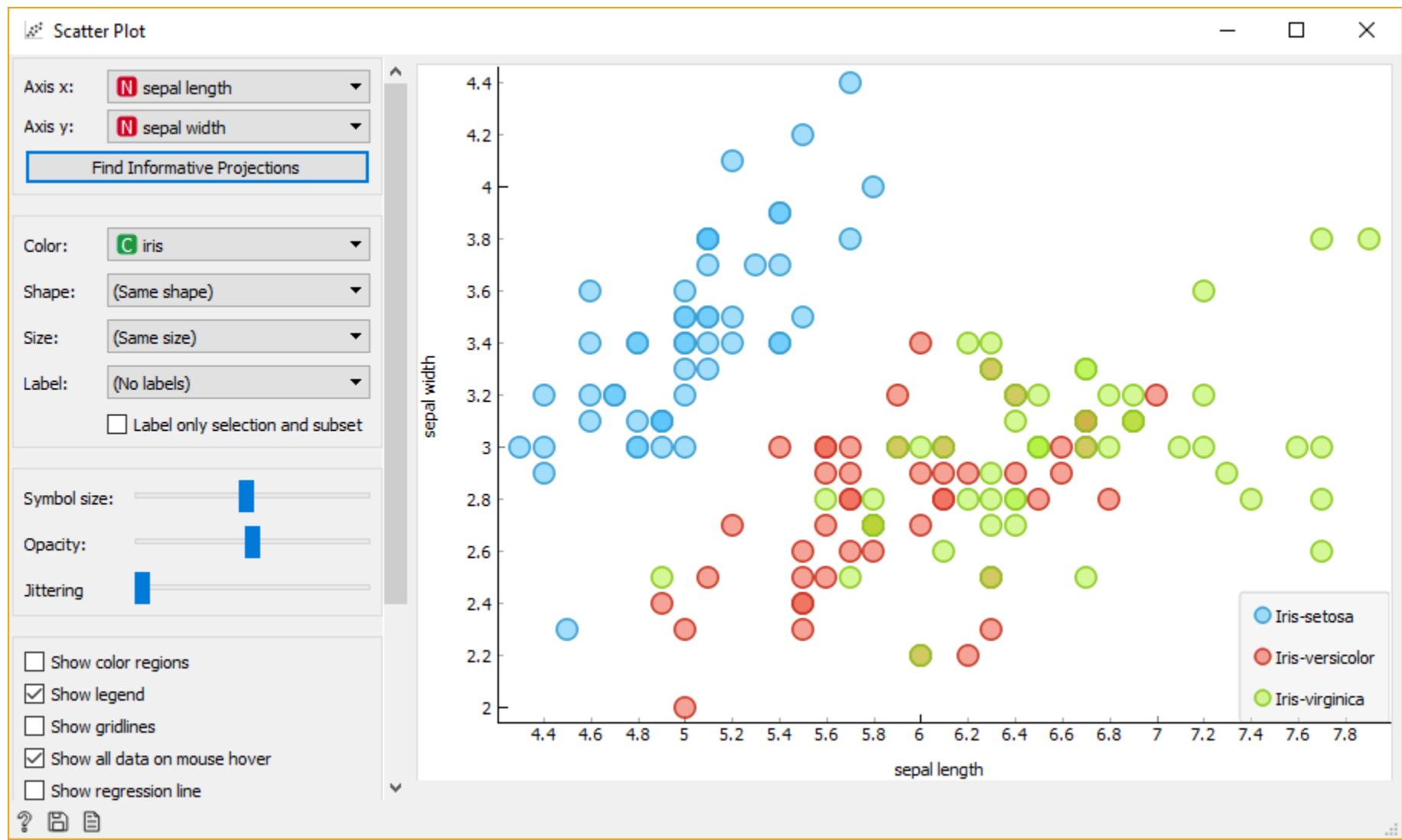
i # T ↵ || ? < >

```
graph LR; File((File)) -- Data --> DataTable((Data Table)); DataTable -- Data --> ScatterPlot((Scatter Plot))
```

The diagram illustrates the data flow in the application. It starts with a 'File' icon, which has a connection labeled 'Data' leading to a 'Data Table' icon. From the 'Data Table' icon, another connection labeled 'Data' leads to a 'Scatter Plot' icon, which is highlighted with a blue border.



Exemplo – Scatter Plot



Características do Conjunto de dados



- Características das Flores:
 - Comprimento da Sépalas
 - Largura da Sépalas
 - Comprimento das Pétalas
 - Largura das Pétalas
- Cada Flor é rotulada com uma das três classes de espécie da Iris:
 - Iris setosa
 - Iris versicolor
 - Iris virginica



Exemplo

EXEMPLO - aula 10.ows*

File Edit View Widget Options Help

Data Visualize

- Tree Viewer
- Box Plot
- Distributi...
- Scatter Plot
- Line Plot
- Sieve Diagram
- Mosaic Display
- FreeViz

Distributions

Display value distributions of a data feature in a graph.

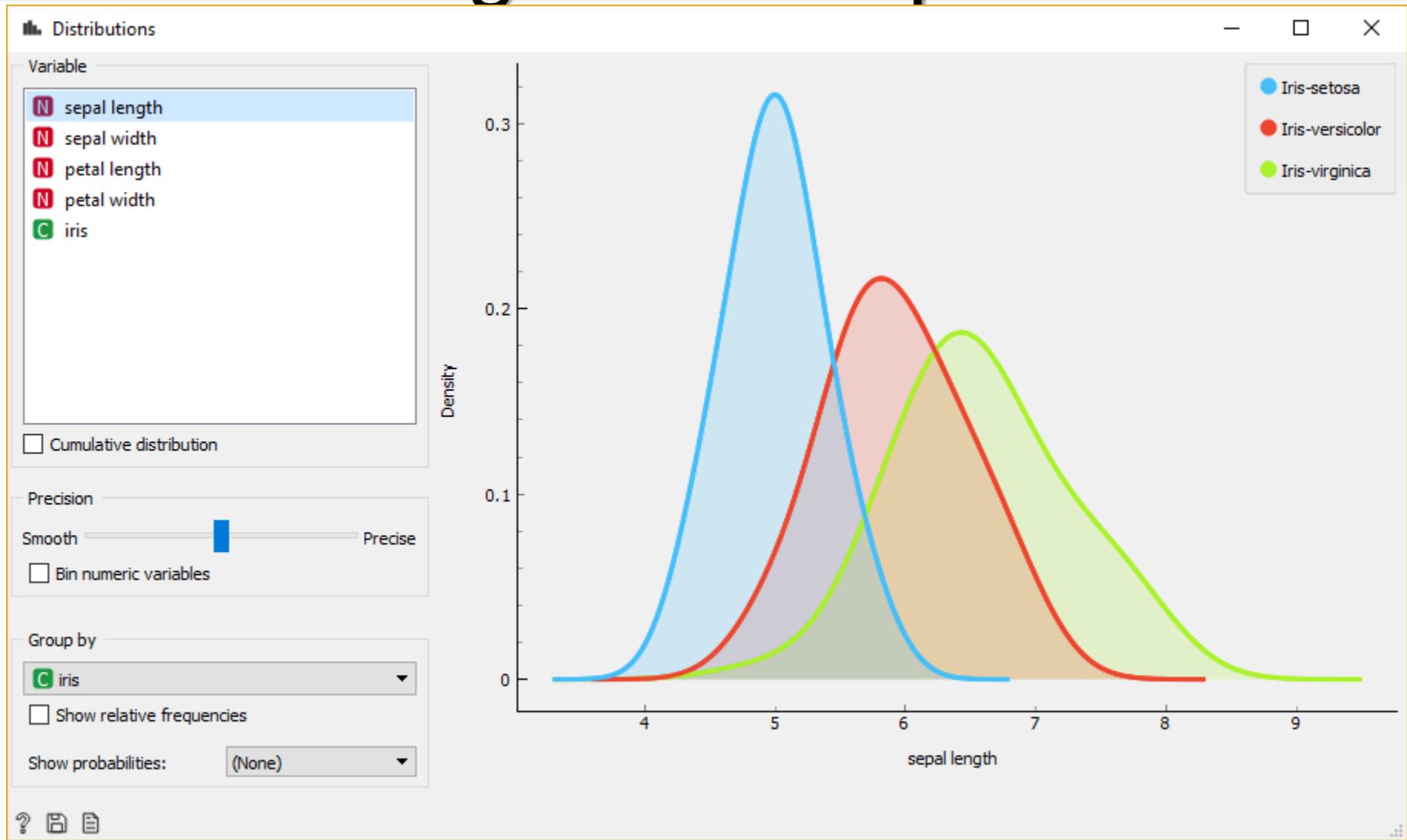
[more...](#)

Diagram illustrating the flow of data from a file through various visualization methods:

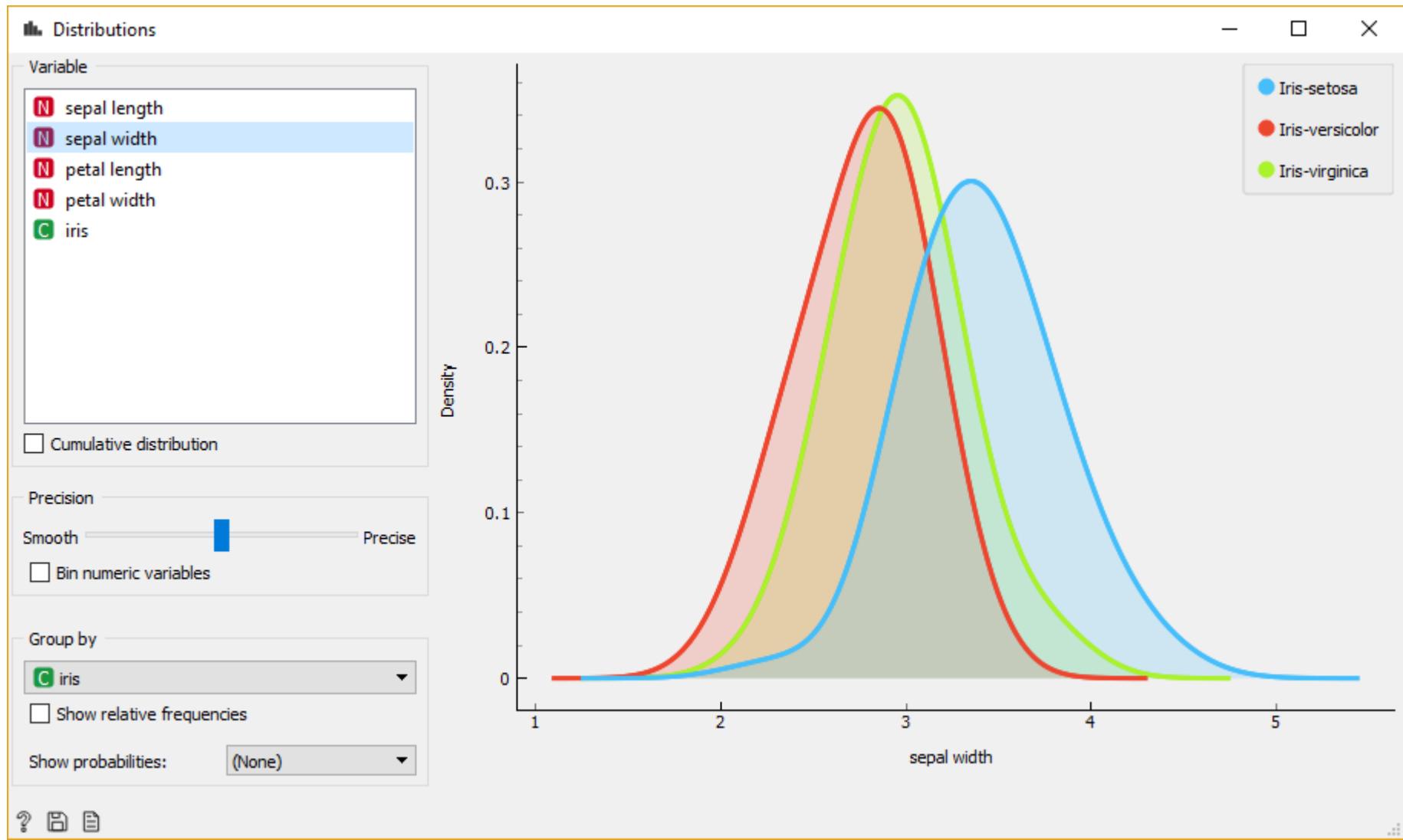
- File → Data → Data Table
- Data Table → Data → Scatter Plot
- Data Table → Data → Distributions

```
graph LR; File[File] --> Data[Data]; Data --> DataTable[Data Table]; DataTable --> ScatterPlot[Scatter Plot]; DataTable --> Distributions[Distributions]
```

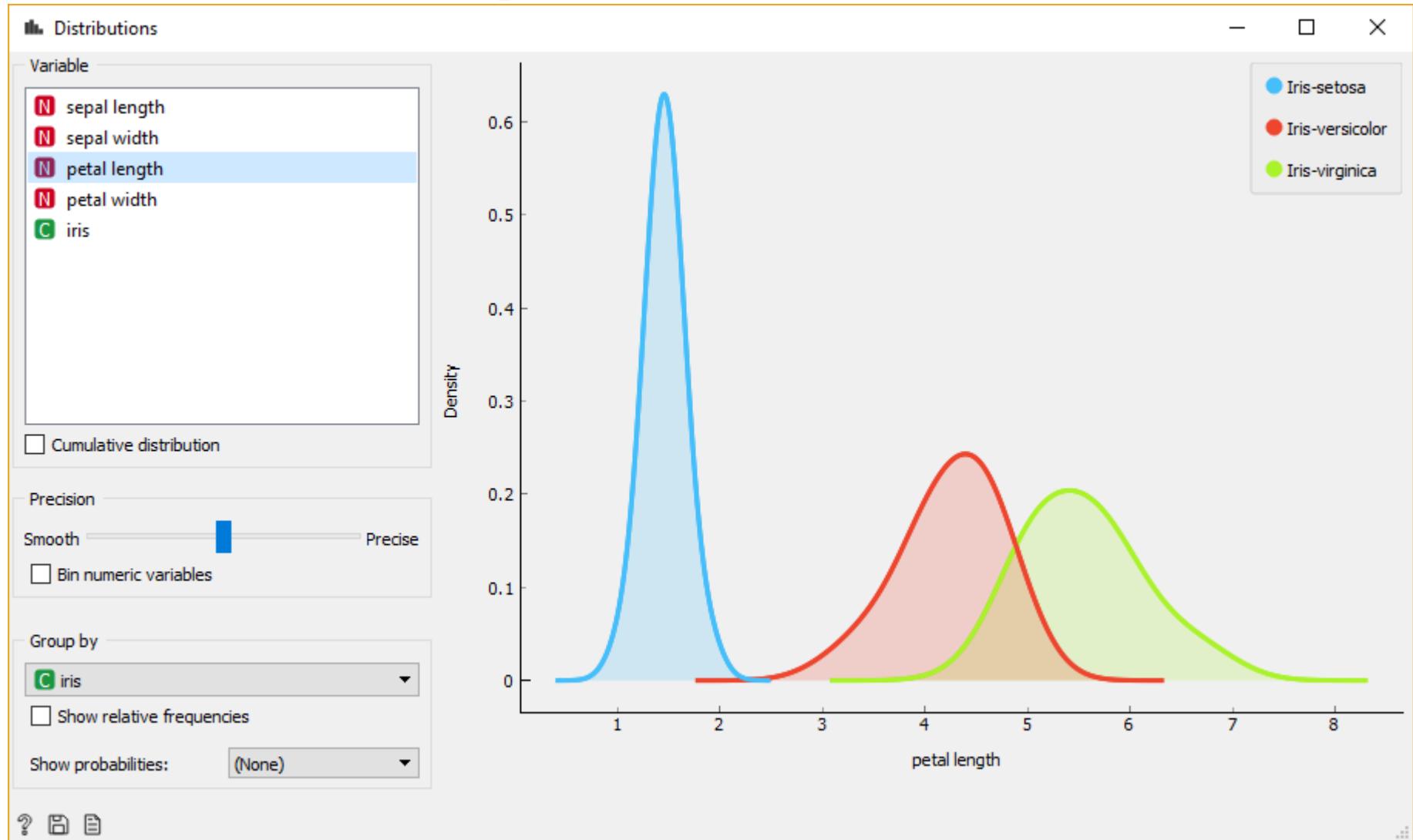
Exemplo – Distribuição Largura da Sépala



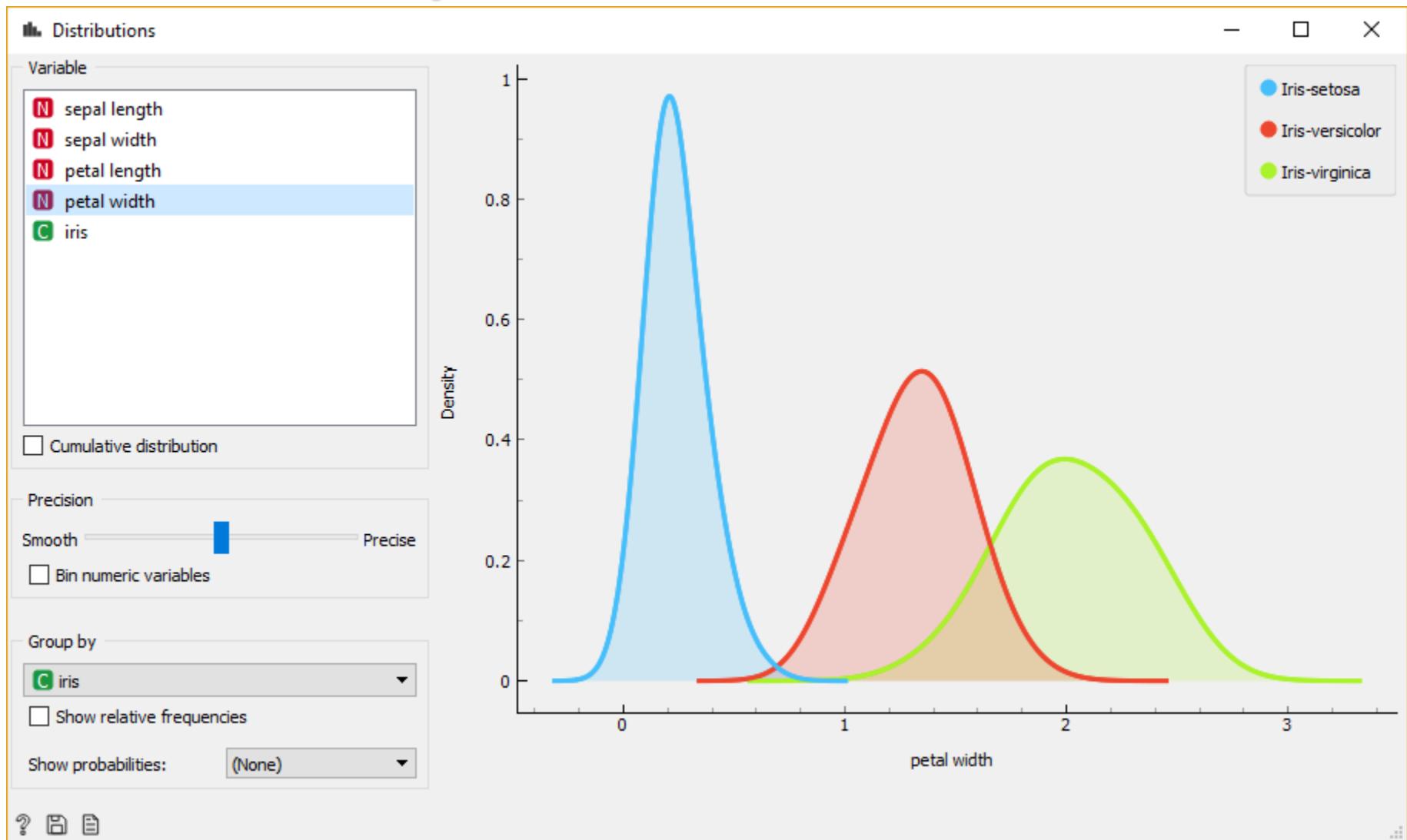
Exemplo – Distribuição Comprimento da Sépala



Exemplo – Distribuição Largura da Pétala

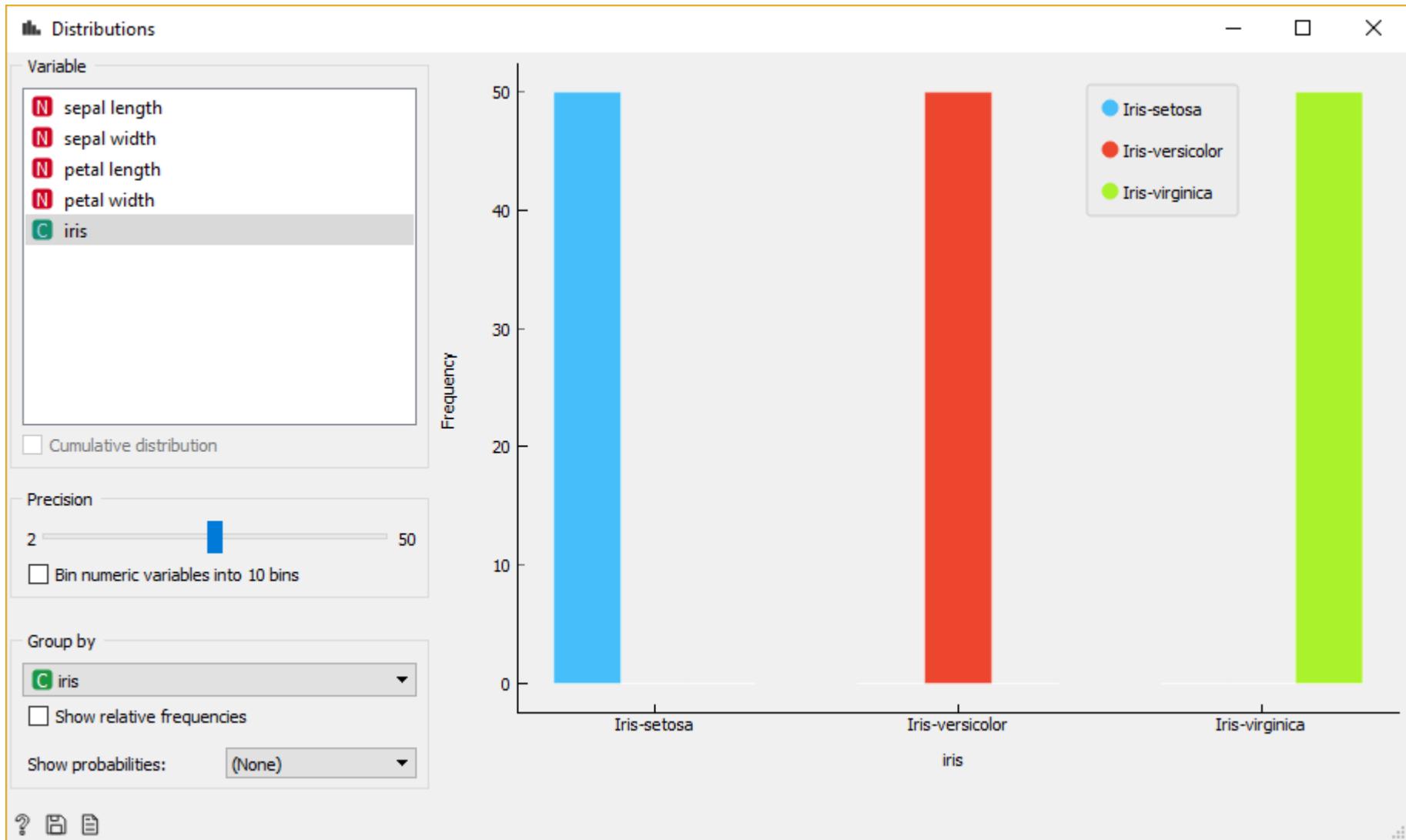


Exemplo – Distribuição Comprimento da Pétala



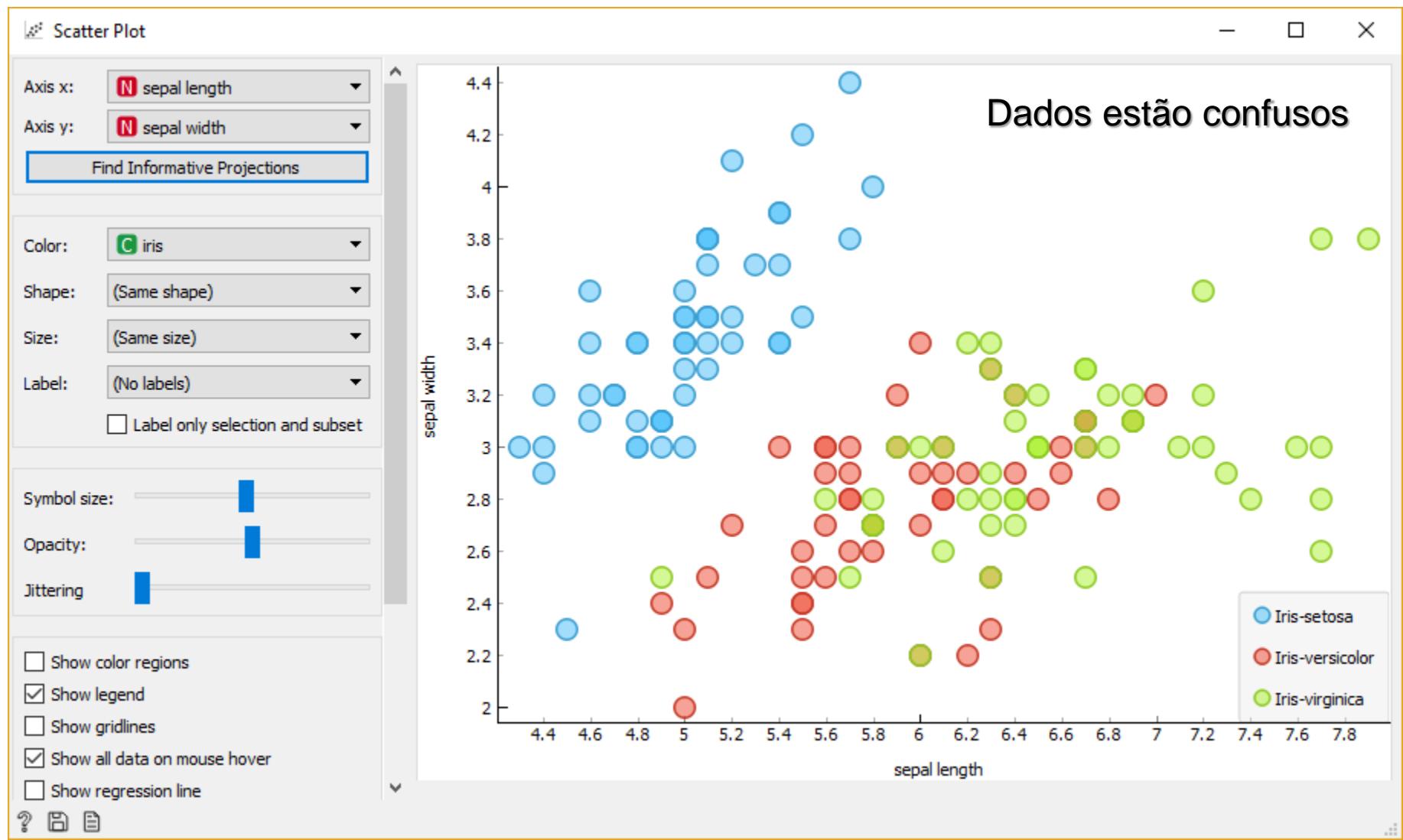


Exemplo - Distribuição





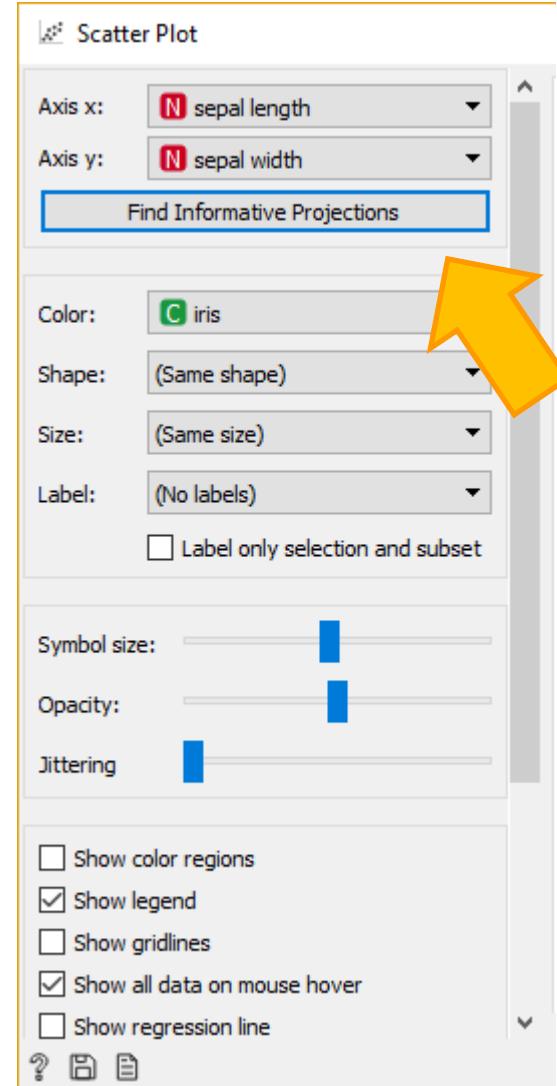
Exemplo – Scatter Plot





Exemplo – Rank Projections

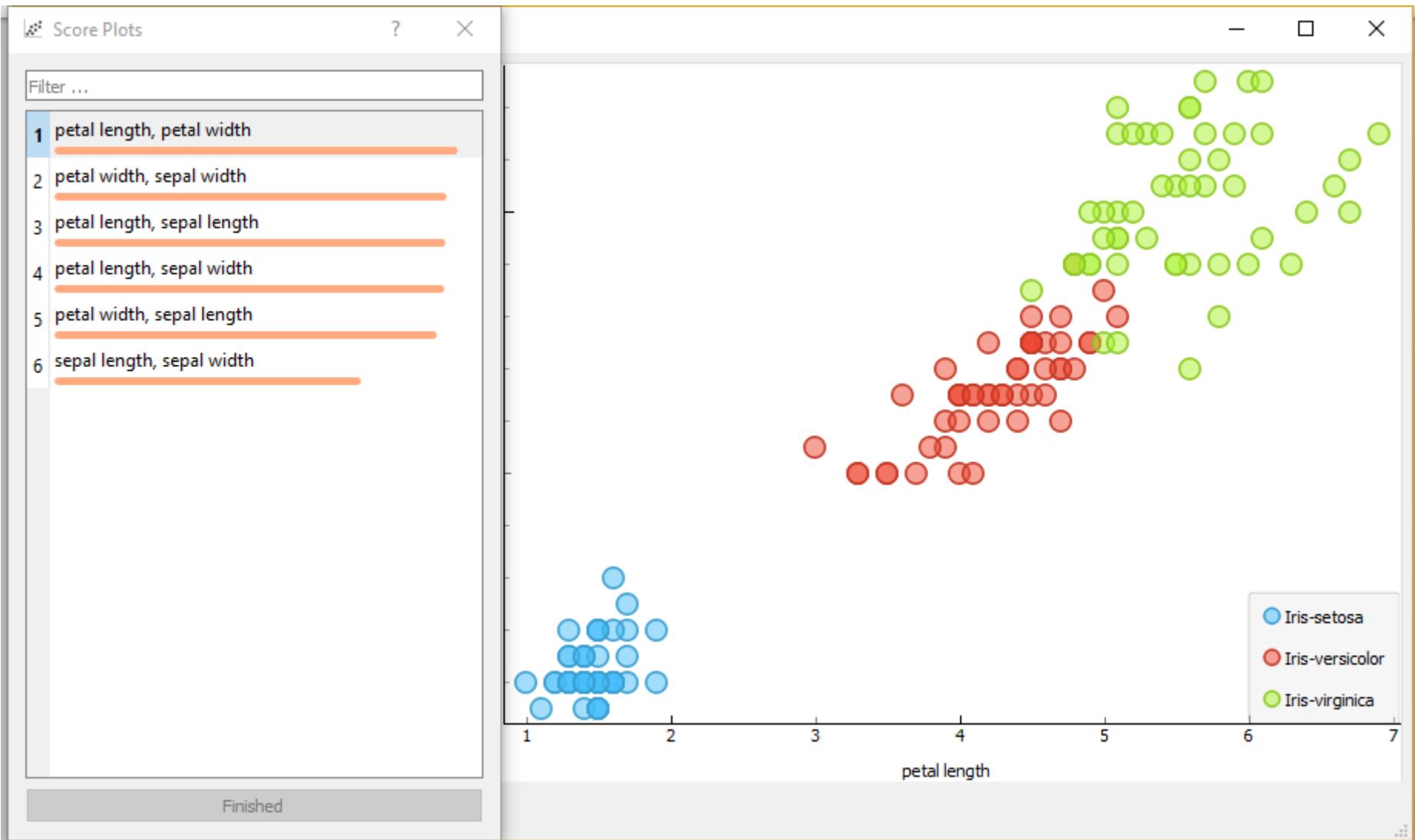
- Será que existe algum par de características que possam separar bem as três classes?
- Selecionar o *Rank Projections* (Projeções de Classificação) ou *Find Informative Projections* para marcar todos os pares de características.
 - Pontuação mais alta indica uma melhor separação de diferentes espécies de Íris.





Exemplo – Score Plots

Largura e comprimento da Pétala





Exemplo – Score Plots

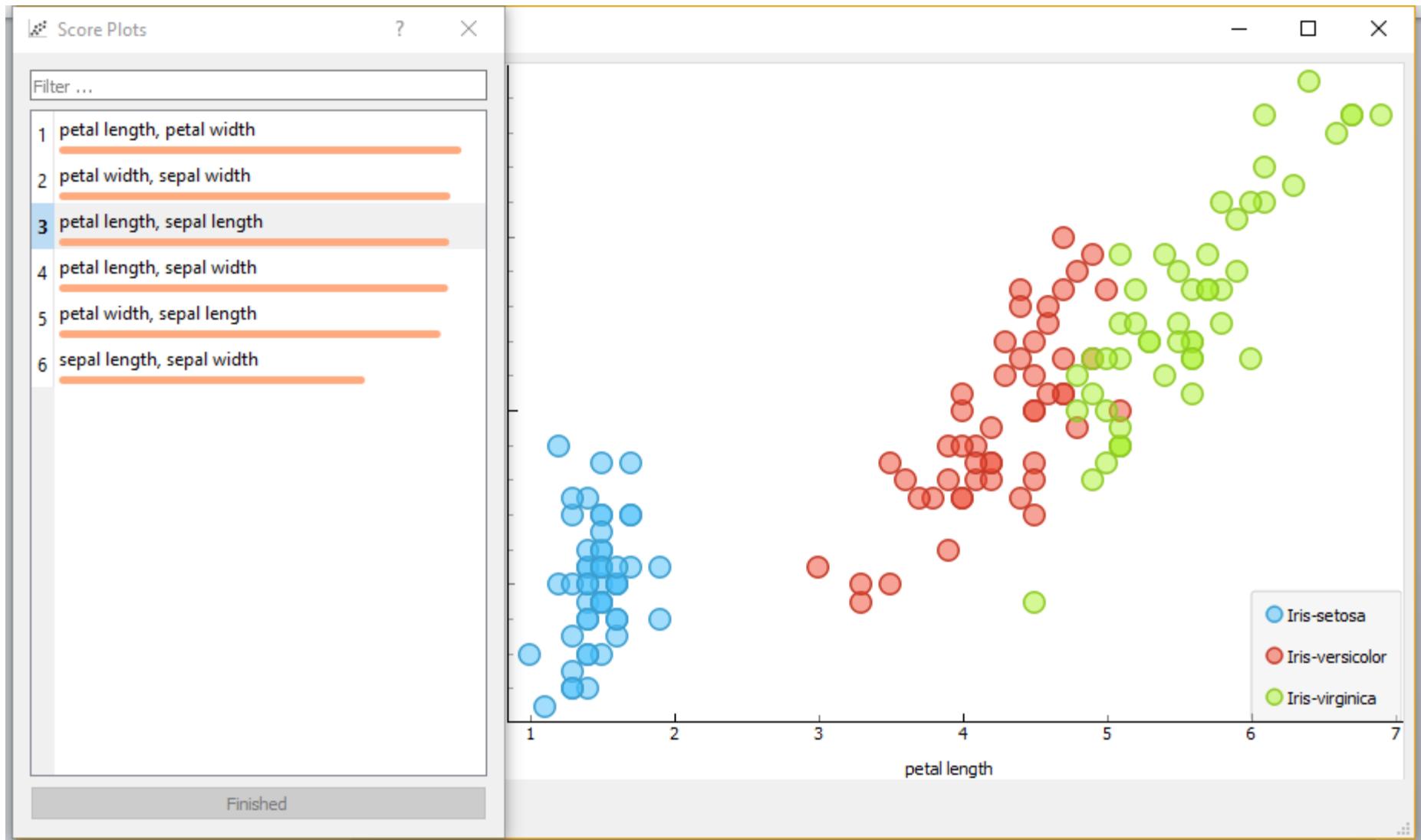
Comprimento da Pétala e da Sépala





Exemplo – Score Plots

Largura da Pétala e da Sépala





Exemplo – Score Plots

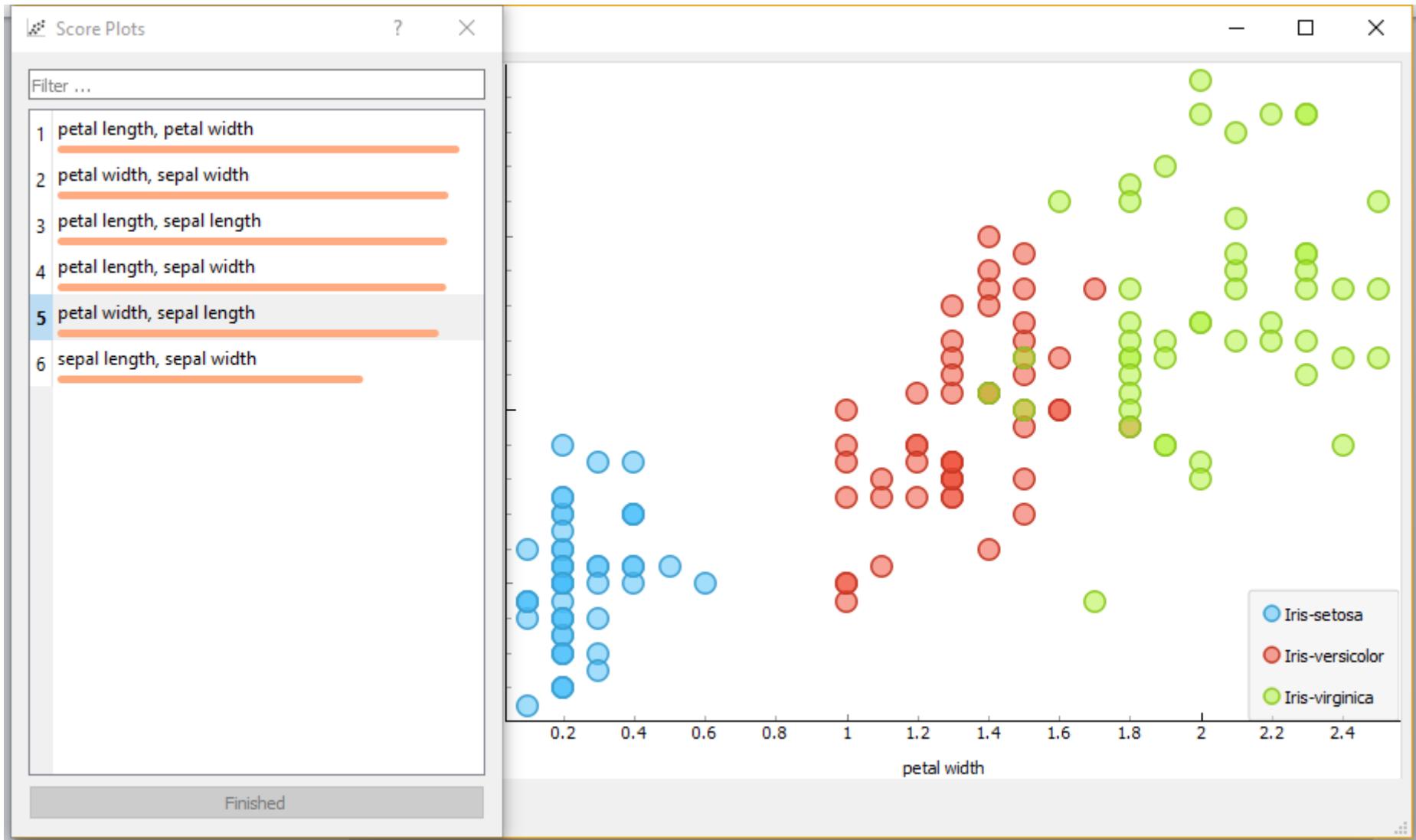
Largura da Pétala e Comprimento da Sépala





Exemplo – Score Plots

Comprimento da Pétala e Largura da Sépala





Exemplo – Score Plots

Largura da Pétala e Comprimento da Sépala





Exemplo – Score Plots

- O melhor escore de gráfico de dispersão é o com comprimento e largura de pétala.
- Separa muito bem instâncias de dados de classes diferentes, mas existe uma sobreposição da Iris versicolor e Iris Virginica.
- Selecionar as instâncias de dados das regiões das sobreposições.



Exemplo – Visualização dos Dados Selecionados



EXEMPLO - aula 10.ows*

File Edit View Widget Options Help

Data

- File
- CSV File Import
- Datasets
- SQL Table
- Data Table
- Paint Data
- Data Info
- Data Sampler
- Select Columns
- Select Rows
- Pivot Table
- Rank

Data Table

View the dataset in a spreadsheet.

[more...](#)

Diagram illustrating the flow of data:

- A **File** node (orange icon) is connected to a **Data Table** node (orange icon).
- The **Data Table** node is connected to a **Scatter Plot** node (red circle).
- The **Scatter Plot** node is connected to a **Data Table (1)** node (orange icon).
- The **Data Table** node is also connected to a **Distributions** node (red circle).

The screenshot shows the Orange data mining software interface. On the left, there's a toolbar with various icons for data manipulation like 'File', 'CSV File Import', 'Datasets', etc. Below that is a section titled 'Data Table' with a description and a 'more...' link. On the right, a data flow diagram is displayed. It starts with a 'File' node (orange square with a document icon), which connects to a 'Data Table' node (orange square with a grid icon). From this 'Data Table' node, two paths emerge: one leading to a 'Scatter Plot' node (red circle with a scatter of points icon), and another leading to a 'Distributions' node (red circle with a bar chart icon). Finally, the 'Scatter Plot' node connects to a second 'Data Table (1)' node (orange square with a grid icon). The nodes are interconnected by arrows labeled 'Data' or 'Selected Data → Data'. The overall background is yellow.



Exemplo – Visualização dos Dados Selecionados

Data Table (1)

Info

28 instances (no missing values)
4 features (no missing values)
Discrete class with 3 values (no missing values)
1 meta attribute (no missing values)

Variables

Show variable labels (if present)
 Visualize numeric values
 Color by instance classes

Selection

Select full rows

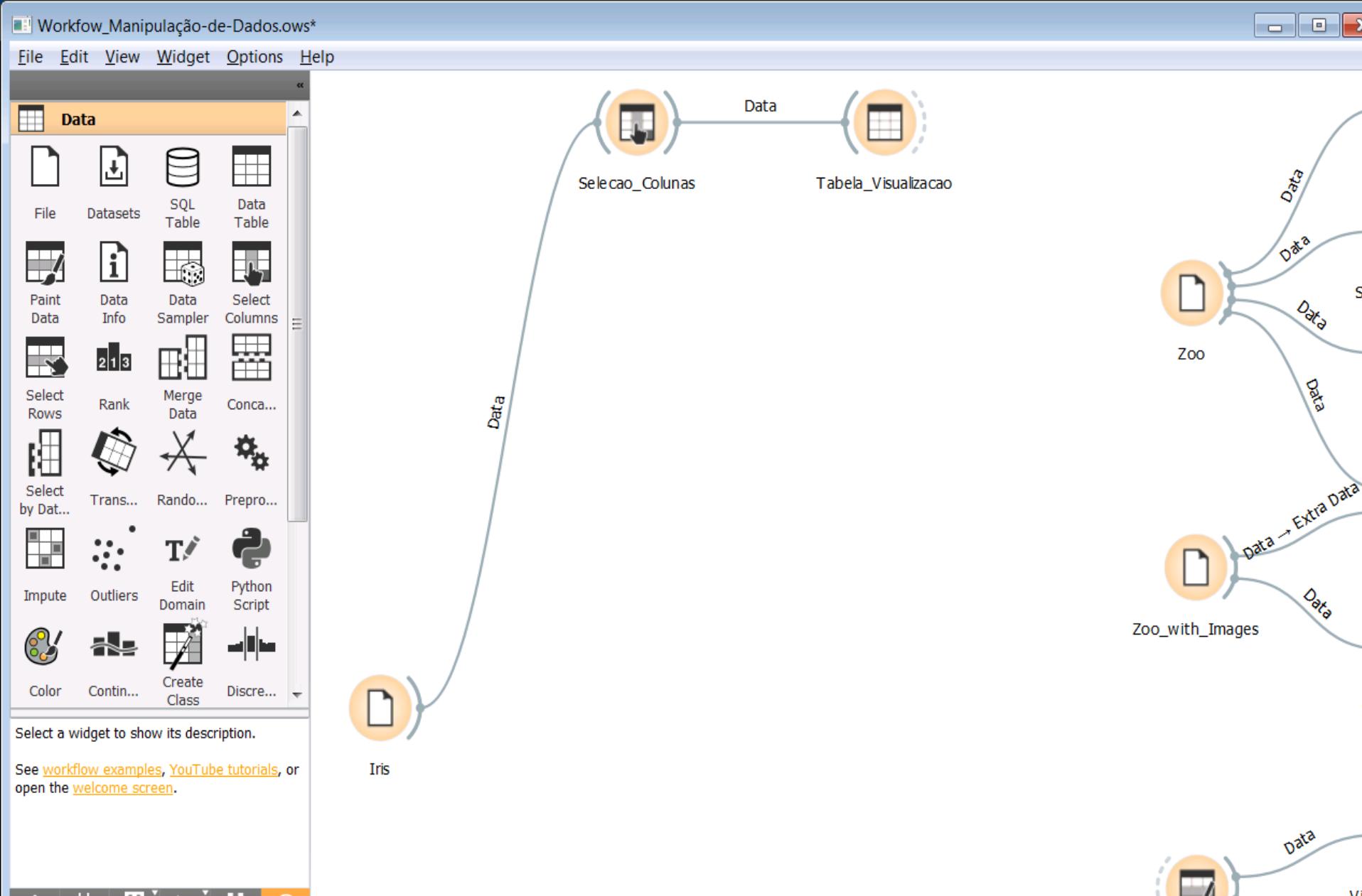
	iris	Group	sepal length	sepal width	petal length	petal width
1	Iris-versicolor	G1	7.0	3.2	4.7	1.4
2	Iris-versicolor	G1	6.4	3.2	4.5	1.5
3	Iris-versicolor	G1	6.9	3.1	4.9	1.5
4	Iris-versicolor	G1	6.5	2.8	4.6	1.5
5	Iris-versicolor	G1	6.3	3.3	4.7	1.6
6	Iris-versicolor	G1	6.1	2.9	4.7	1.4
7	Iris-versicolor	G1	6.7	3.1	4.4	1.4
8	Iris-versicolor	G1	5.6	3.0	4.5	1.5
9	Iris-versicolor	G1	6.2	2.2	4.5	1.5
10	Iris-versicolor	G1	5.9	3.2	4.8	1.8
11	Iris-versicolor	G1	6.3	2.5	4.9	1.5
12	Iris-versicolor	G1	6.6	3.0	4.4	1.4
13	Iris-versicolor	G1	6.8	2.8	4.8	1.4
14	Iris-versicolor	G1	6.7	3.0	5.0	1.7
15	Iris-versicolor	G1	6.0	2.9	4.5	1.5
16	Iris-versicolor	G1	6.0	2.7	5.1	1.6
17	Iris-versicolor	G1	5.4	3.0	4.5	1.5
18	Iris-versicolor	G1	6.0	3.4	4.5	1.6
19	Iris-versicolor	G1	6.7	3.1	4.7	1.5
20	Iris-versicolor	G1	6.1	3.0	4.6	1.4
21	Iris-virginica	G1	4.9	2.5	4.5	1.7
22	Iris-virginica	G1	6.0	2.2	5.0	1.5
23	Iris-virginica	G1	6.3	2.7	4.9	1.8
24	Iris-virginica	G1	6.2	2.8	4.8	1.8
25	Iris-virginica	G1	6.1	3.0	4.9	1.8
26	Iris-virginica	G1	6.3	2.8	5.1	1.5
27	Iris-virginica	G1	6.0	3.0	4.8	1.8
28	Iris-virginica	G1	5.9	3.0	5.1	1.8

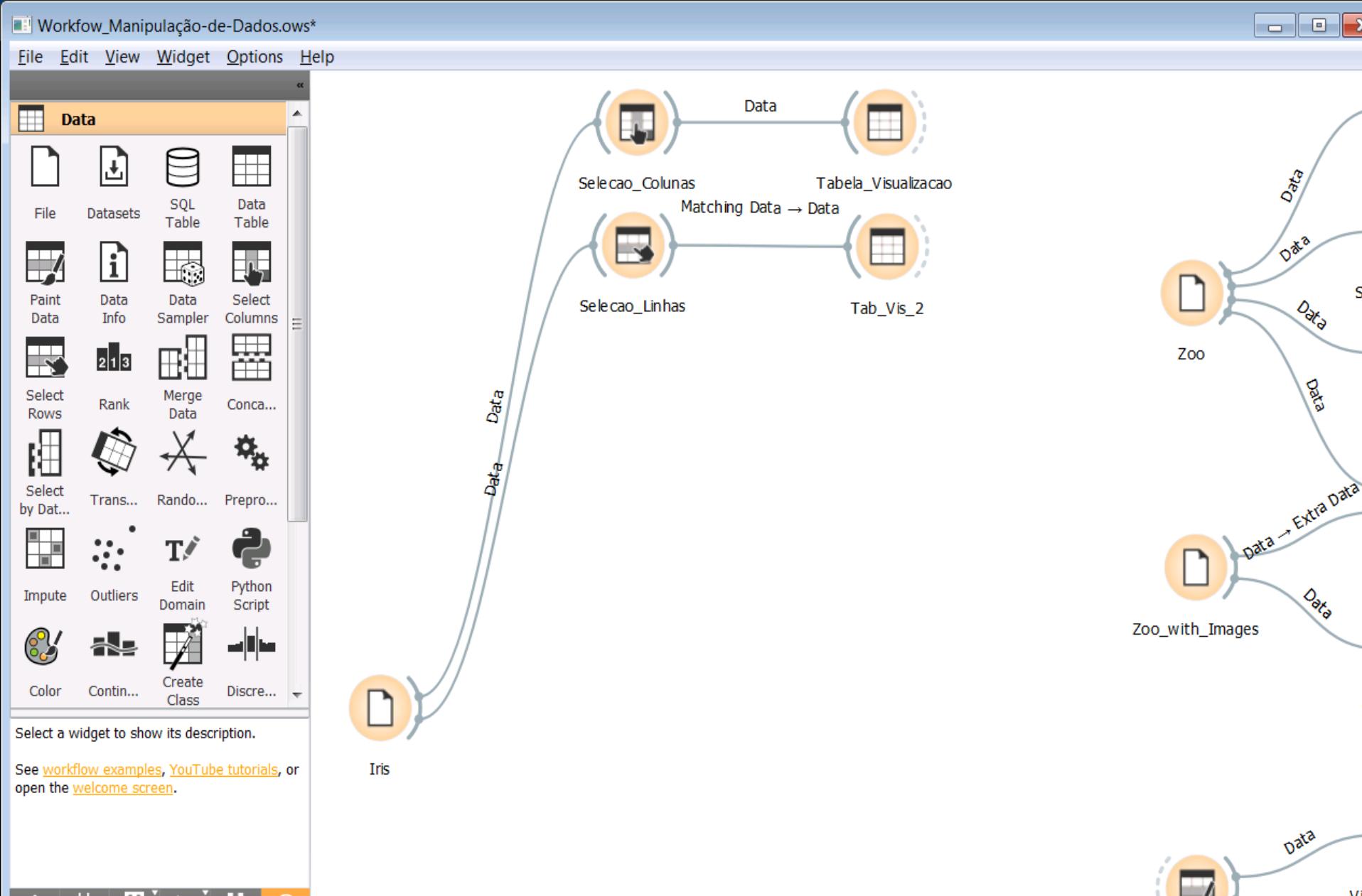
Restore Original Order

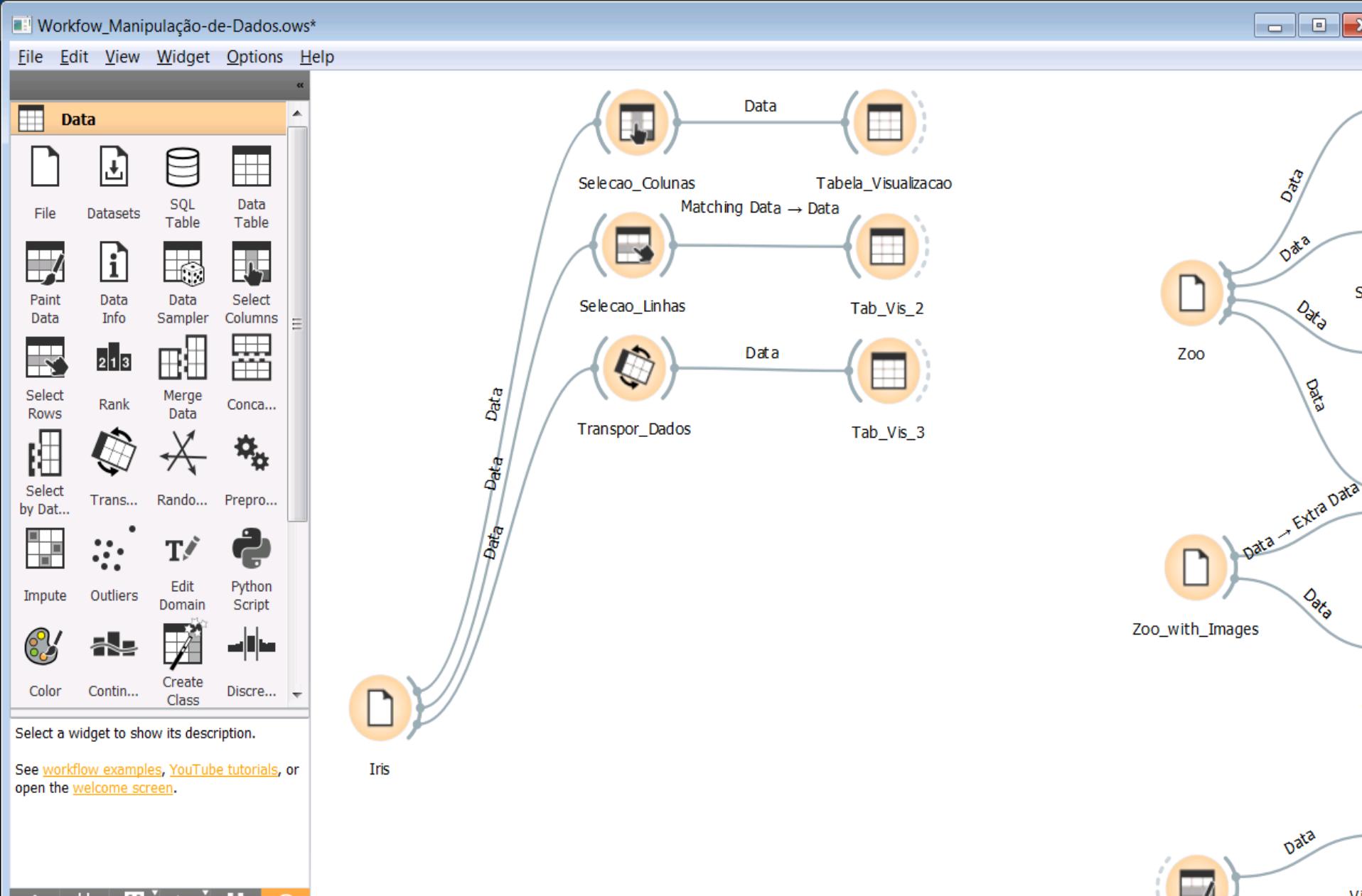
Send Automatically

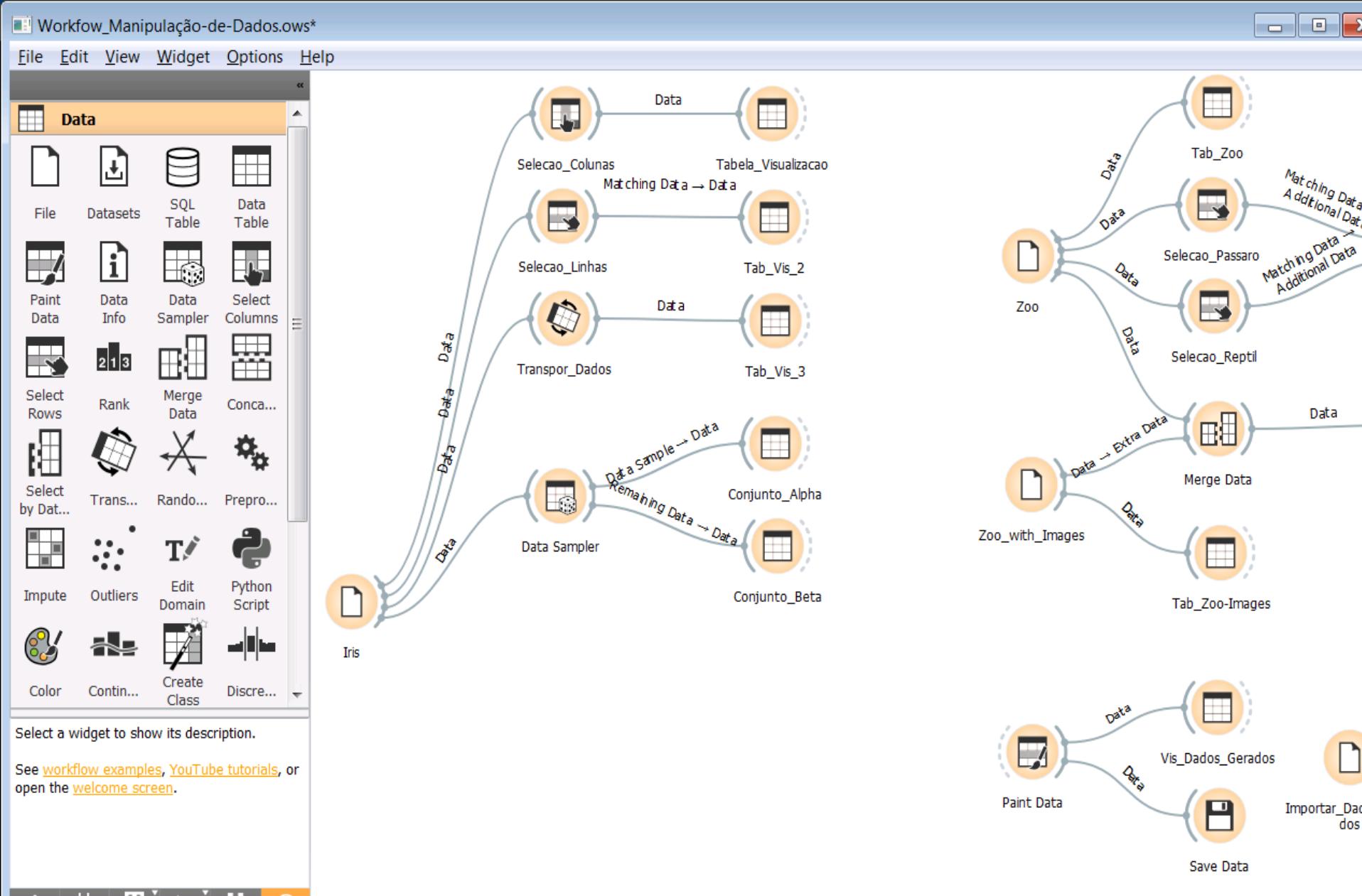


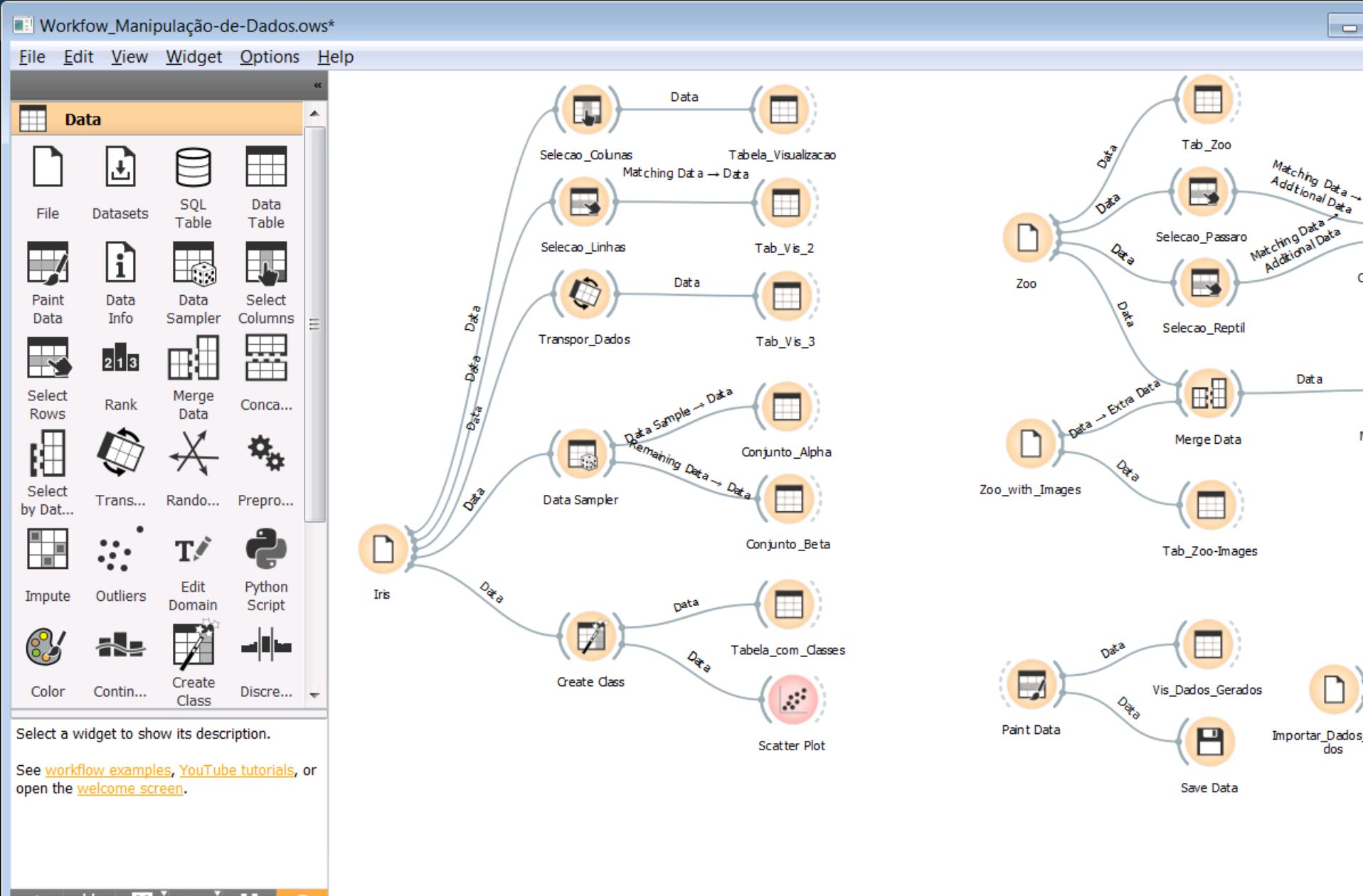
EXEMPLO MANIPULAÇÃO DE DADOS

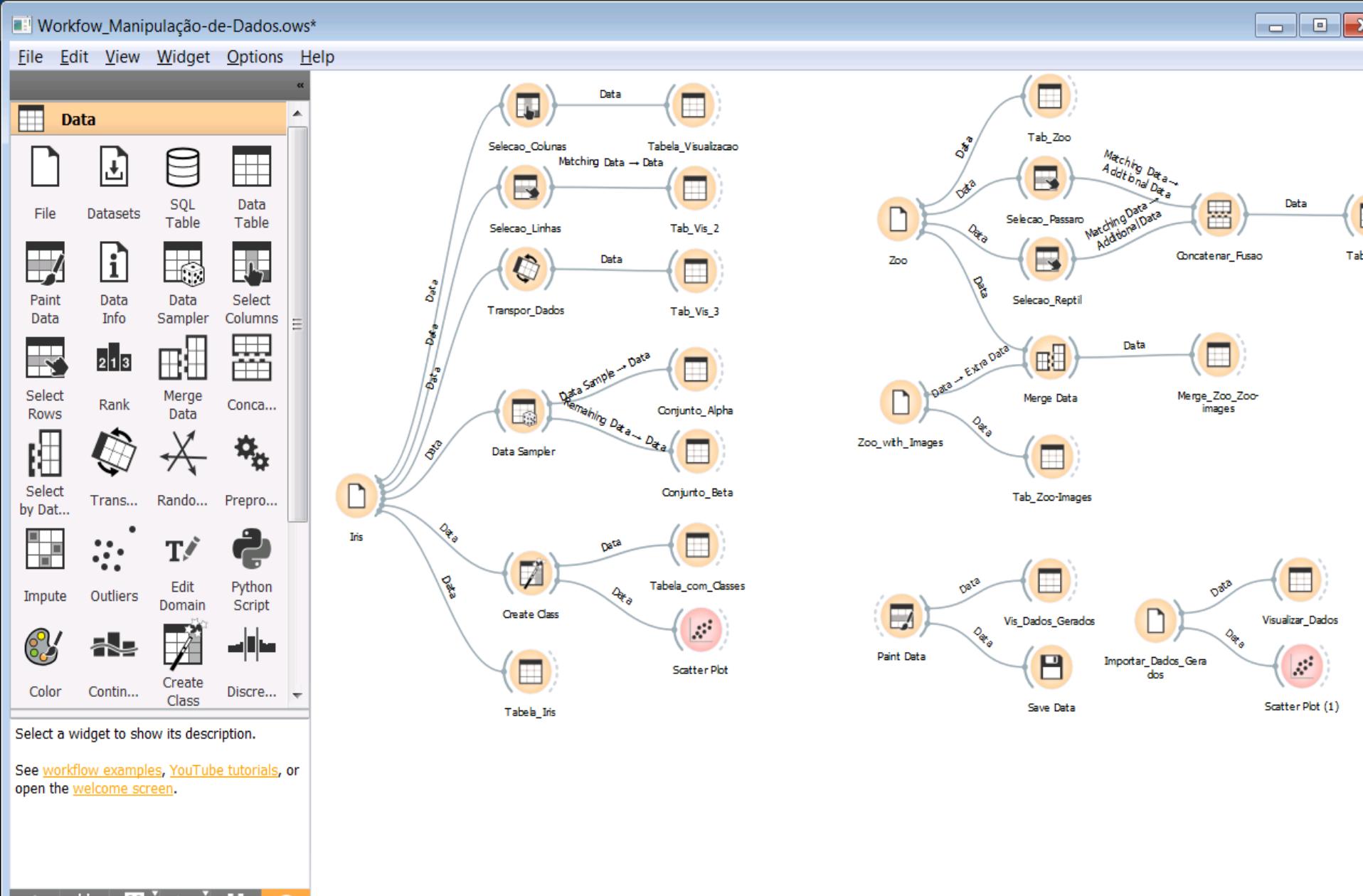


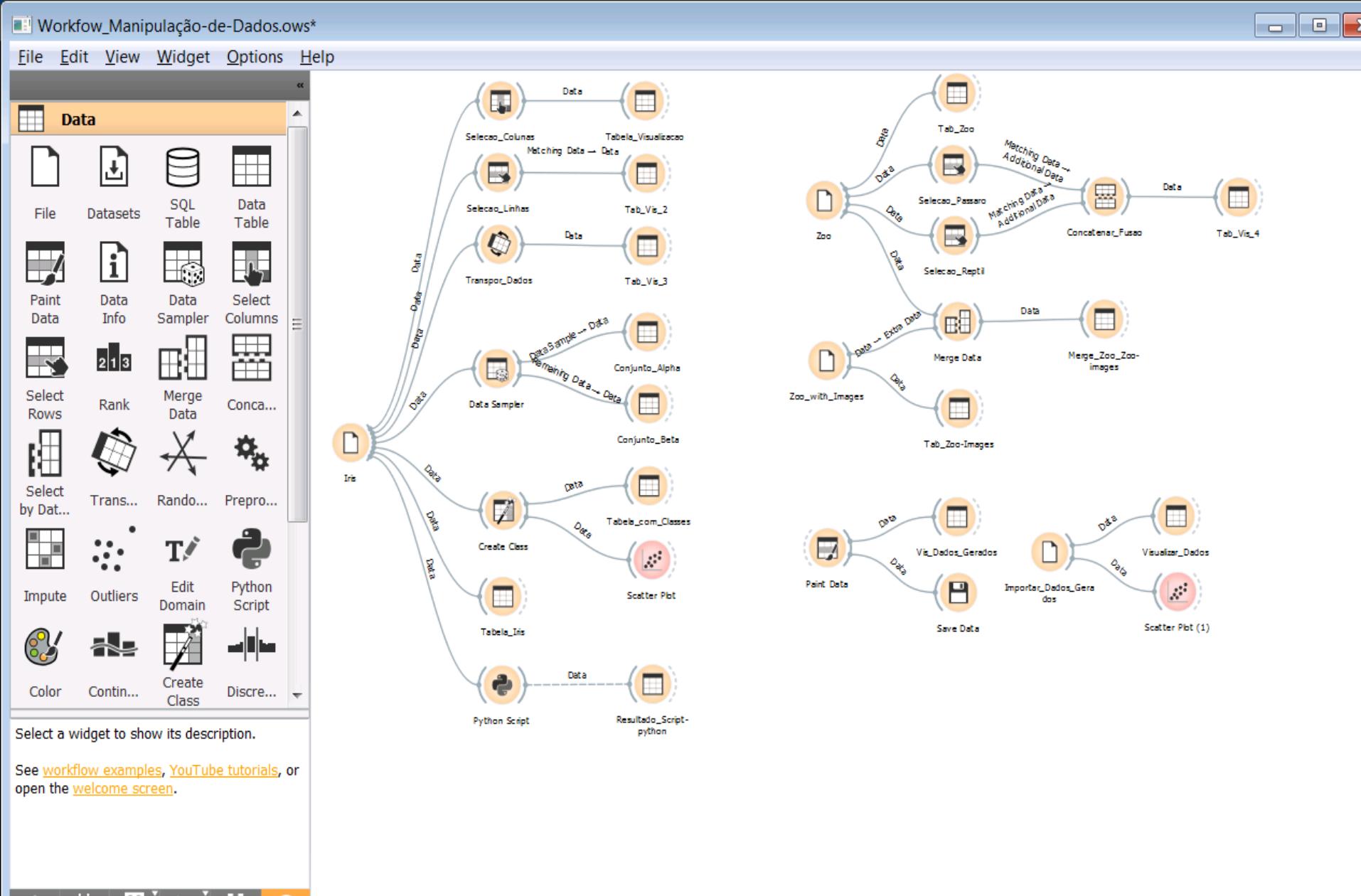


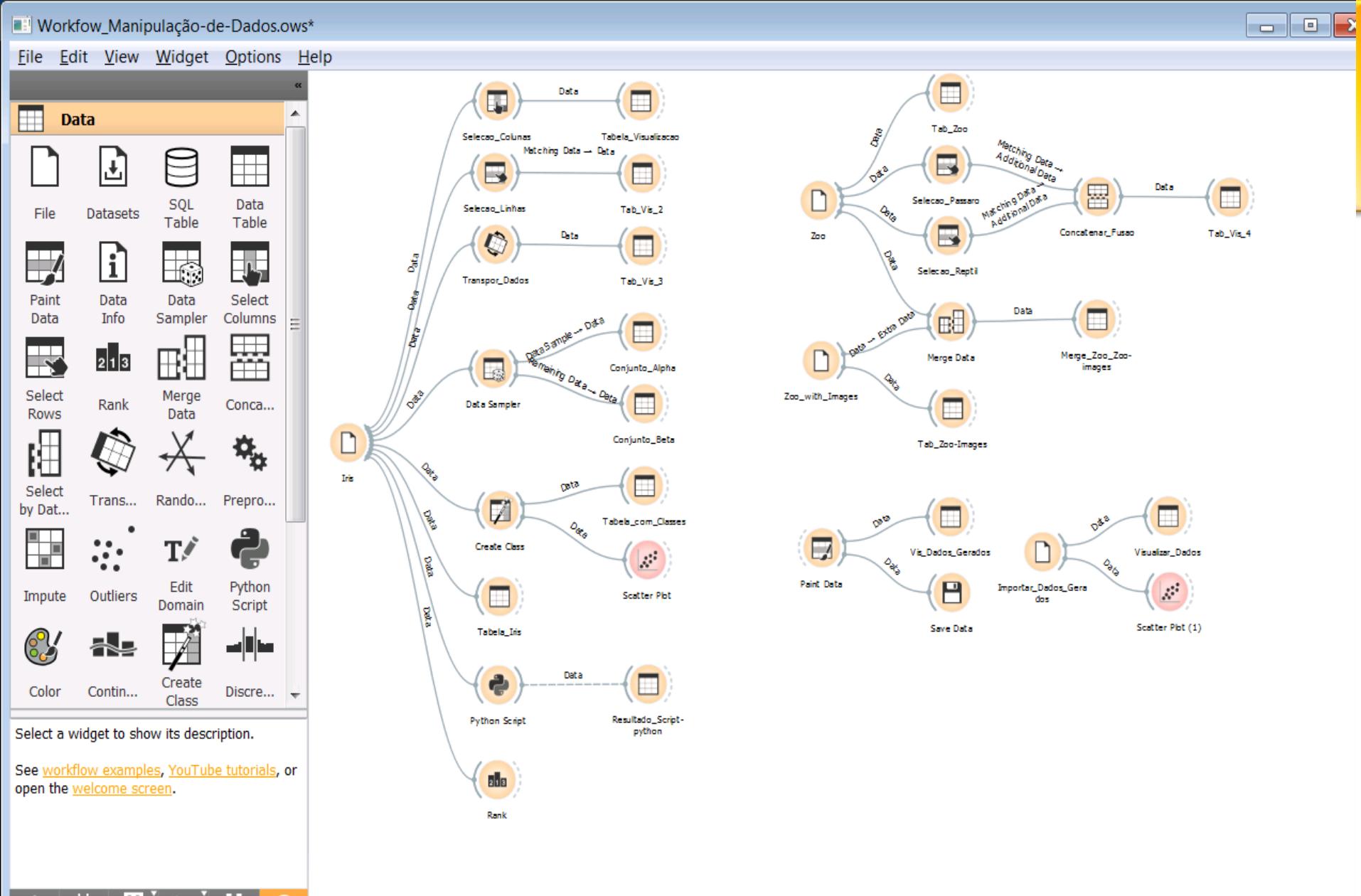


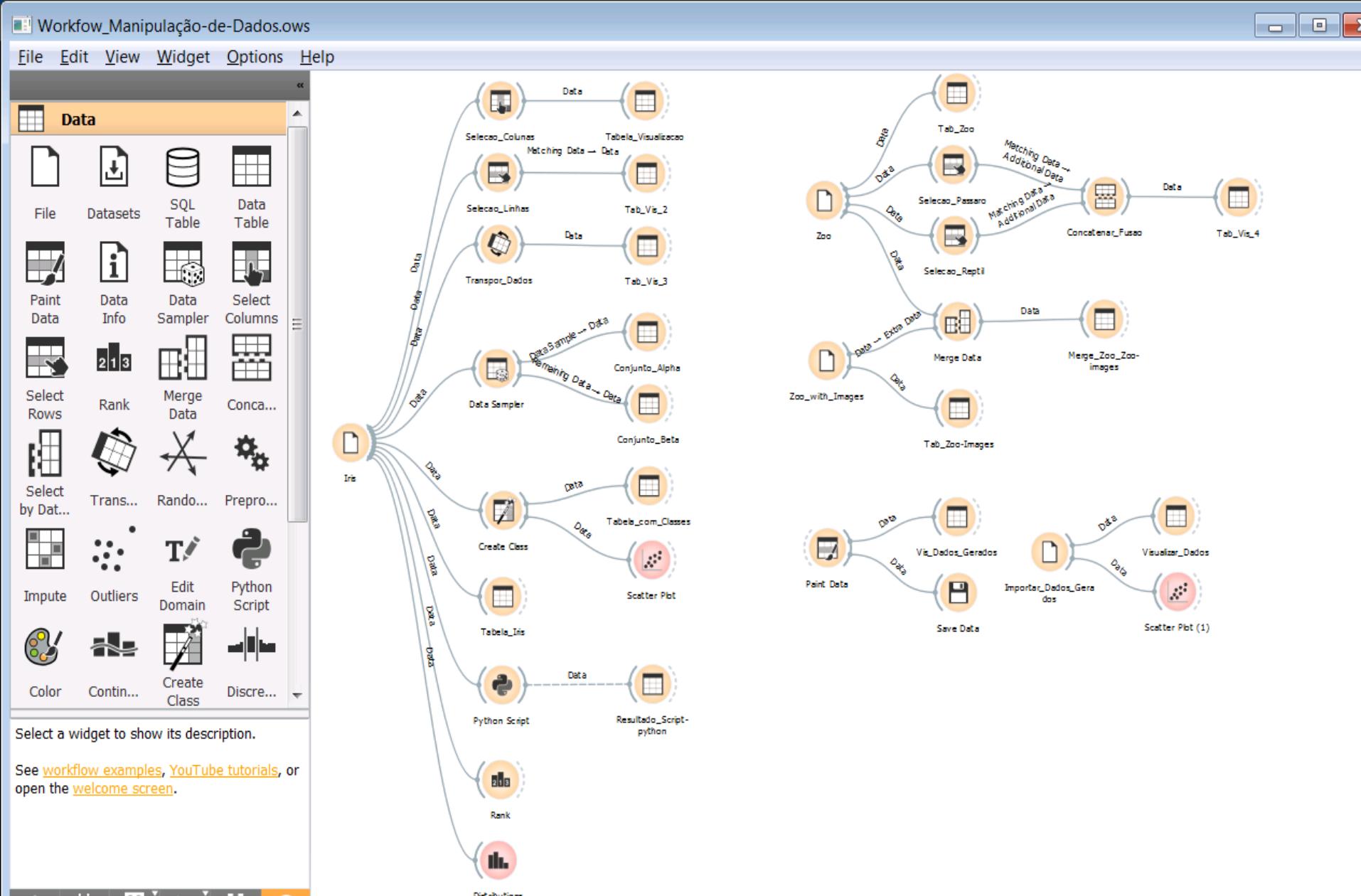


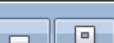
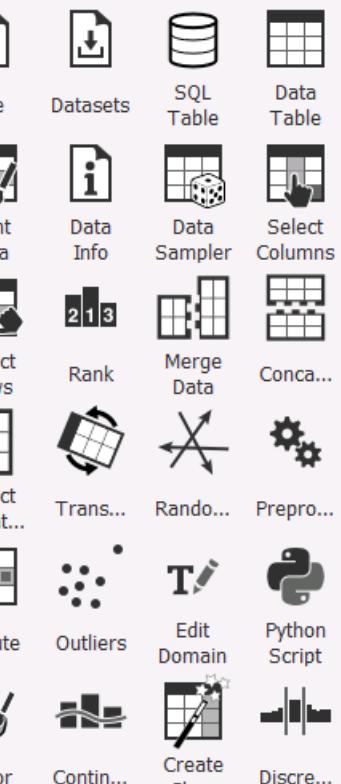






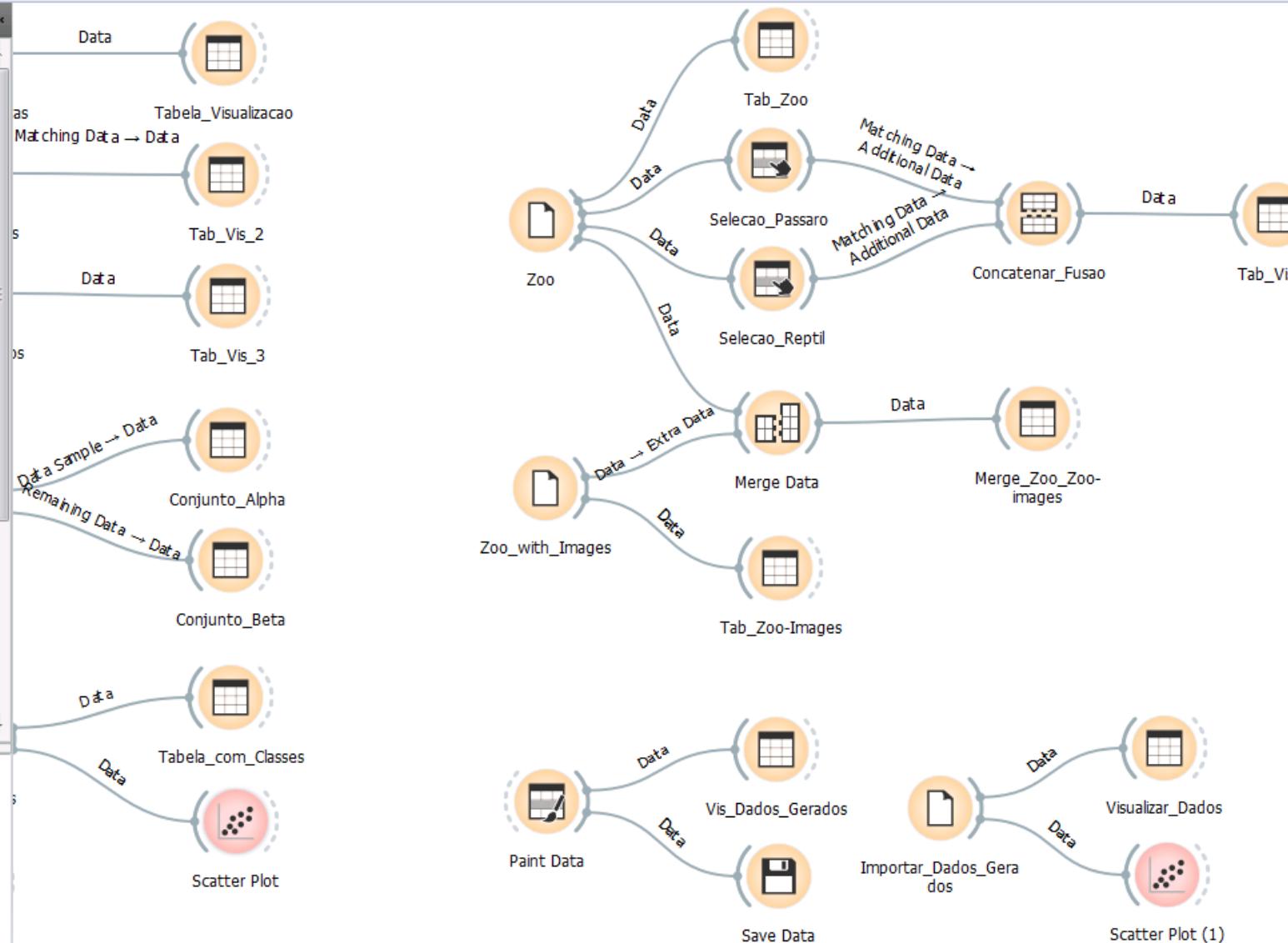




**Data**

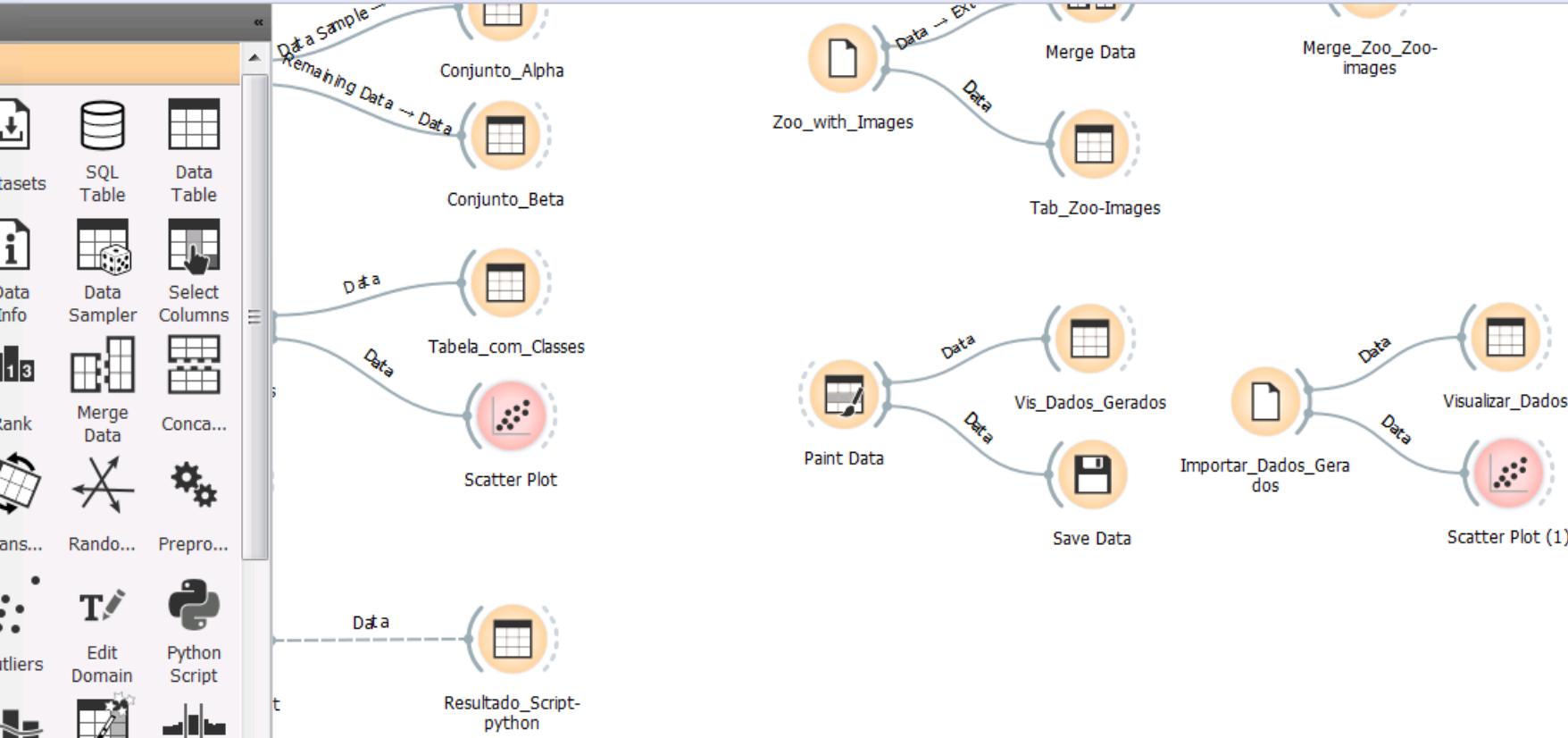
a widget to show its description.

[orkflow examples](#), [YouTube tutorials](#), or
the [welcome screen](#).



_Manipulação-de-Dados.ows

View Widget Options Help



to show its description.

examples, YouTube tutorials, or
the screen.



EXEMPLO - REDES NEURAIS



Orange Canvas

File Edit View Widget Options Help

Data Visualize Model

Constant CN2 Rule I... kNN Tree

Random Forest SVM Linear Regre... Logistic Regre...

Naive Bayes AdaBo... Neural Network Stoch... Gradie...

Save Model Load Model

Evaluate Unsupervised

Select a widget to show its description.

See [workflow examples](#), [YouTube tutorials](#), or open the [welcome screen](#).

Modelos

Rede Neural

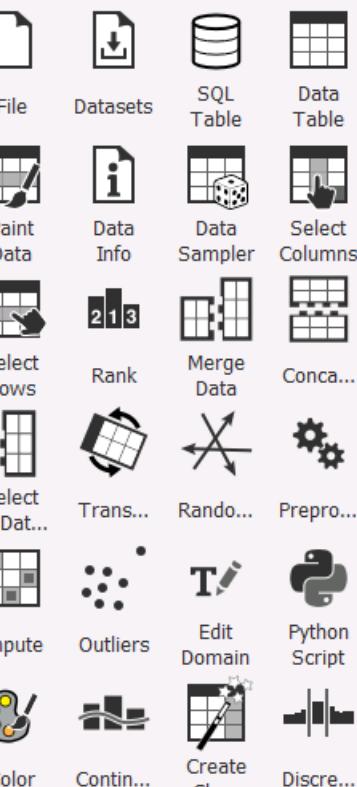


orange_workflow_aprendiz_superv.ows*



File Edit View Widget Options Help

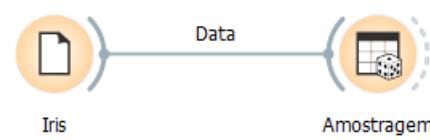
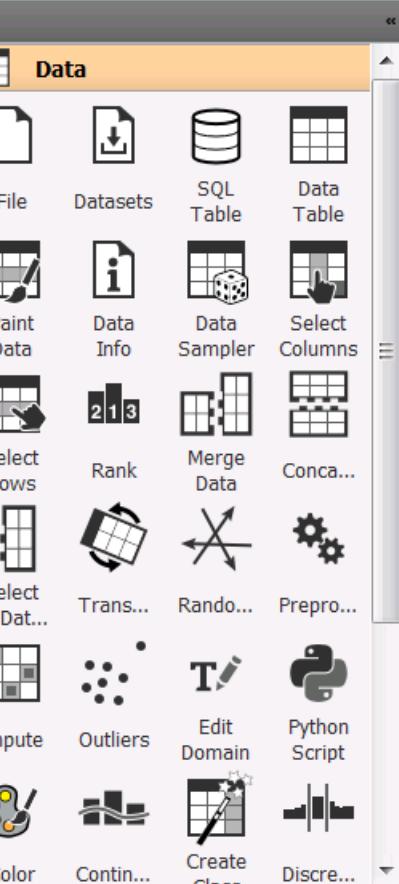
Data



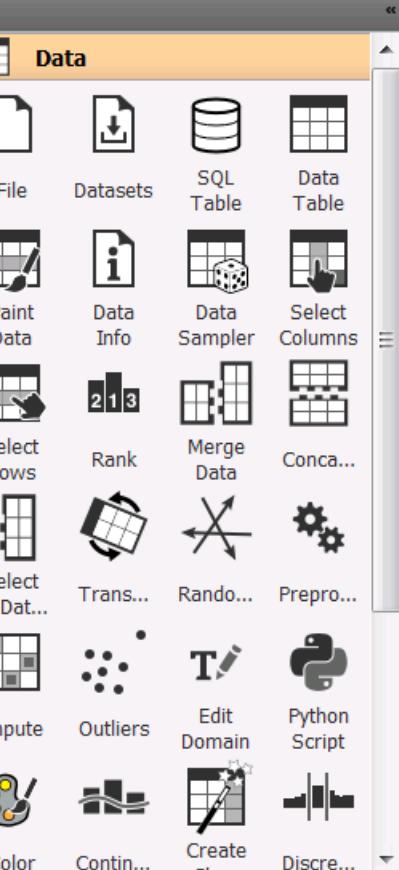
Select a widget to show its description.

See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).



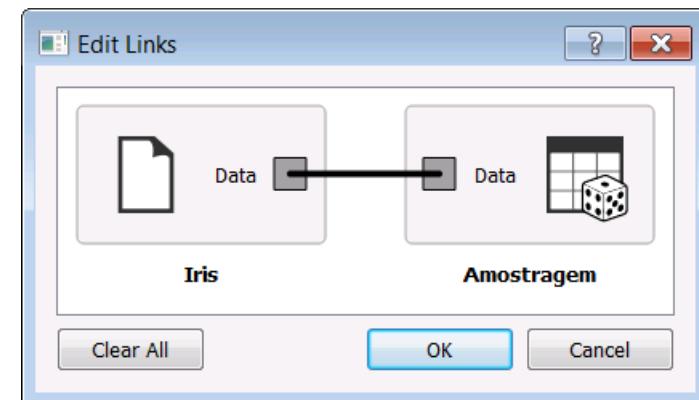
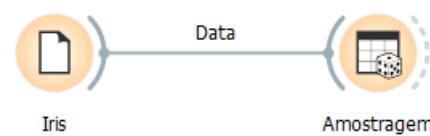


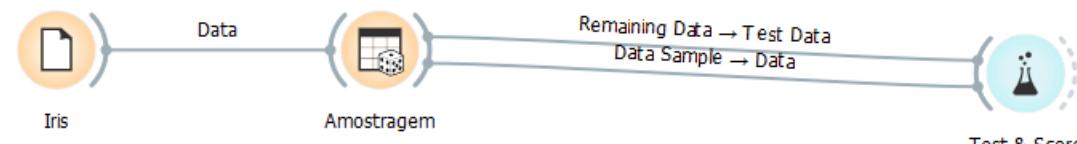
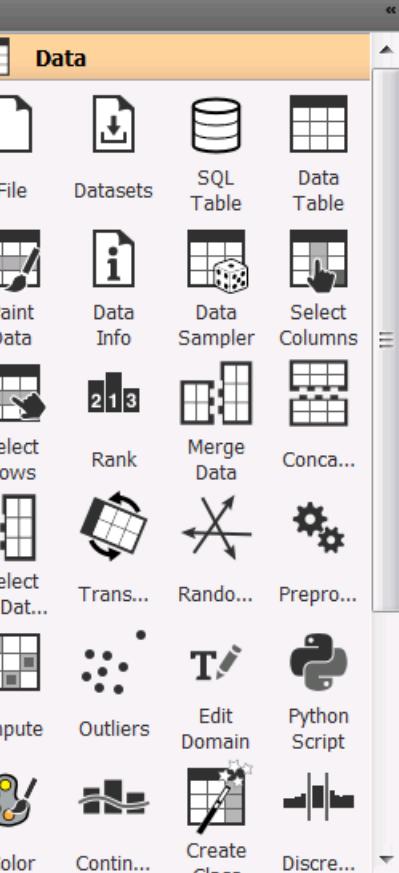
File Edit View Widget Options Help



Select a widget to show its description.

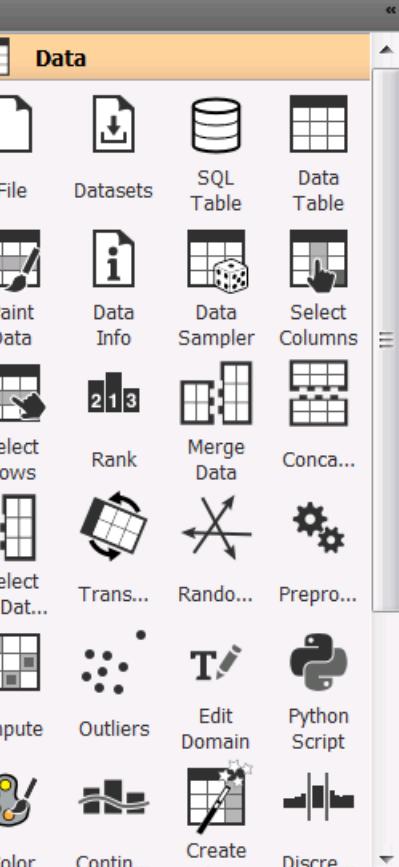
See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).





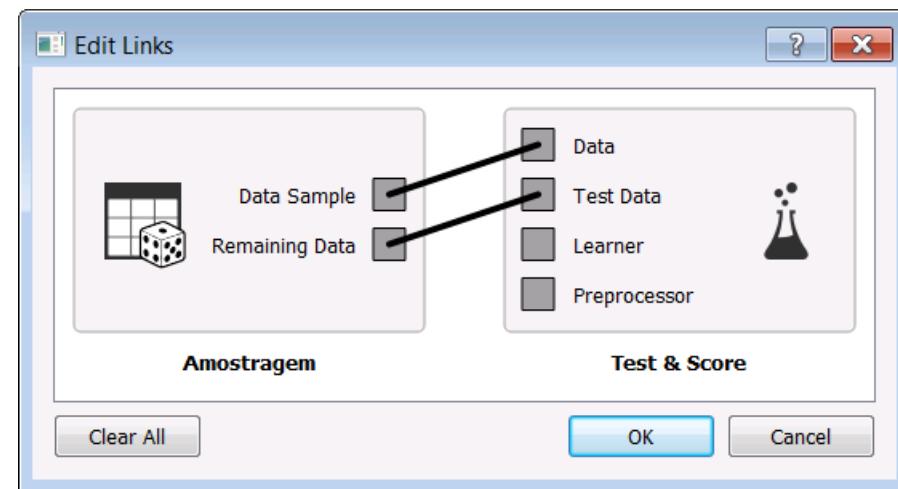
Select a widget to show its description.

See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).

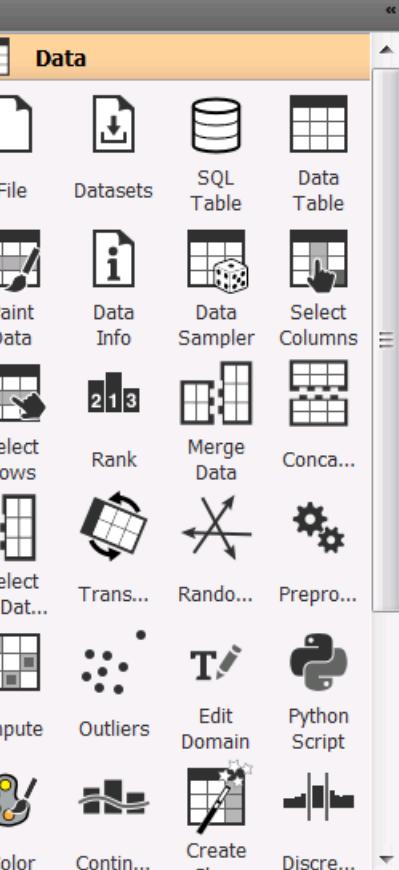


Select a widget to show its description.

[Workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).

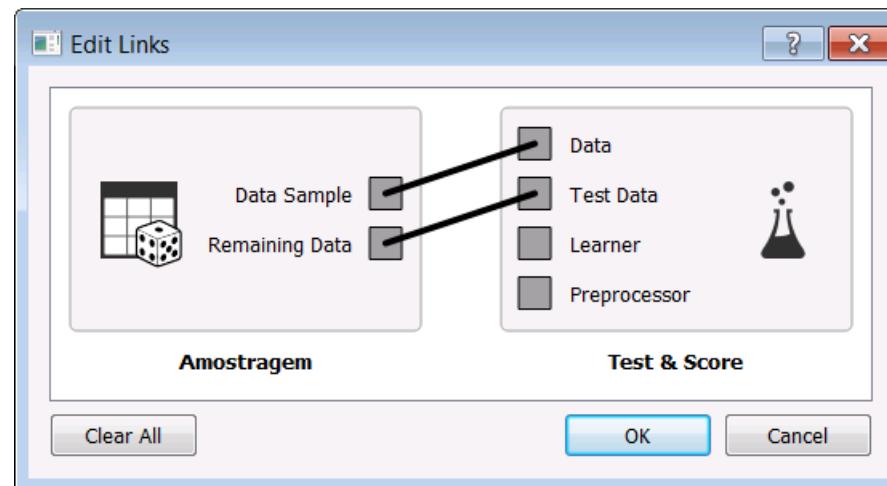


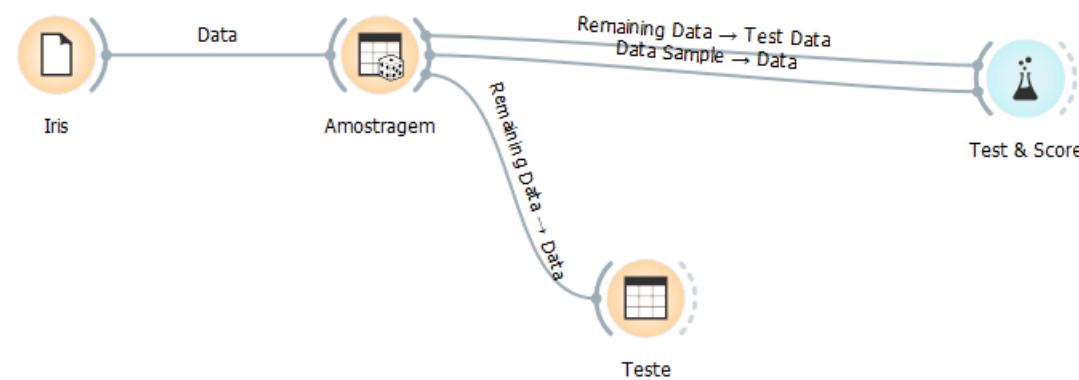
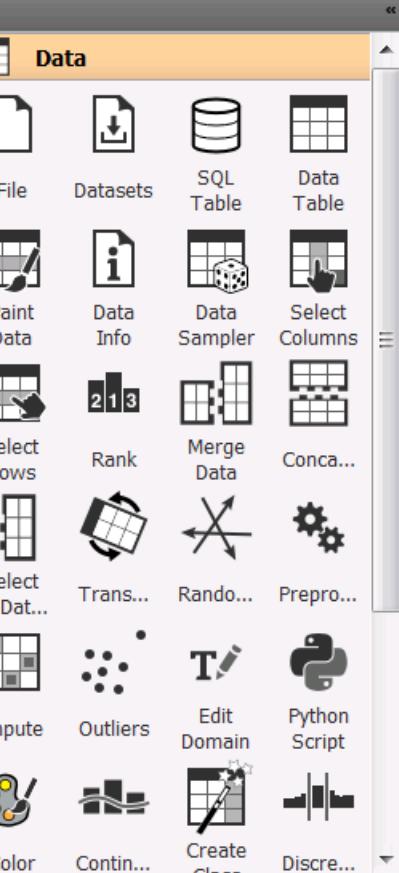
File Edit View Widget Options Help



Select a widget to show its description.

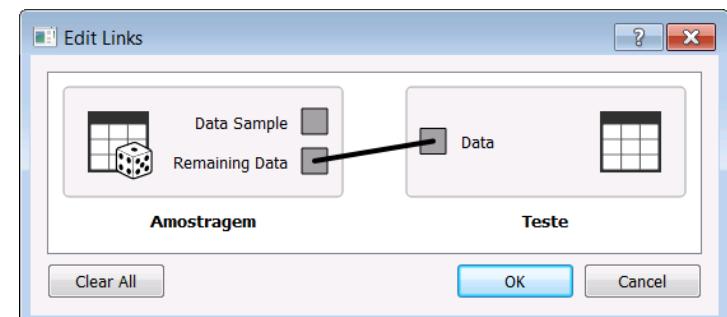
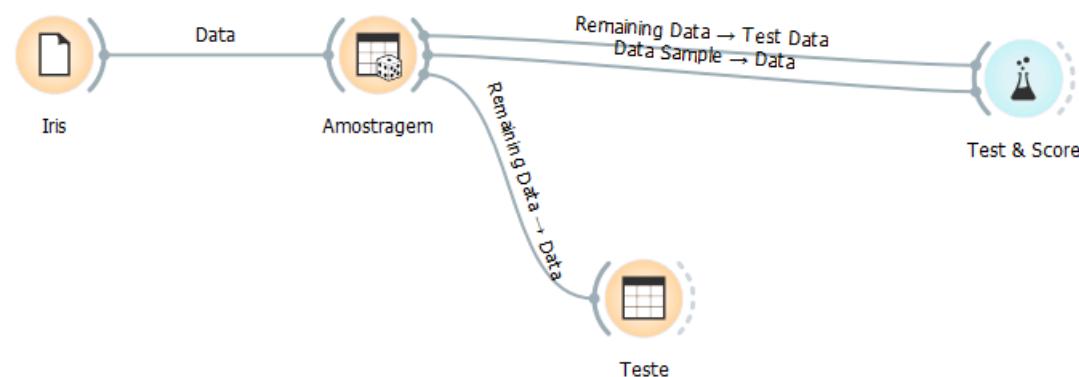
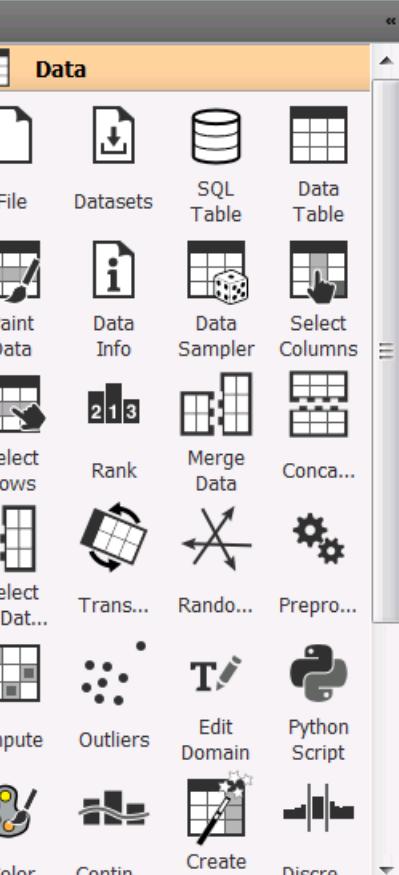
[Workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).

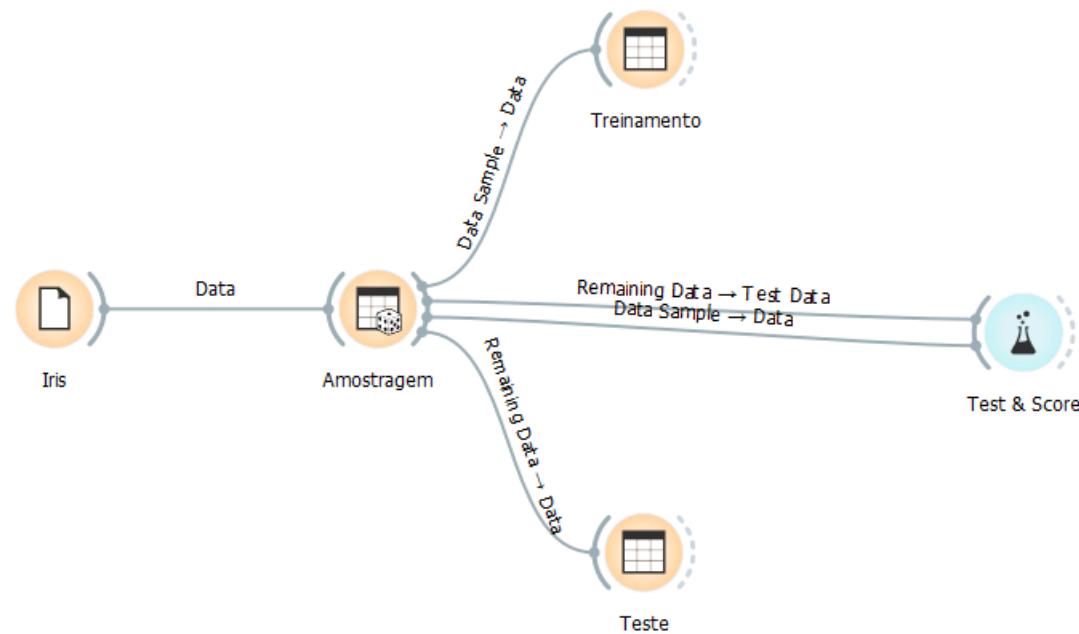
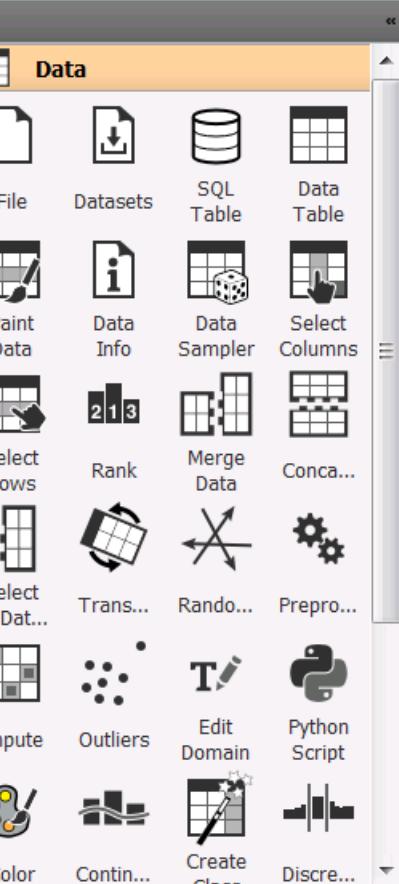




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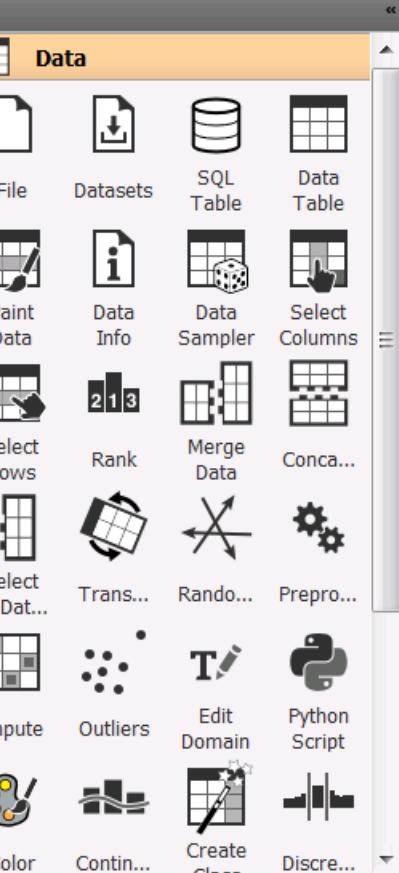
See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).





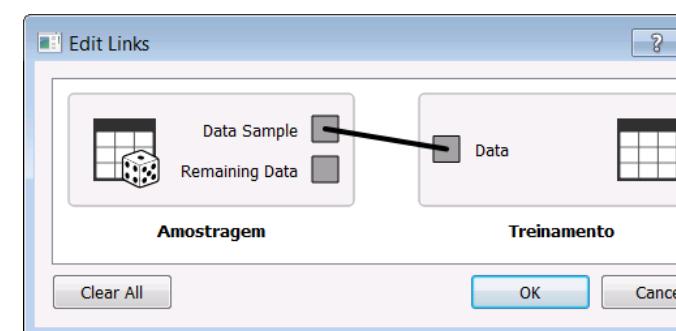
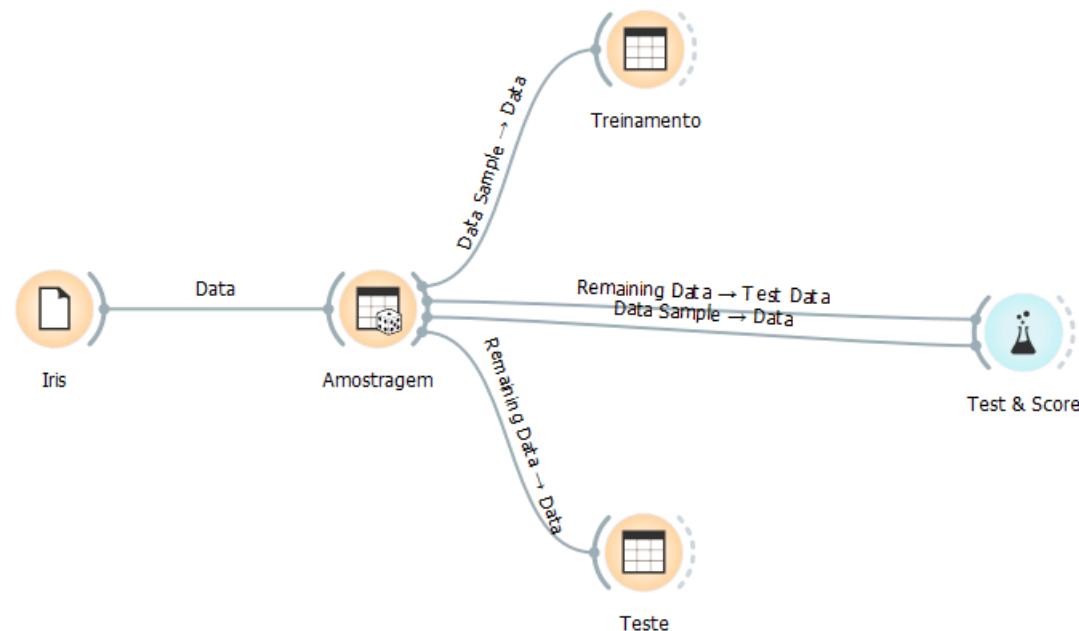
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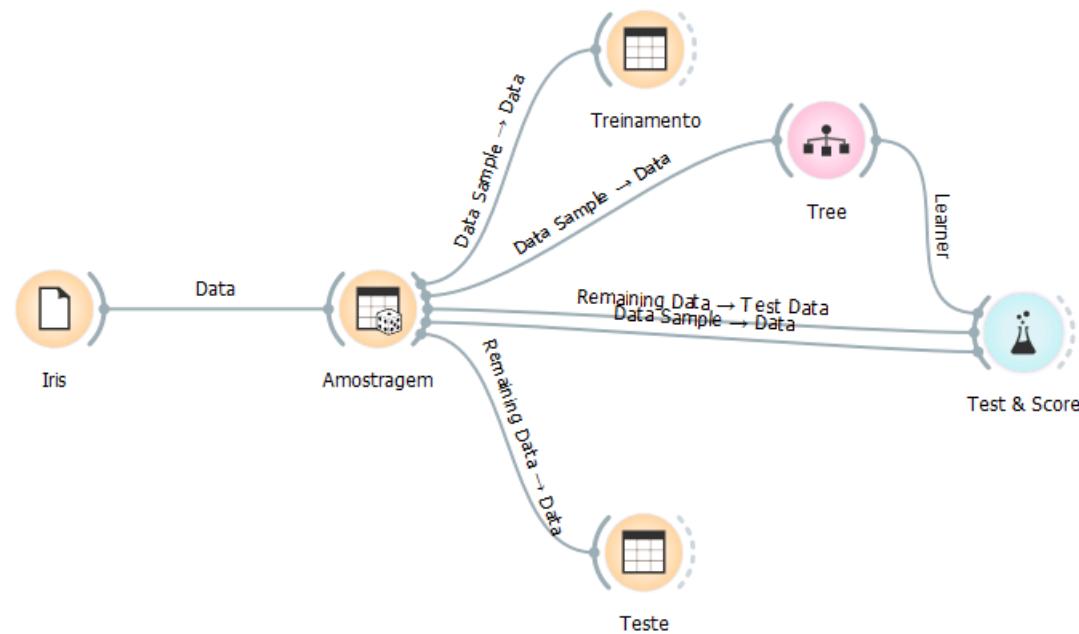
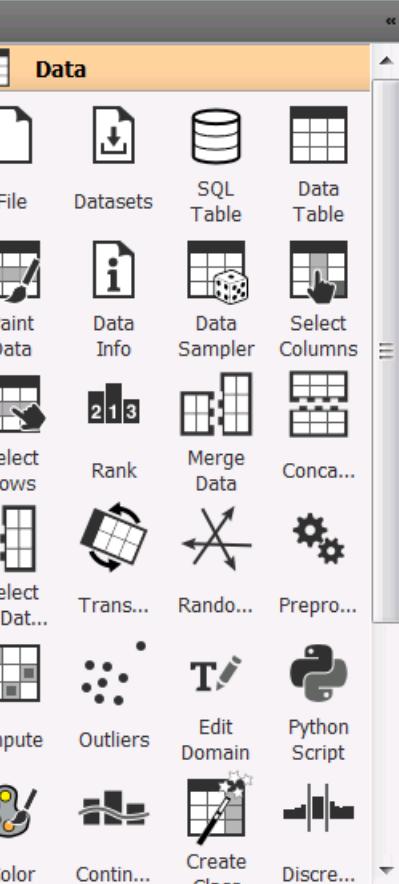
See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).



Select a widget to show its description.

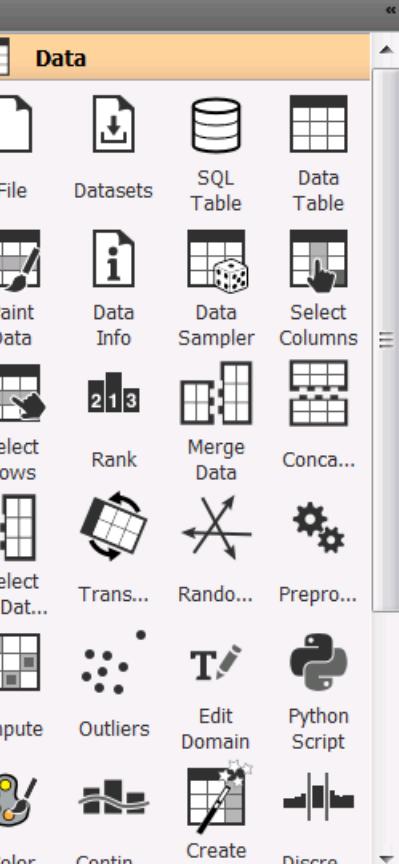
See [workflow examples](#), [YouTube tutorials](#), or
on the [welcome screen](#).





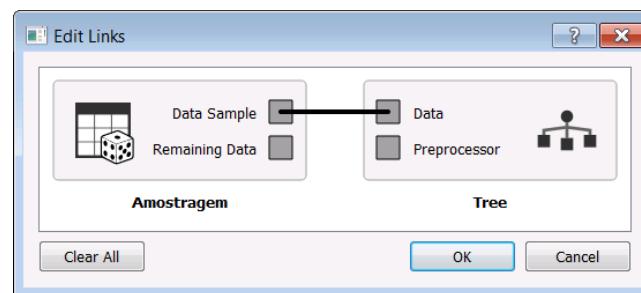
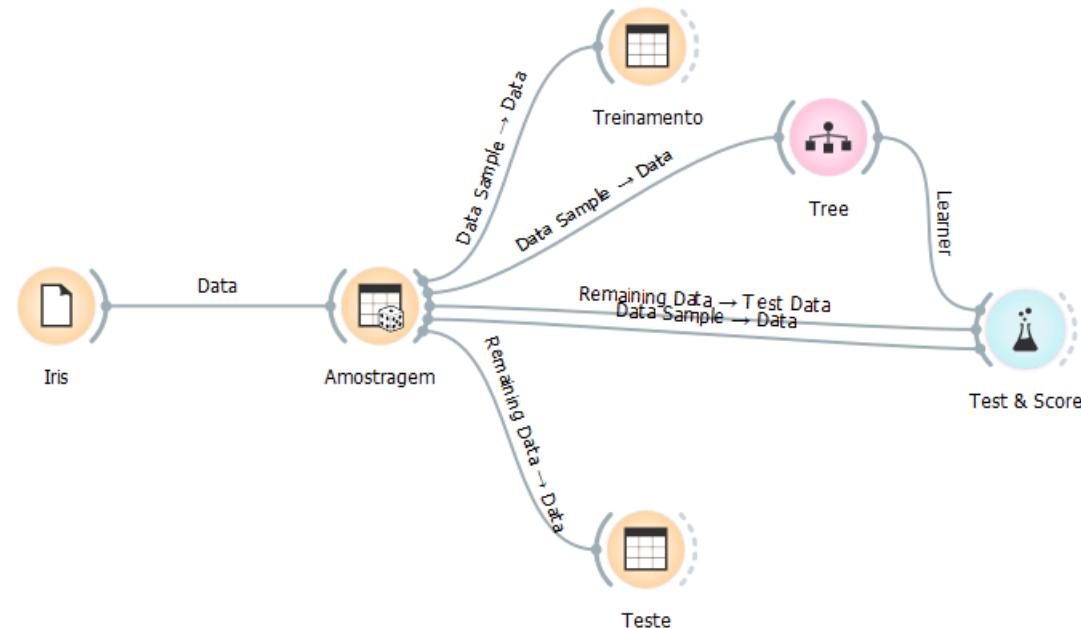
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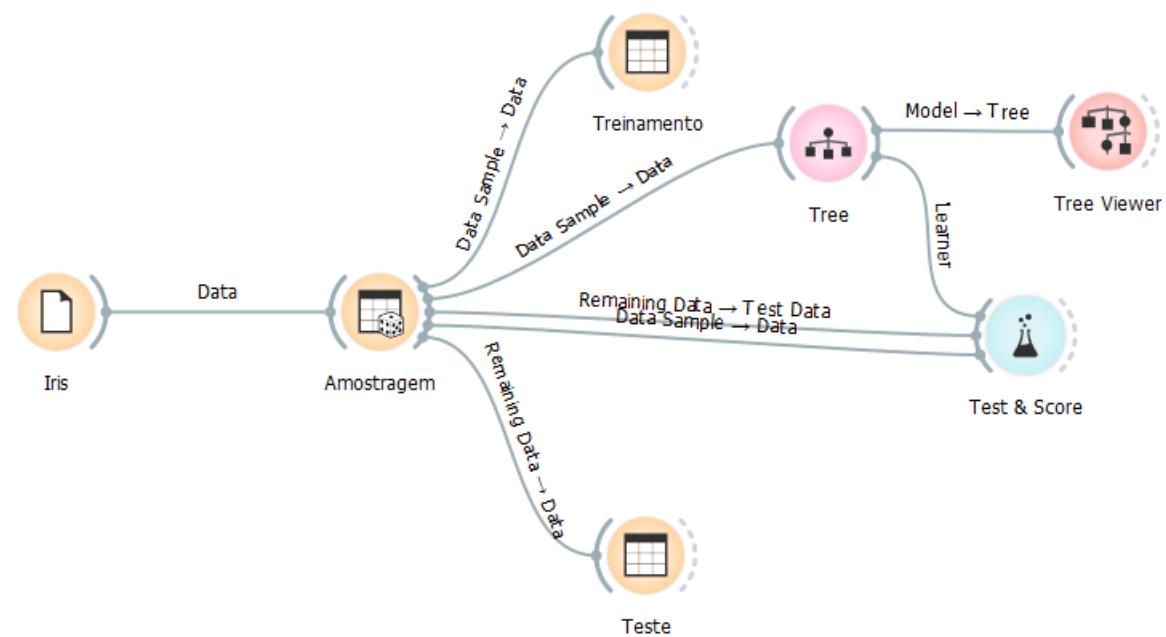
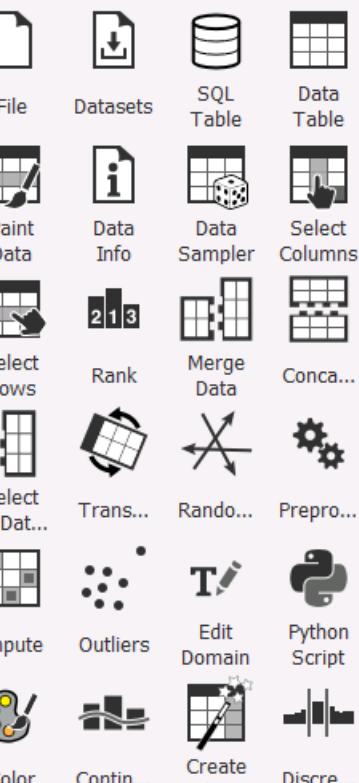
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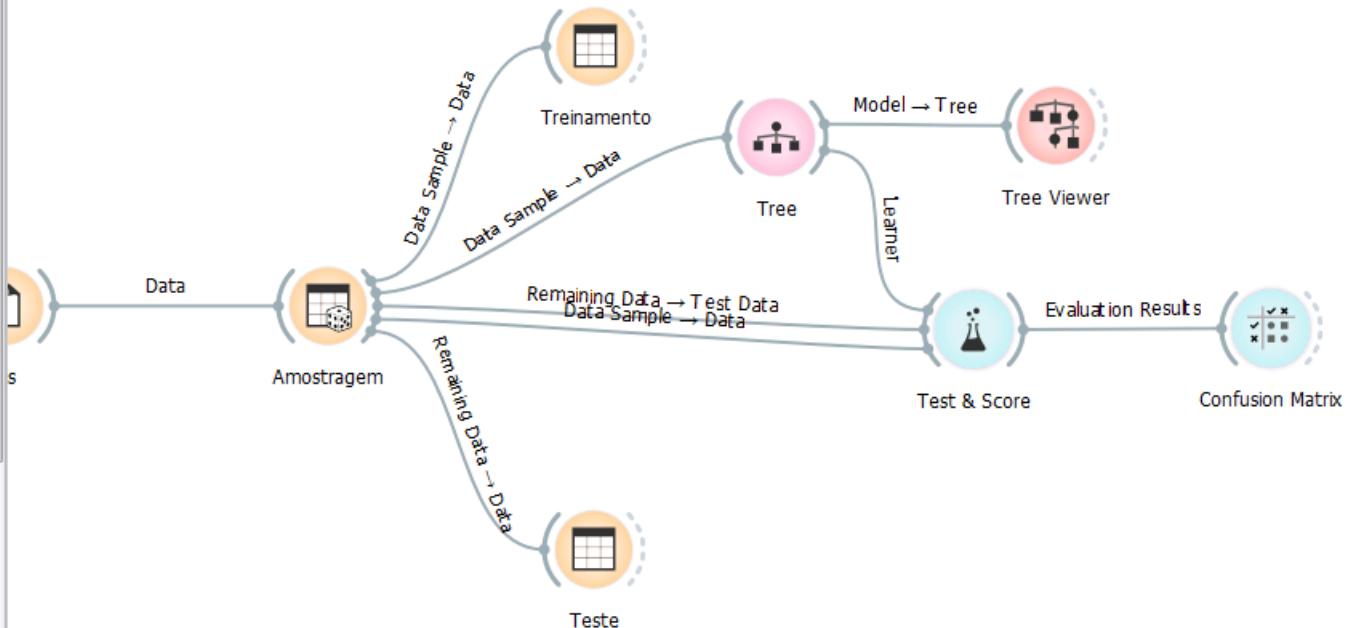
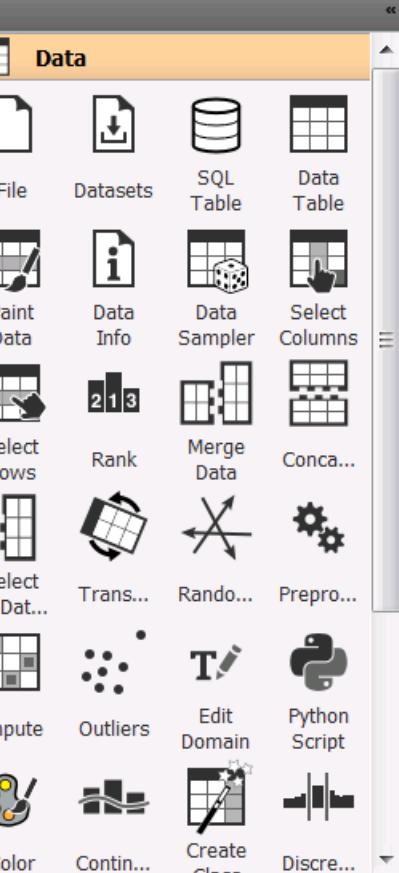
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Data

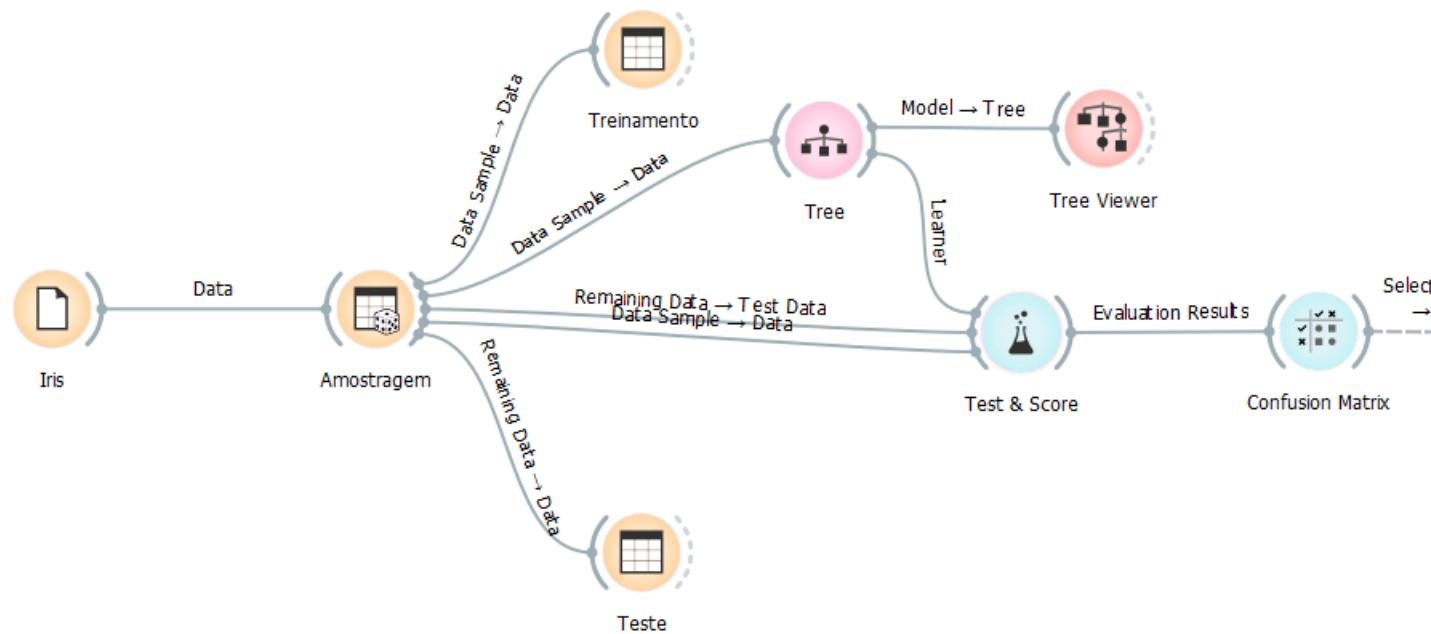
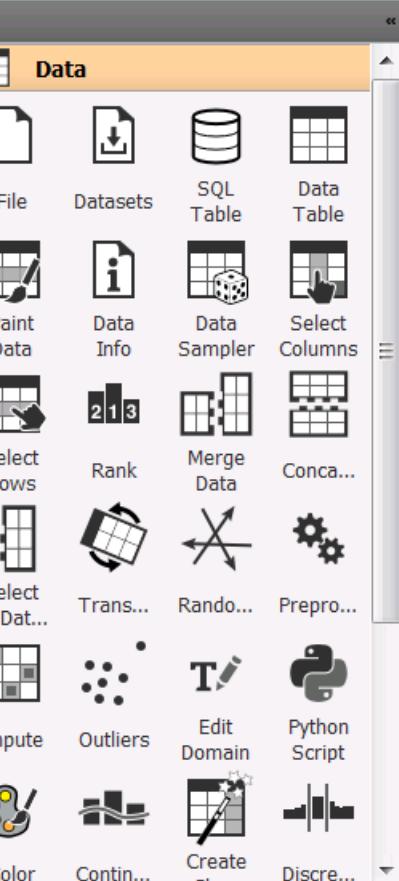
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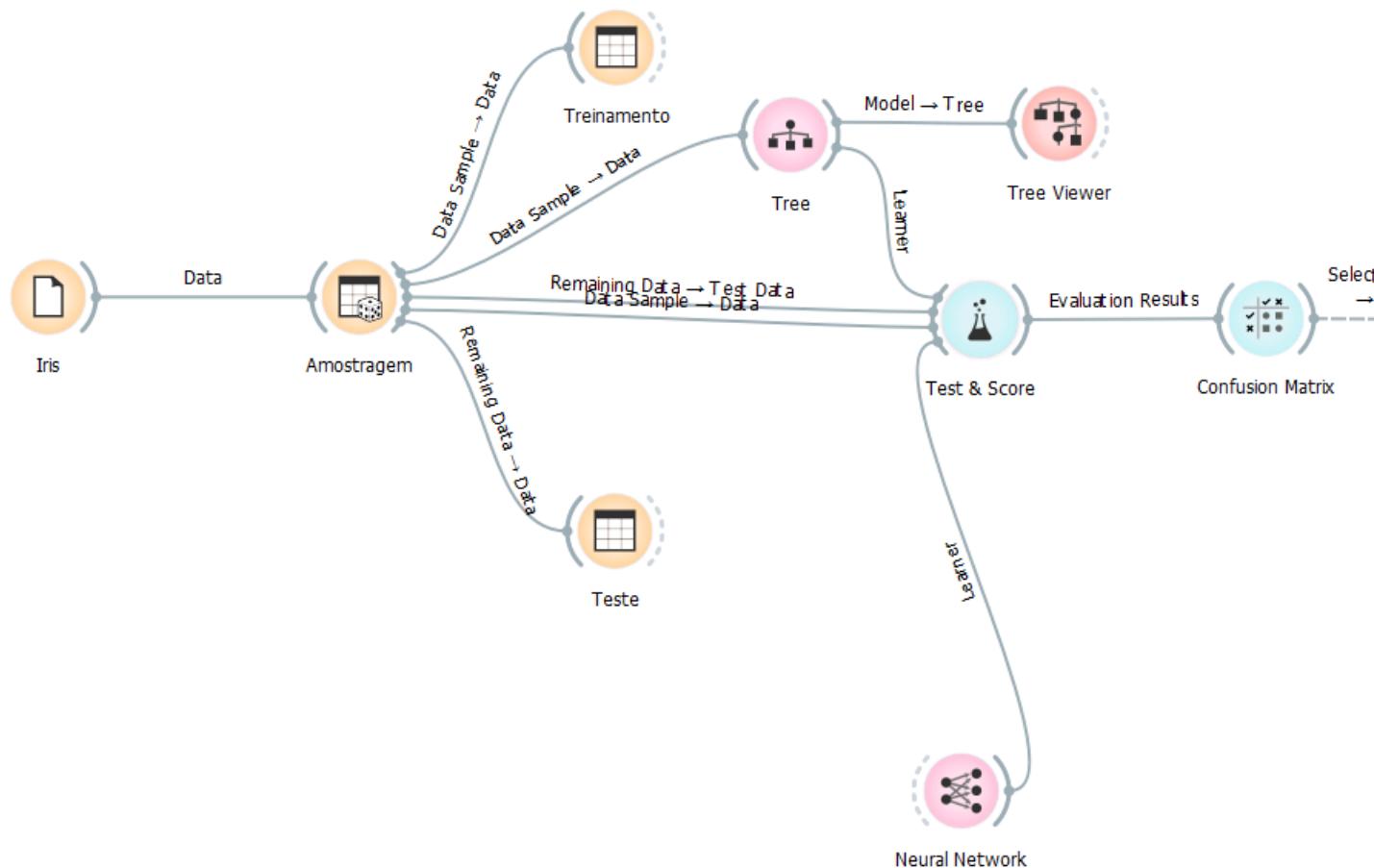
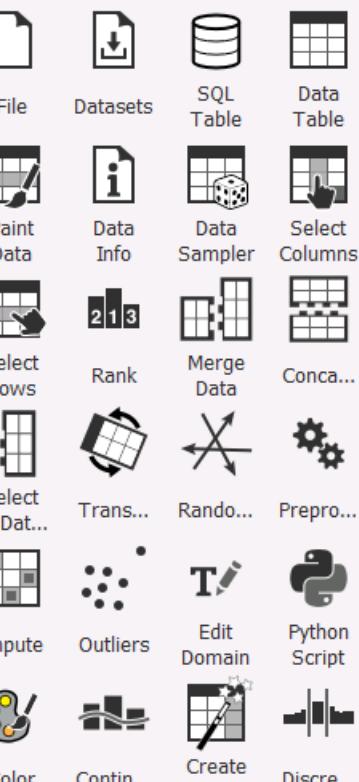
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Neural Network

Name: Neural Network

Network

Neurons per hidden layer: 100,

Activation: ReLu

Solver: Adam

Alpha: 0,00010

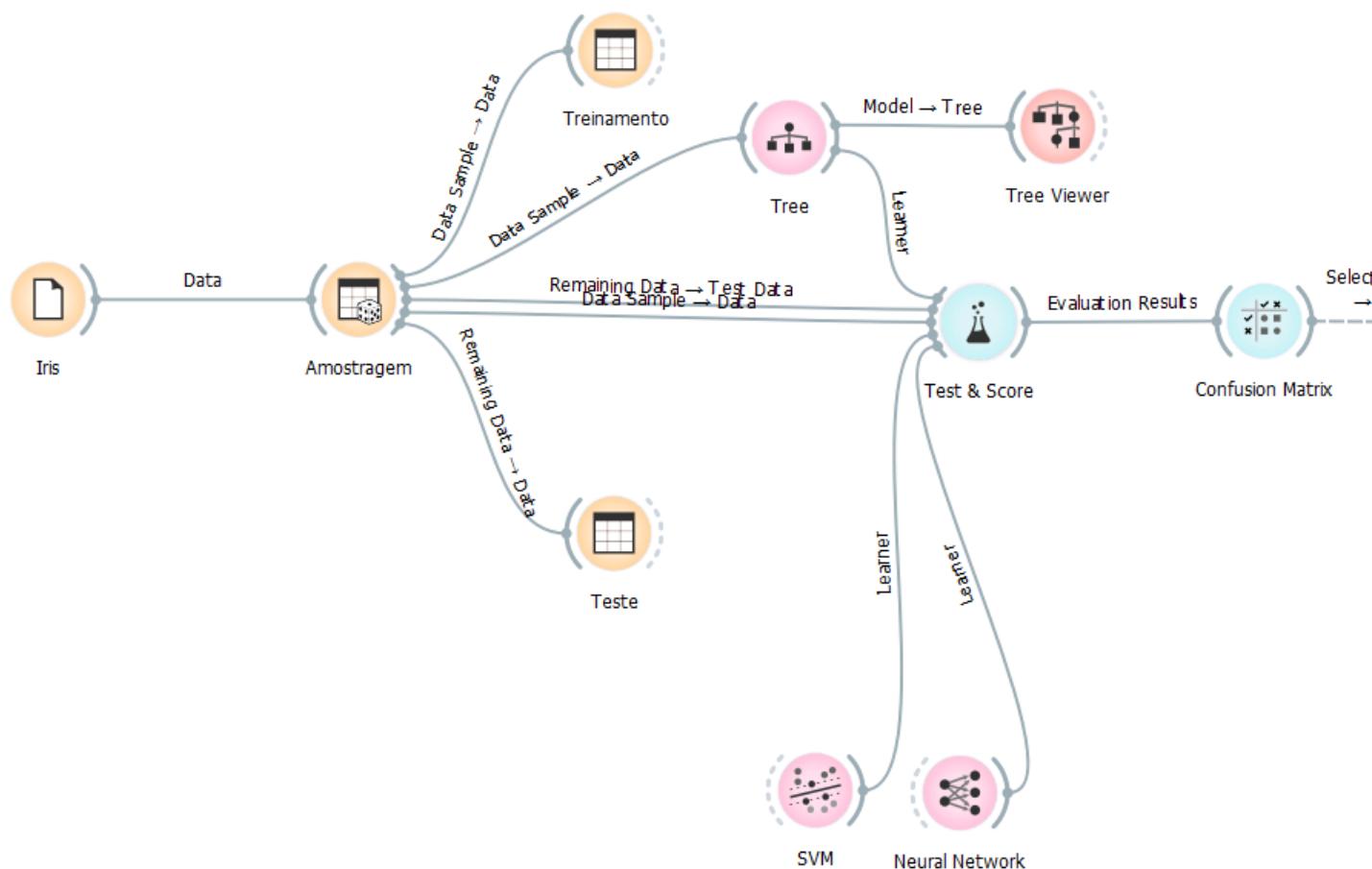
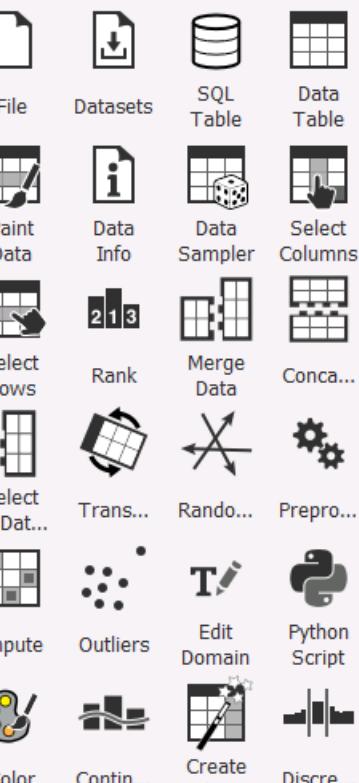
Max iterations: 200

Apply Automatically

Cancel

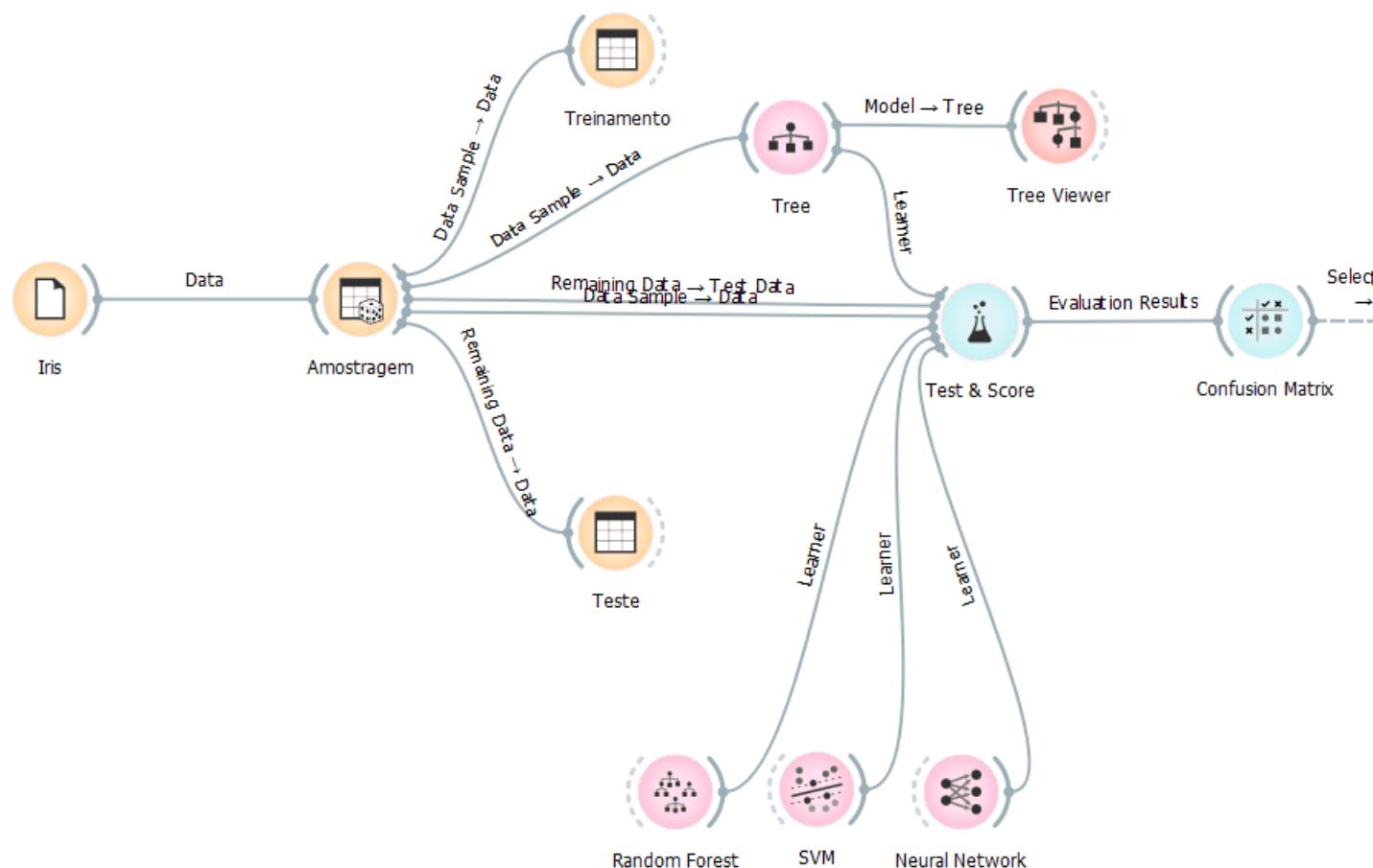
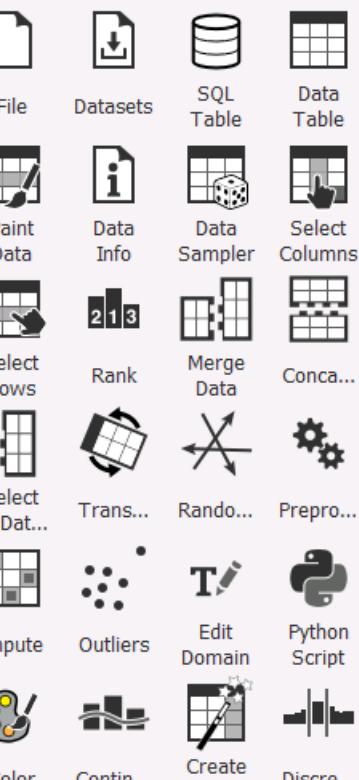
? | ⌂

L-BFGS-B: um otimizador da família dos métodos quase Newton
SGD: Gradiente descendente Estocástico
Adam: Otimizador baseado no gradiente descendente estocástico

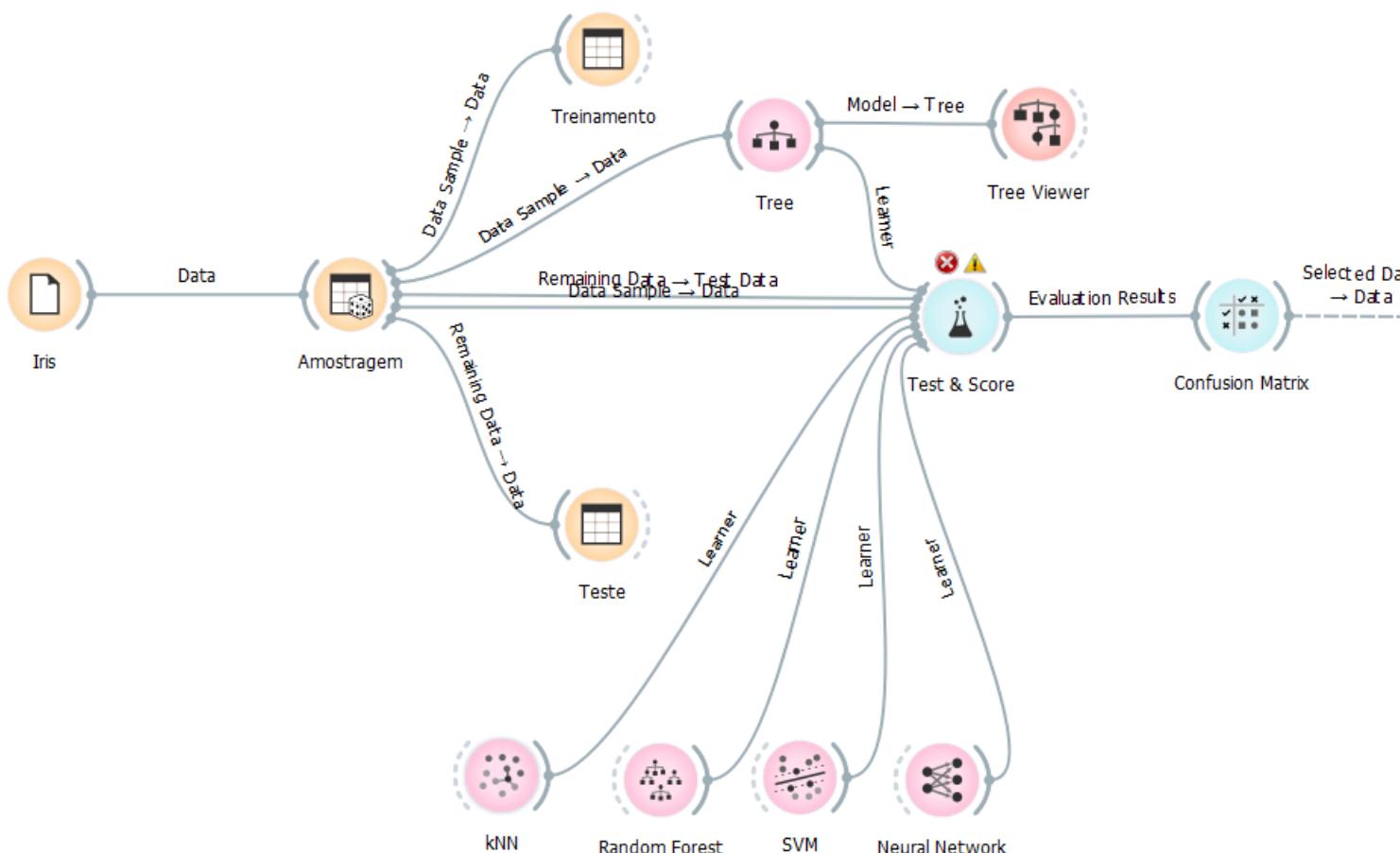
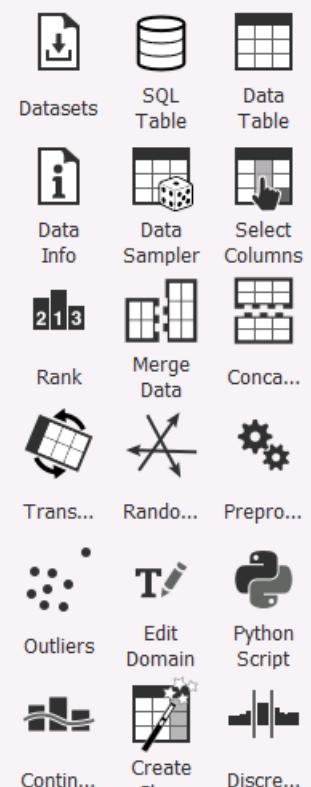
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Data

data



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