Universidade do Minho
Departamento de Informática

Ferramentas de Aprendizagem por Máquina

(Machine Learning Tools)

LEI/MiEI @ 2024/2025, 2º sem

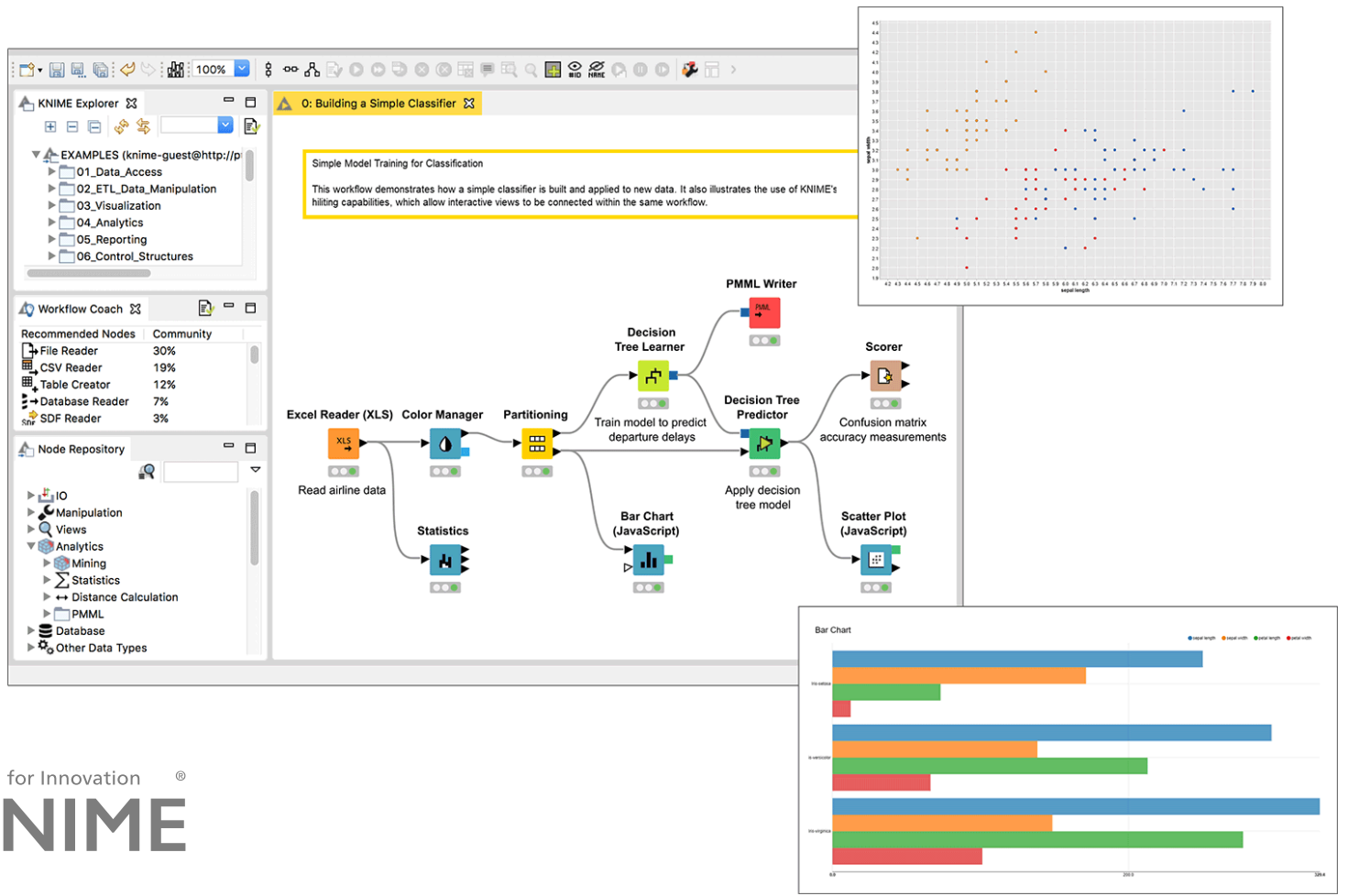
Agenda

- Introdução à plataforma KNIME
- Construção de fluxos de análise de dados (KNIME *workflows*)
- Experimentação (*hands on*)

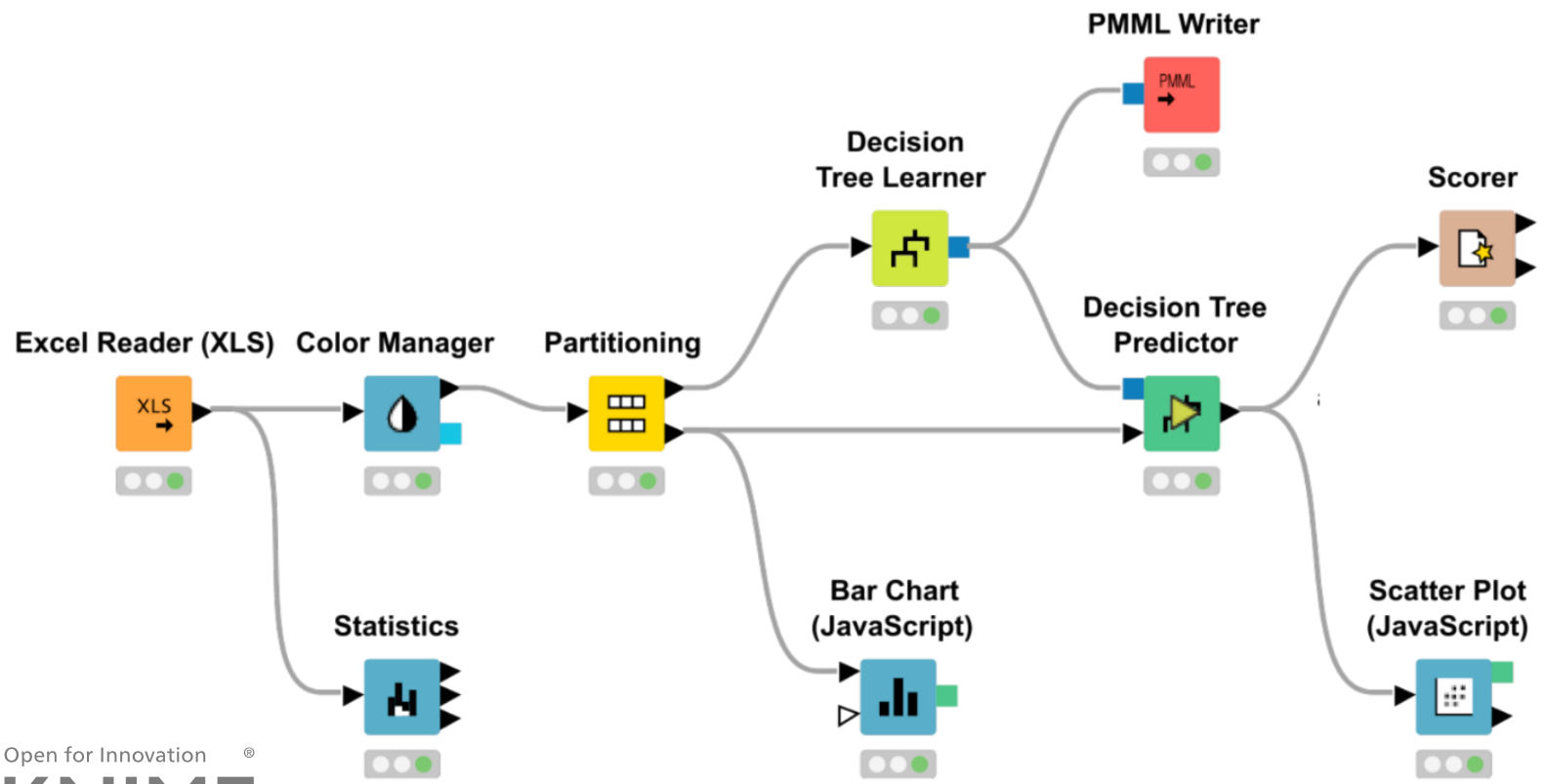
Universidade do Minho
Departamento de Informática

Open for Innovation ®
KNIME

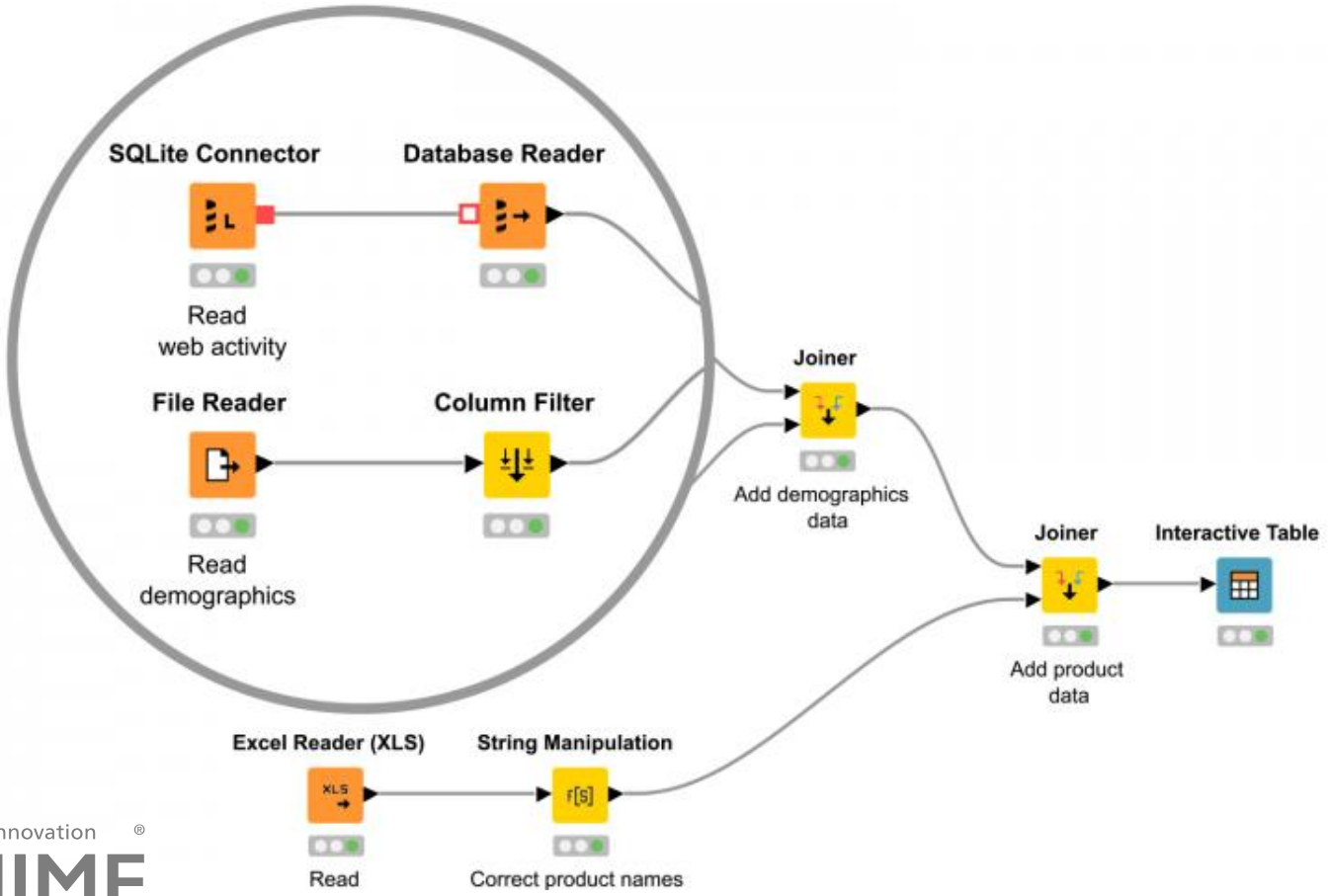
KNIME | Open for Innovation



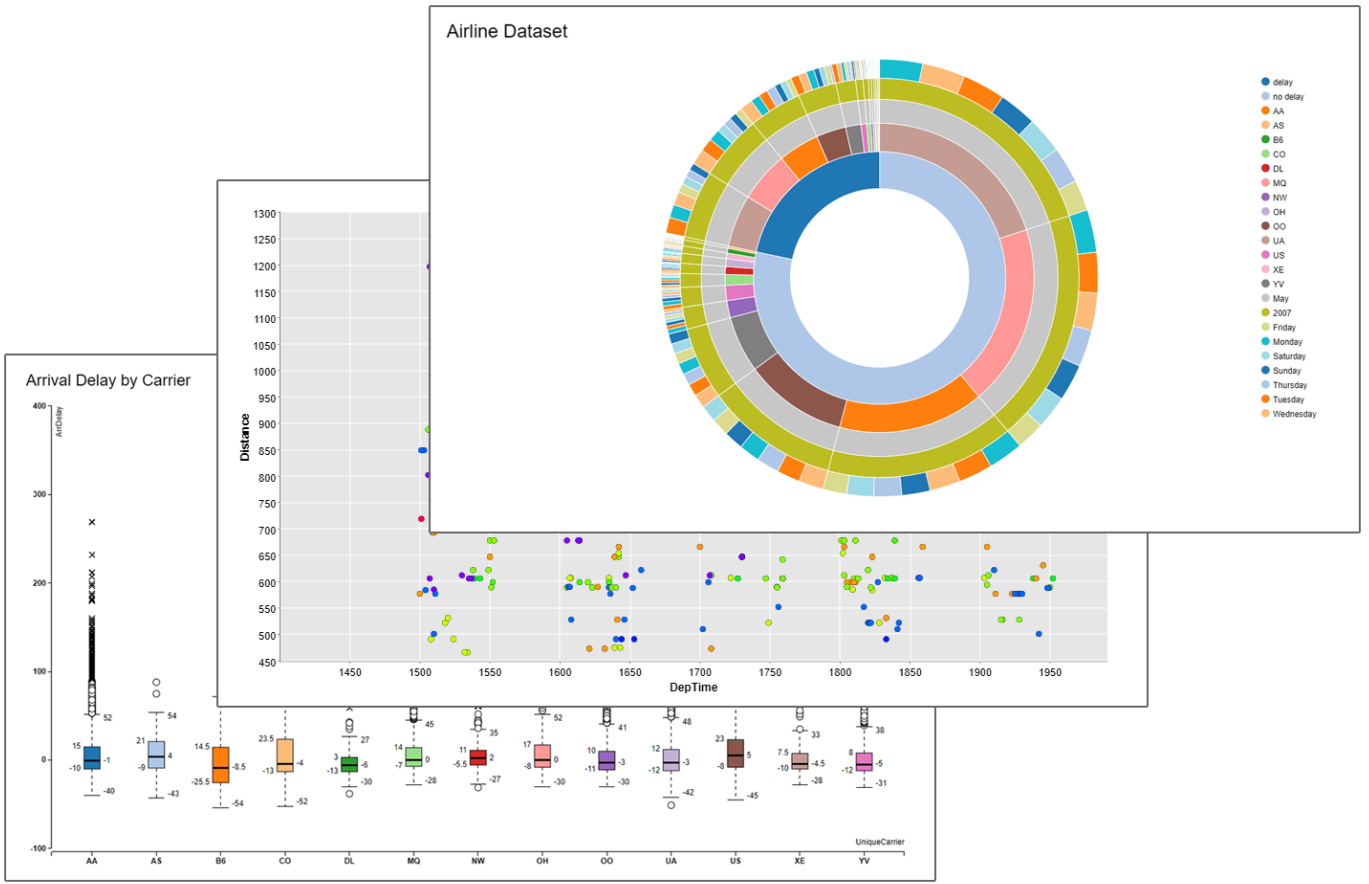
Open for Innovation ®
KNIME

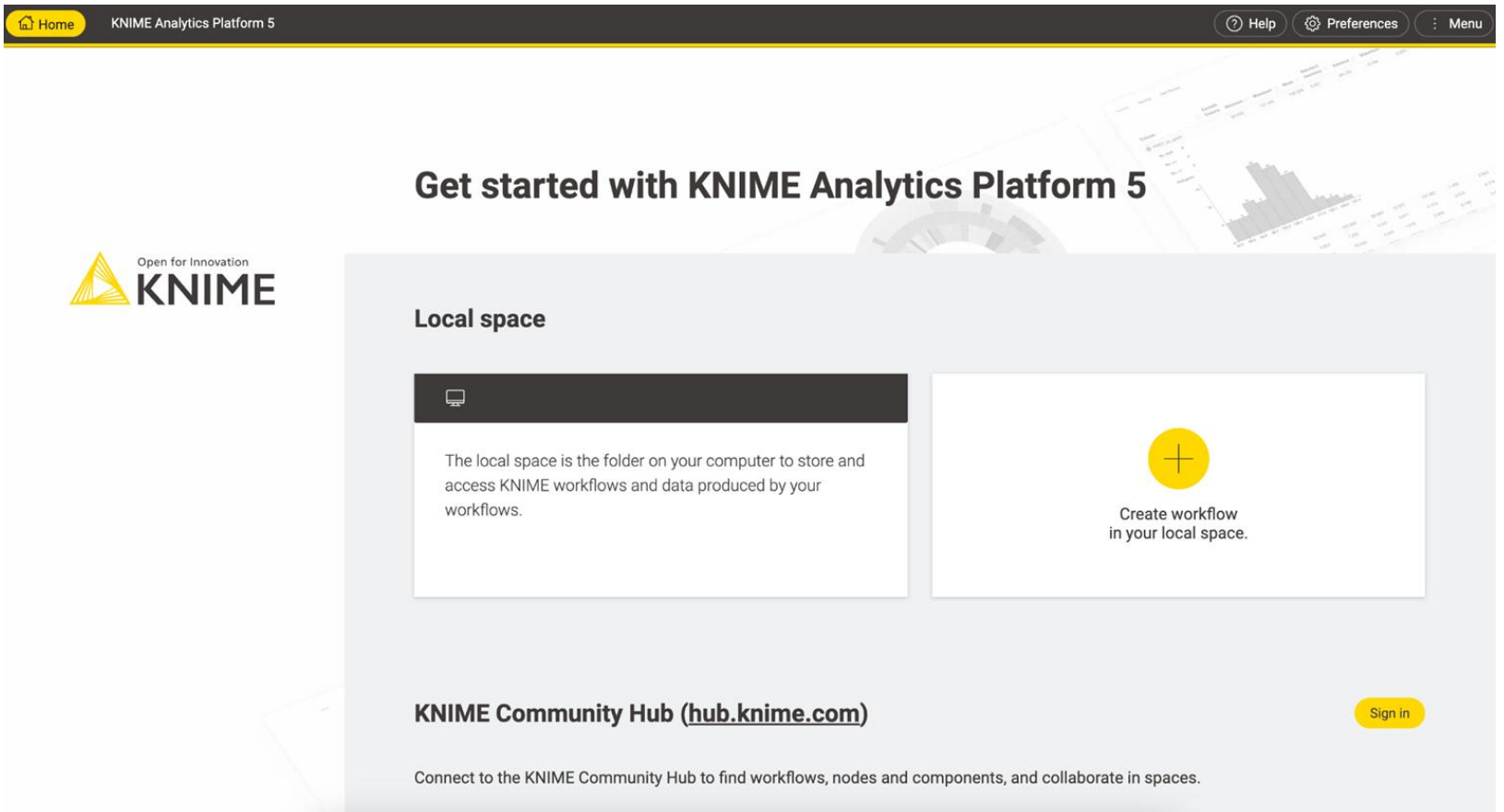


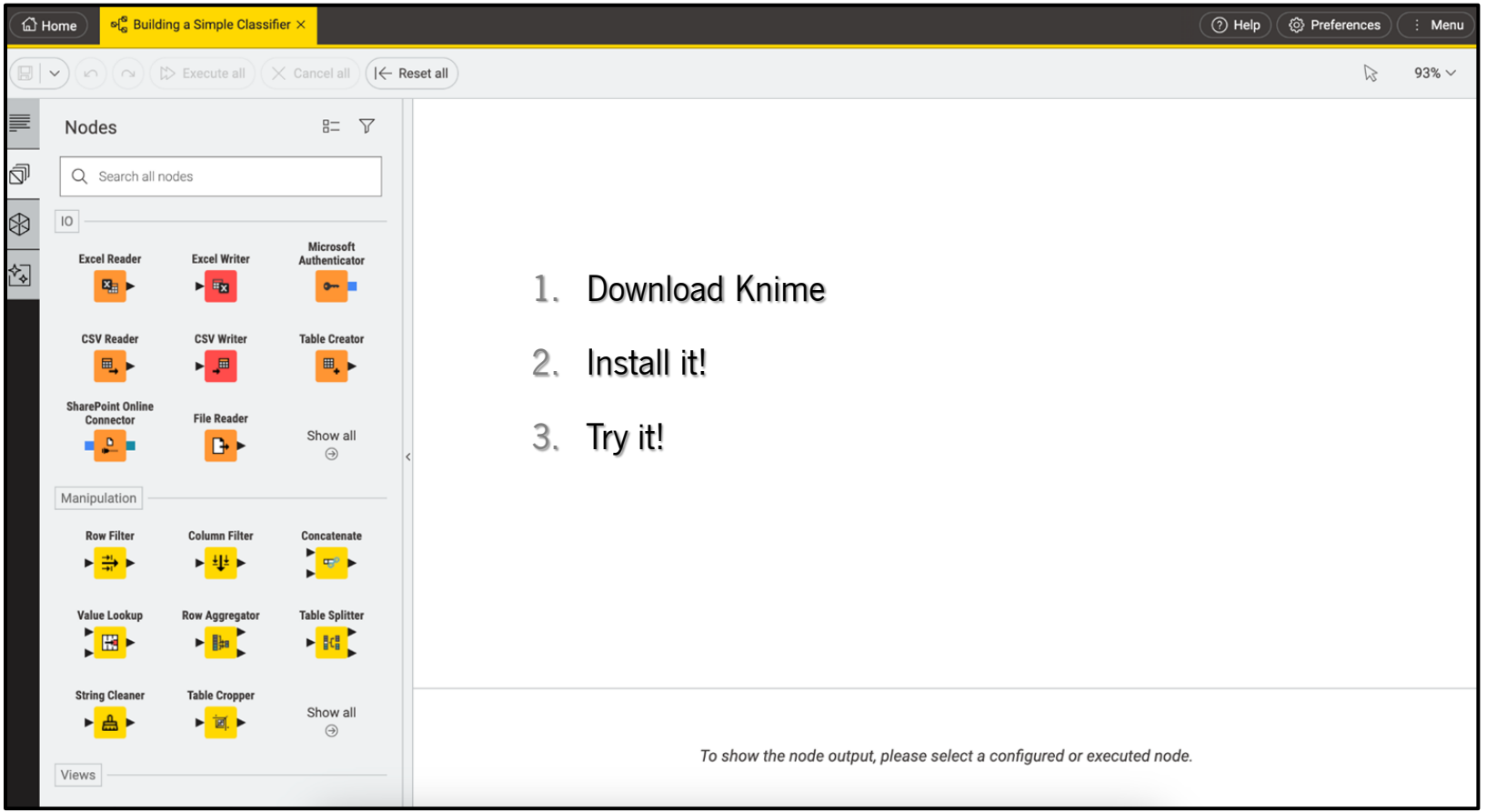
Open for Innovation ®
KNIME

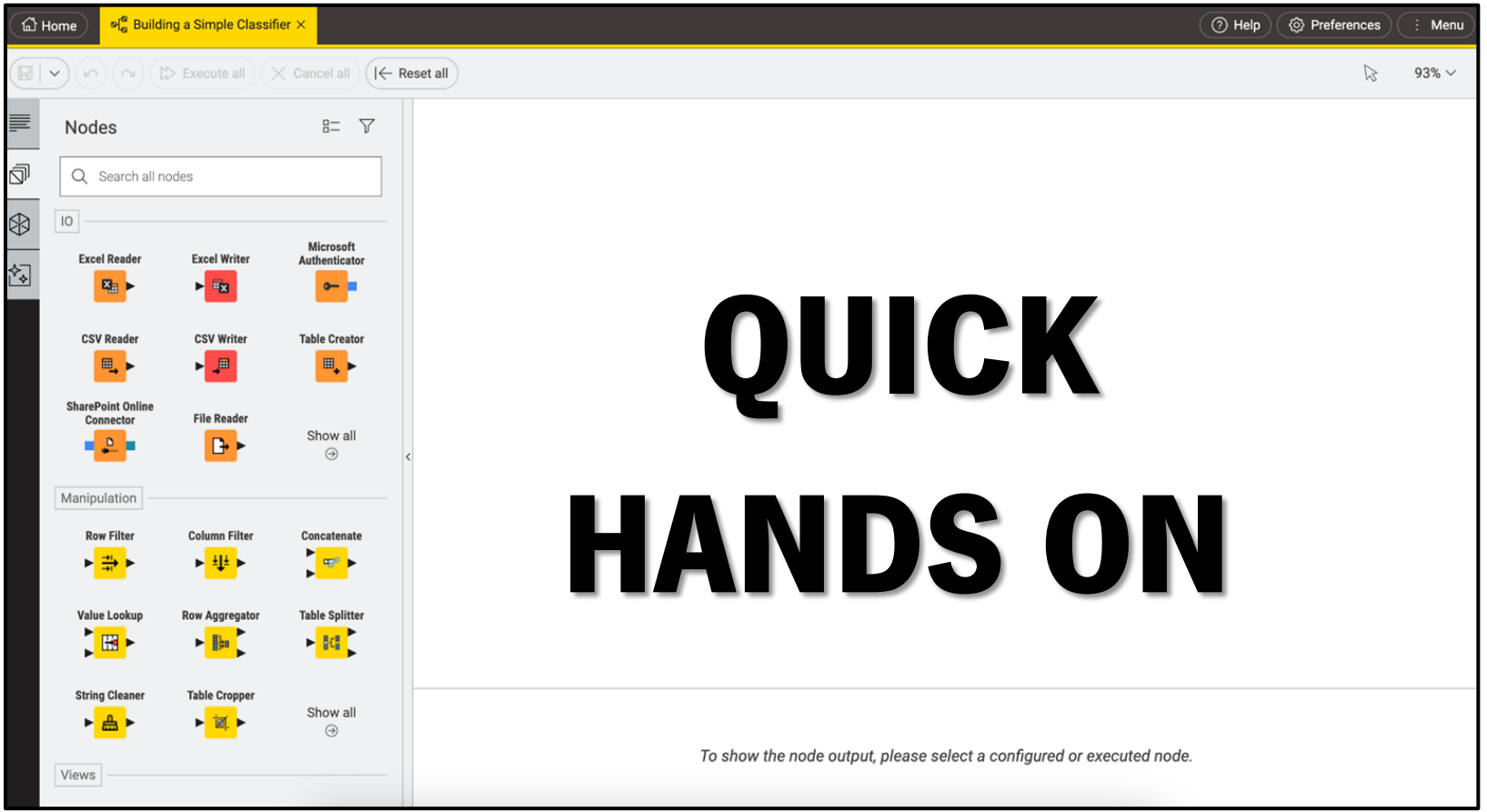


Open for Innovation ®
KNIME


Airline Dataset
delay
no delay
AA
AS
B6
CO
DL
MQ
NW
OH
OO
UA
US
XE
YV
May
2007
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
Distance
DepTime
Arrival Delay by Carrier
ArrDelay
UniqueCarrier
AA
AS
B6
CO
DL
MQ
NW
OH
OO
UA
US
XE
YV

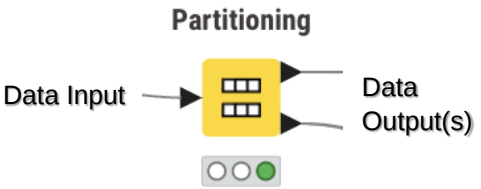

Home
KNIME Analytics Platform 5
Help
Preferences
Menu
Get started with KNIME Analytics Platform 5
Open for Innovation
KNIME
Local space
The local space is the folder on your computer to store and access KNIME workflows and data produced by your workflows.
Create workflow in your local space.
KNIME Community Hub (hub.knime.com)
Sign in
Connect to the KNIME Community Hub to find workflows, nodes and components, and collaborate in spaces.

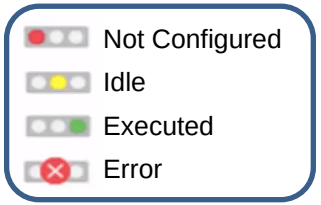

Home
Building a Simple Classifier
Help
Preferences
Menu
Execute all
Cancel all
Reset all
93%
Nodes
Search all nodes
IO
Excel Reader
Excel Writer
Microsoft Authenticator
CSV Reader
CSV Writer
Table Creator
SharePoint Online Connector
File Reader
Show all
Manipulation
Row Filter
Column Filter
Concatenate
Value Lookup
Row Aggregator
Table Splitter
String Cleaner
Table Cropper
Show all
Views
1. Download Knime
2. Install it!
3. Try it!
To show the node output, please select a configured or executed node.

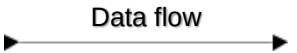

Home
Building a Simple Classifier
Help
Preferences
Menu
Execute all
Cancel all
Reset all
93%
Nodes
Search all nodes
IO
Excel Reader
Excel Writer
Microsoft Authenticator
CSV Reader
CSV Writer
Table Creator
SharePoint Online Connector
File Reader
Show all
Manipulation
Row Filter
Column Filter
Concatenate
Value Lookup
Row Aggregator
Table Splitter
String Cleaner
Table Cropper
Show all
Views
QUICK
HANDS ON
To show the node output, please select a configured or executed node.

Nodos e Fluxos
Nodes and Workflows

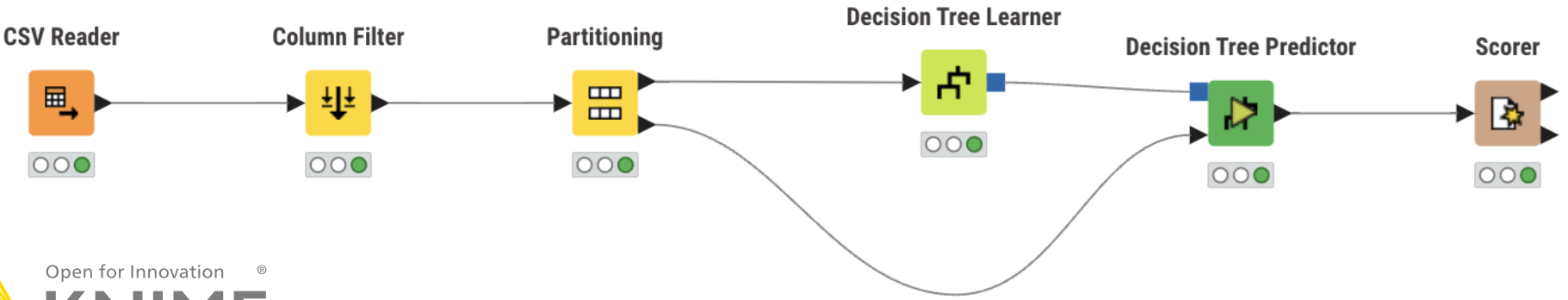
- Nodos
  Nodes





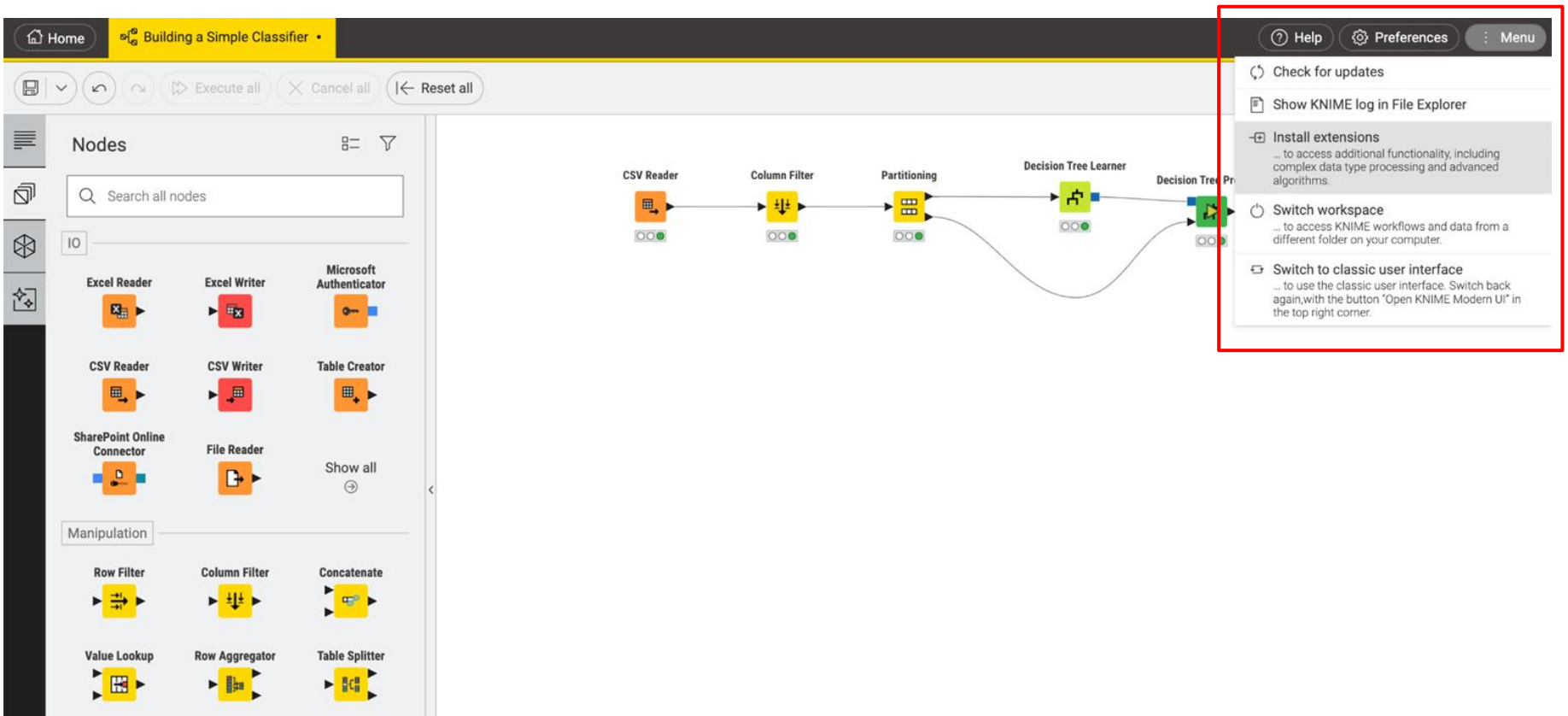


- Fluxos
  Workflows

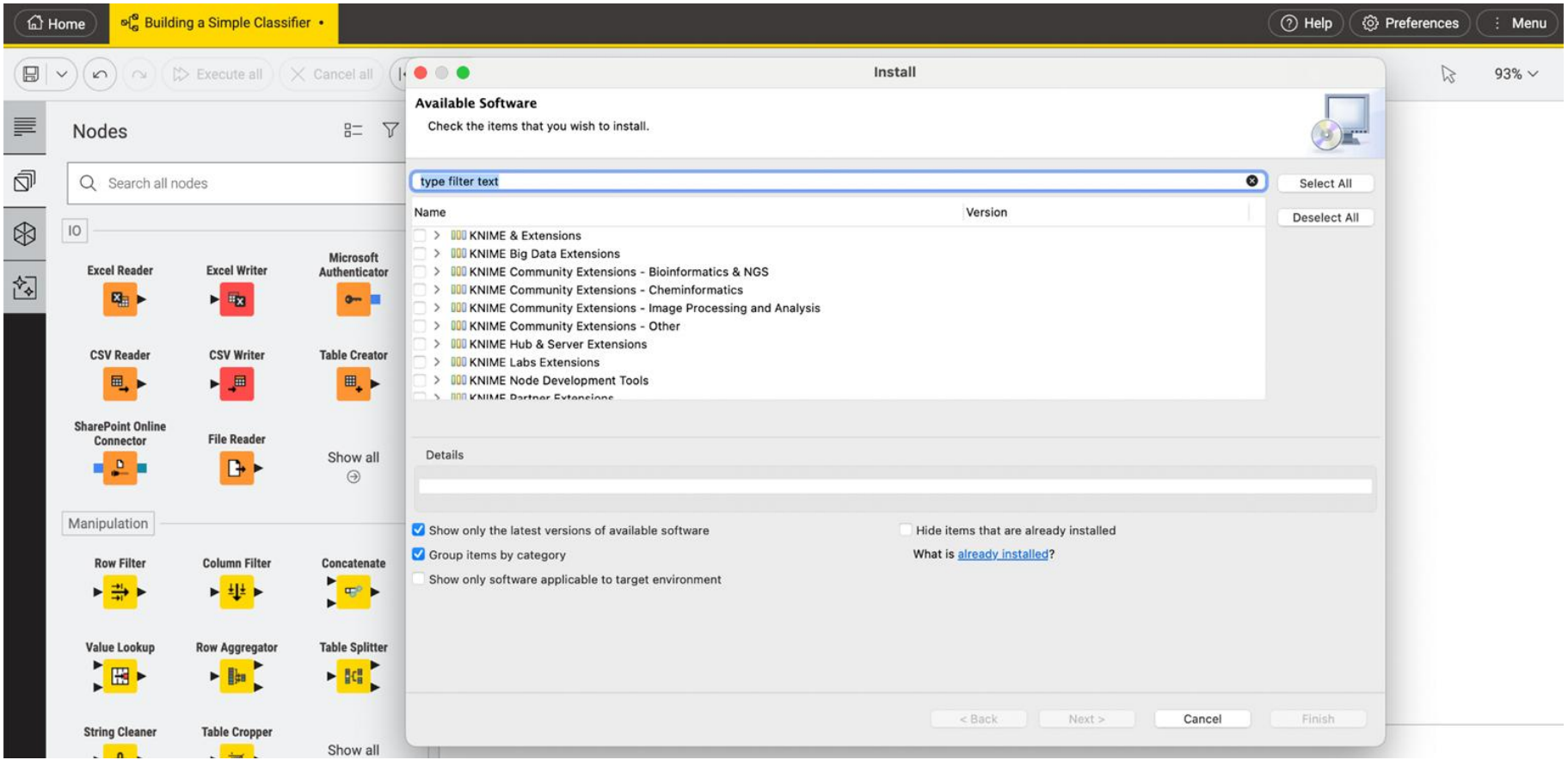


Open for Innovation ®
KNIME

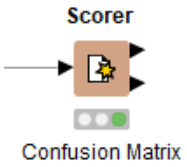
Extensões KNIME
KNIME *Extensions*



Extensões KNIME
KNIME *Extensions*



Descrição dos Nodos
Node Description



Description | KNIME Hub Search

Scorer

Compares two columns by their attribute value pairs and shows the confusion matrix, i.e. how many rows of which attribute and their classification match. Additionally, it is possible to hilight cells of this matrix to determine the underlying rows. The dialog allows you to select two columns for comparison; the values from the first selected column are represented in the confusion matrix's rows and the values from the second column by the confusion matrix's columns. The output of the node is the confusion matrix with the number of matches in each cell. Additionally, the second out-port reports a number of accuracy statistics such as True-Positives, False-Positives, True-Negatives, False-Negatives, Recall, Precision, Sensitivity, Specificity, F-measure, as well as the overall accuracy and Cohen's kappa.

Dialog Options

First column

The first column represents the real classes of the data.

Second column

The second column represents the predicted classes of the data.

Sorting strategy

Whether to sort the labels according to their appearance, or use the lexical/numeric ordering.

Reverse order

Reverse the order of the elements.

Use name prefix

The scores (i.e. accuracy, error rate, number of correct and wrong classification) are exported as flow variables with a hard coded name. This option allows you to define a prefix for these variable identifiers so that name conflicts are resolved.

Missing Values

Choose how to treat missing values in either the reference or prediction column. Default is to ignore them (treat them as if the row did not exist). Alternatively, you can expect the table to not contain missing values in these two columns. If they do, the node will fail during execution.

Ports

Input Ports	
0	Table containing at least two columns to compare.

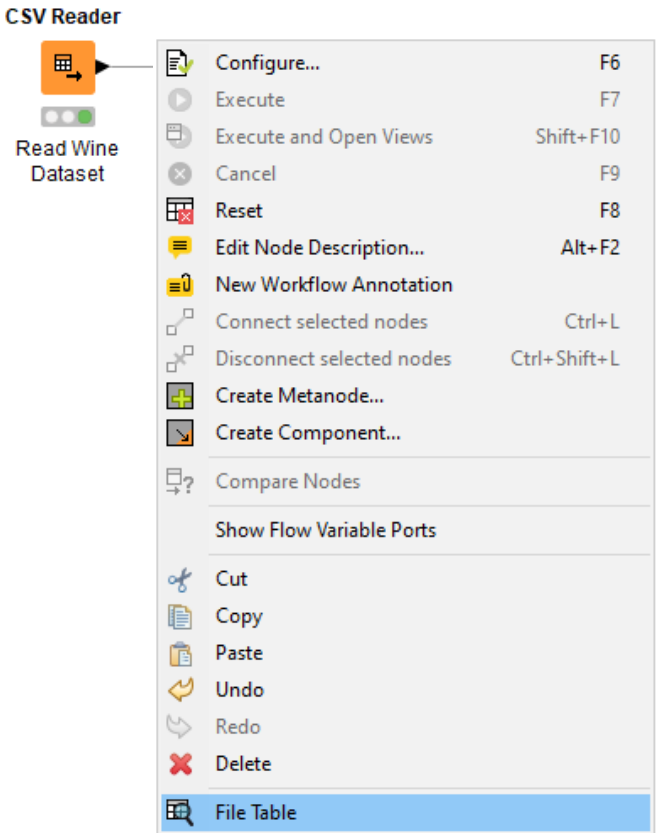
Output Ports	
0	The confusion matrix.
1	The accuracy statistics table.

Views

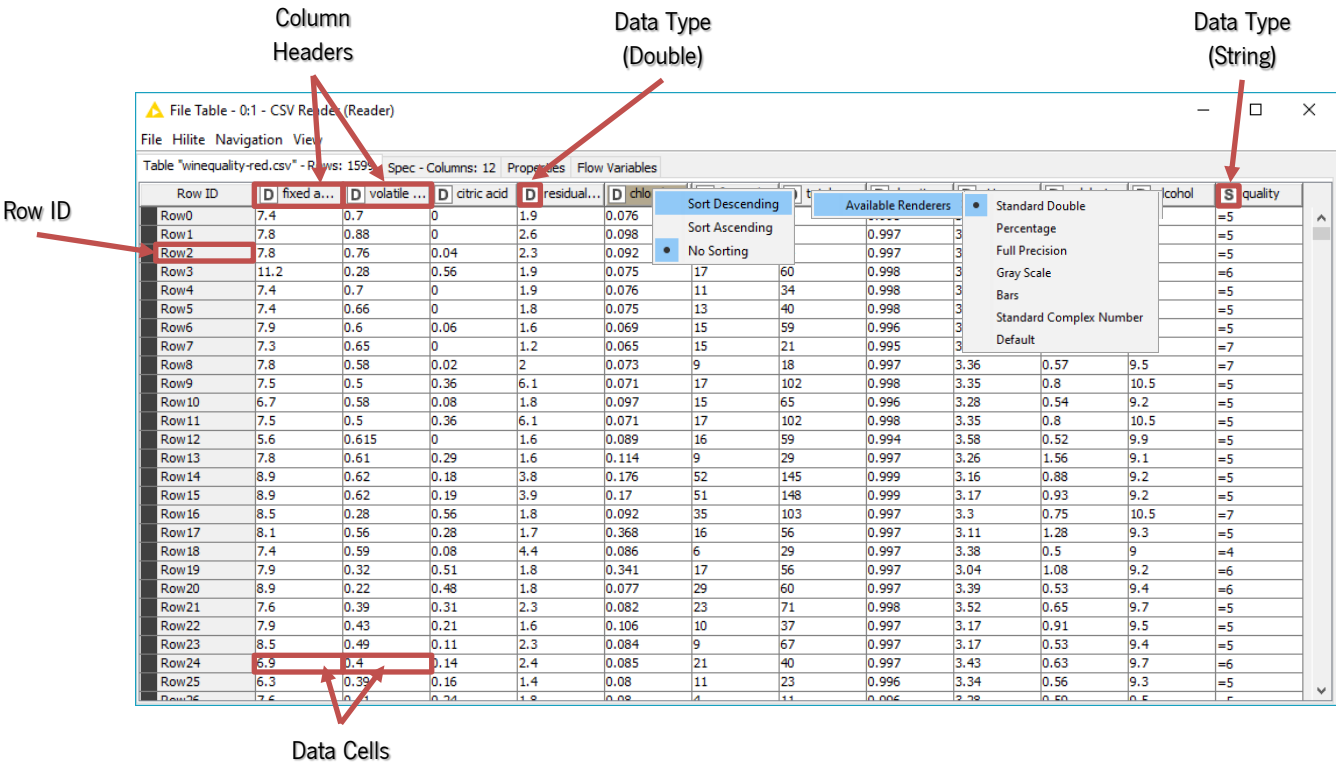
Confusion Matrix

Displays the confusion matrix in a table view. It is possible to hilight cells of the matrix which propagates highlighting to the corresponding rows. Therefore, it is possible for example to identify wrong predictions.

Visualização do Ficheiro de Dados
Data Table Structure View

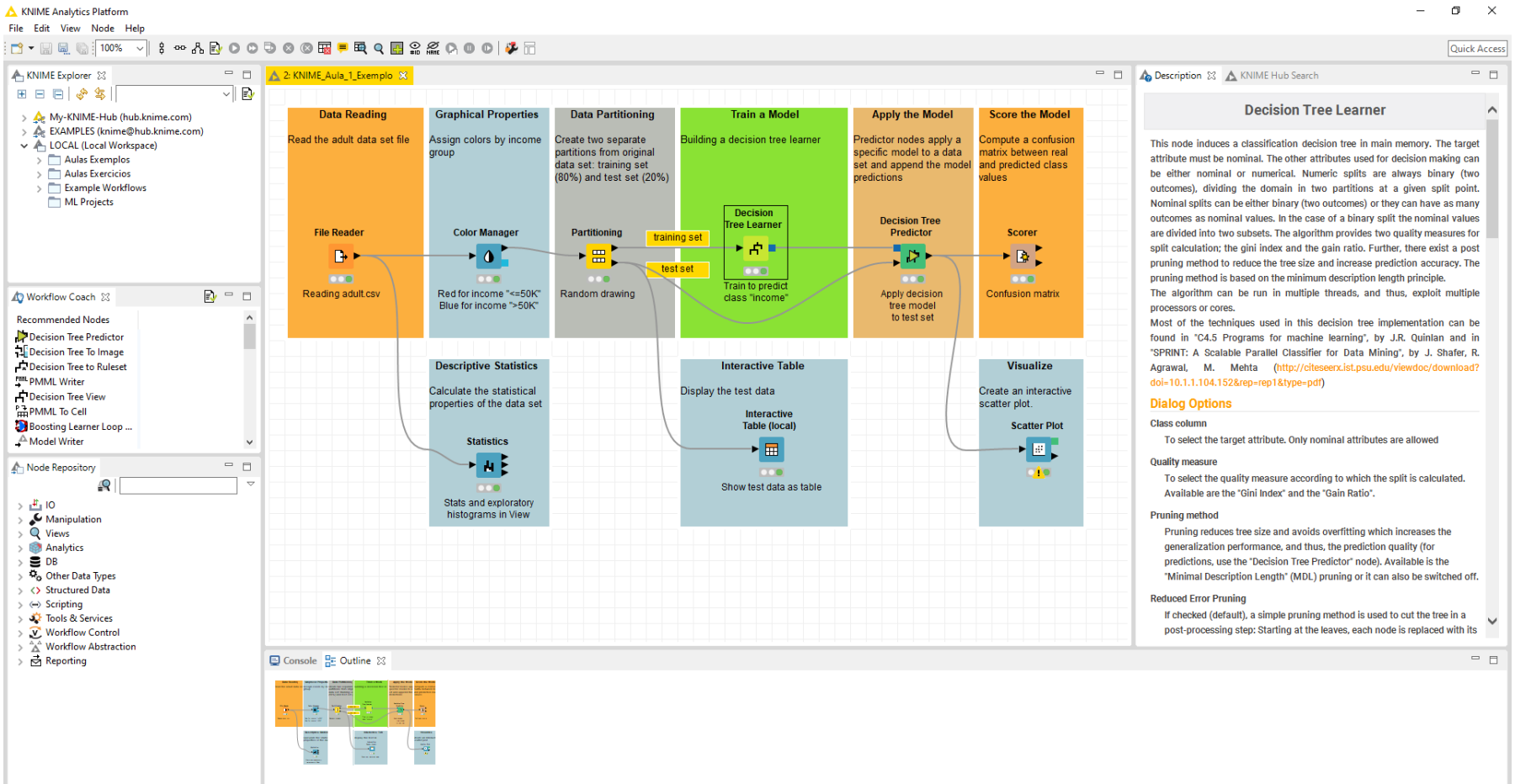


Visualização do Ficheiro de Dados
Data Table Structure View

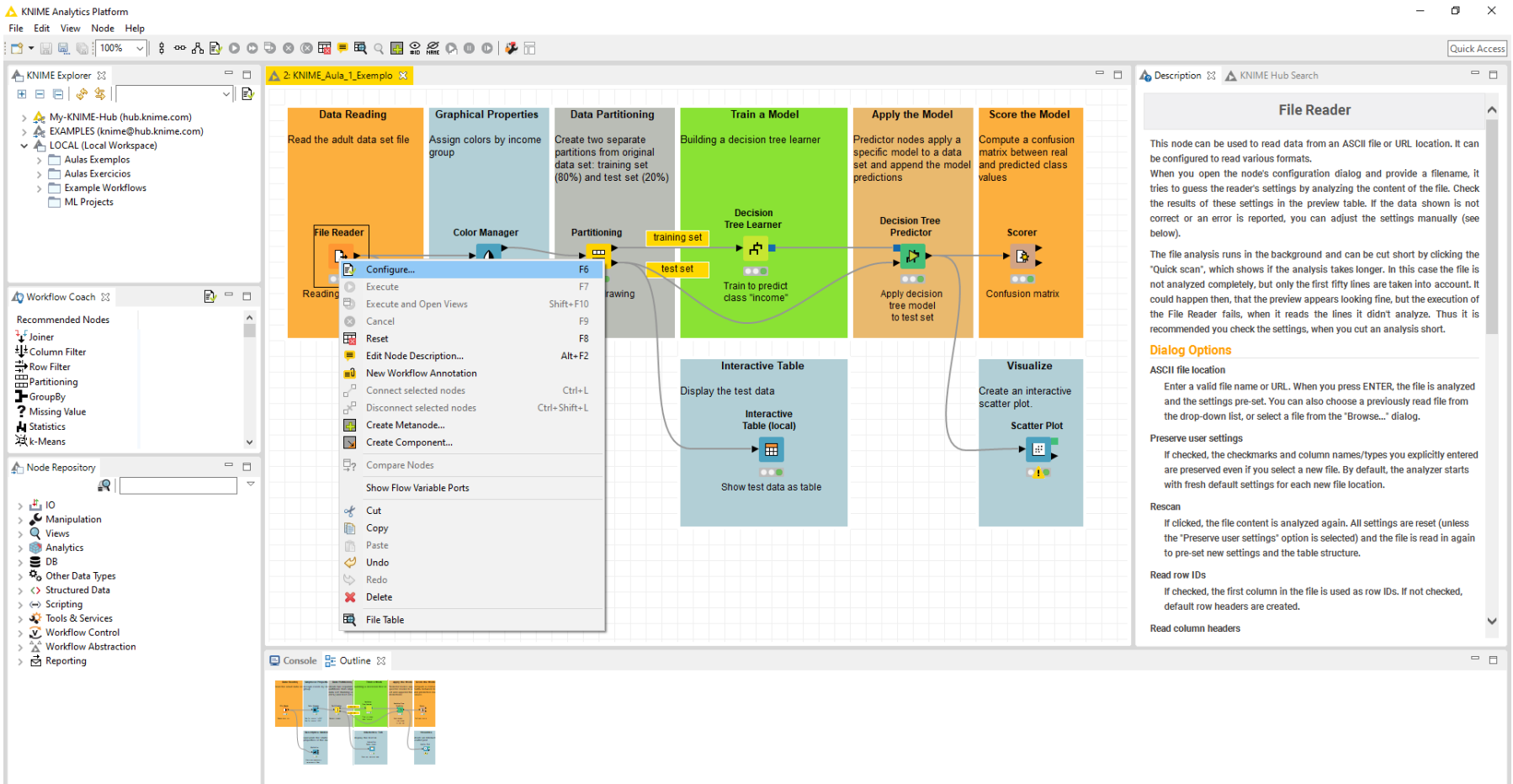


Row ID	fixed a...	volatile ...	citric acid	residual...	chlo						cohol	quality
Row0	7.4	0.7	0	1.9	0.076							=5
Row1	7.8	0.88	0	2.6	0.098			0.997	3			=5
Row2	7.8	0.76	0.04	2.3	0.092			0.997	3			=5
Row3	11.2	0.28	0.56	1.9	0.075	17	60	0.998	3			=6
Row4	7.4	0.7	0	1.9	0.076	11	34	0.998	3			=5
Row5	7.4	0.66	0	1.8	0.075	13	40	0.998	3			=5
Row6	7.9	0.6	0.06	1.6	0.069	15	59	0.996	3			=5
Row7	7.3	0.65	0	1.2	0.065	15	21	0.995	3			=7
Row8	7.8	0.58	0.02	2	0.073	9	18	0.997	3.36	0.57	9.5	=7
Row9	7.5	0.5	0.36	6.1	0.071	17	102	0.998	3.35	0.8	10.5	=5
Row10	6.7	0.58	0.08	1.8	0.097	15	65	0.996	3.28	0.54	9.2	=5
Row11	7.5	0.5	0.36	6.1	0.071	17	102	0.998	3.35	0.8	10.5	=5
Row12	5.6	0.615	0	1.6	0.089	16	59	0.994	3.58	0.52	9.9	=5
Row13	7.8	0.61	0.29	1.6	0.114	9	29	0.997	3.26	1.56	9.1	=5
Row14	8.9	0.62	0.18	3.8	0.176	52	145	0.999	3.16	0.88	9.2	=5
Row15	8.9	0.62	0.19	3.9	0.17	51	148	0.999	3.17	0.93	9.2	=5
Row16	8.5	0.28	0.56	1.8	0.092	35	103	0.997	3.3	0.75	10.5	=7
Row17	8.1	0.56	0.28	1.7	0.368	16	56	0.997	3.11	1.28	9.3	=5
Row18	7.4	0.59	0.08	4.4	0.086	6	29	0.997	3.38	0.5	9	=4
Row19	7.9	0.32	0.51	1.8	0.341	17	56	0.997	3.04	1.08	9.2	=6
Row20	8.9	0.22	0.48	1.8	0.077	29	60	0.997	3.39	0.53	9.4	=6
Row21	7.6	0.39	0.31	2.3	0.082	23	71	0.998	3.52	0.65	9.7	=5
Row22	7.9	0.43	0.21	1.6	0.106	10	37	0.997	3.17	0.91	9.5	=5
Row23	8.5	0.49	0.11	2.3	0.084	9	67	0.997	3.17	0.53	9.4	=5
Row24	6.9	0.4	0.14	2.4	0.085	21	40	0.997	3.43	0.63	9.7	=6
Row25	6.3	0.39	0.16	1.4	0.08	11	23	0.996	3.34	0.56	9.3	=5

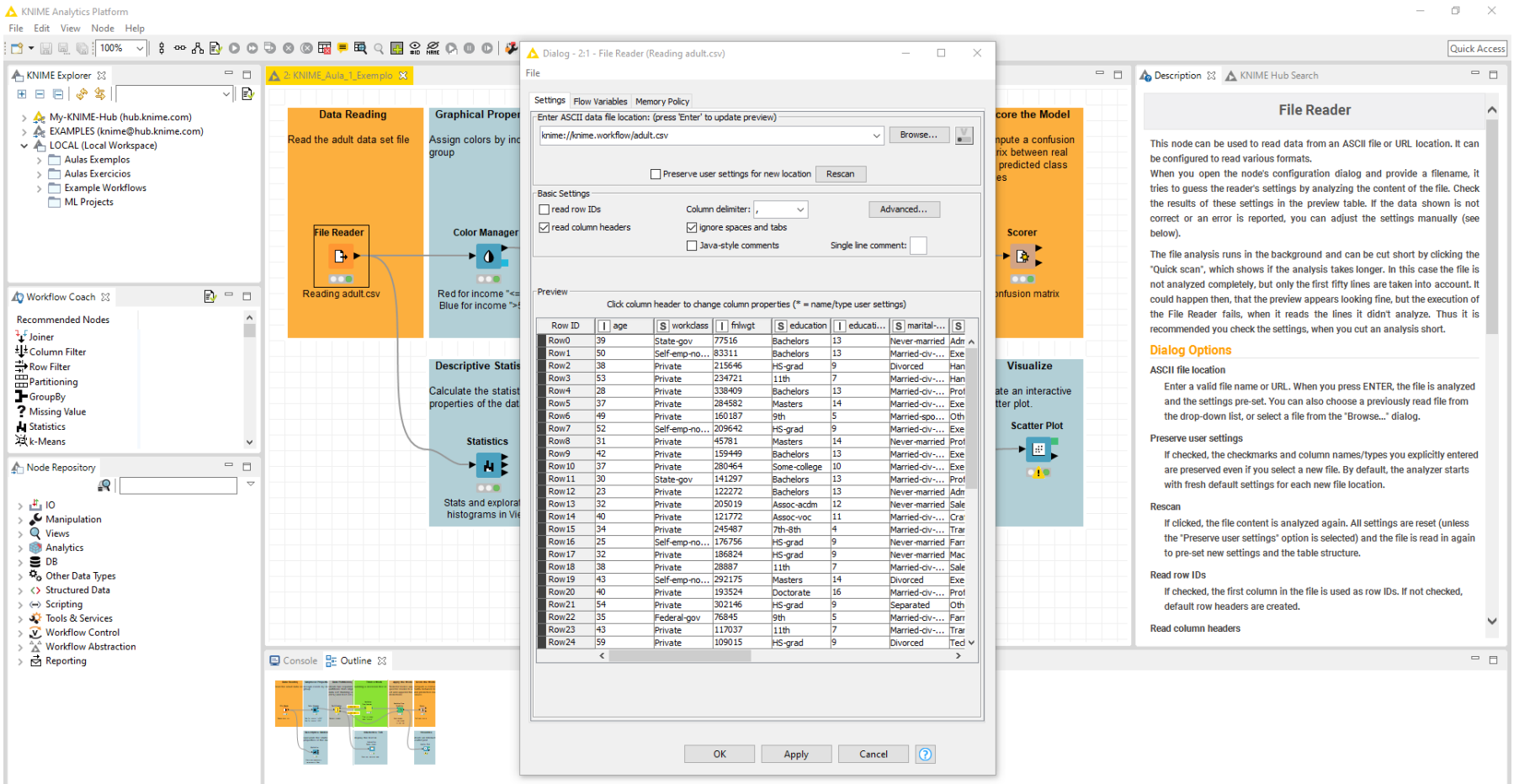
Building a Simple Workflow



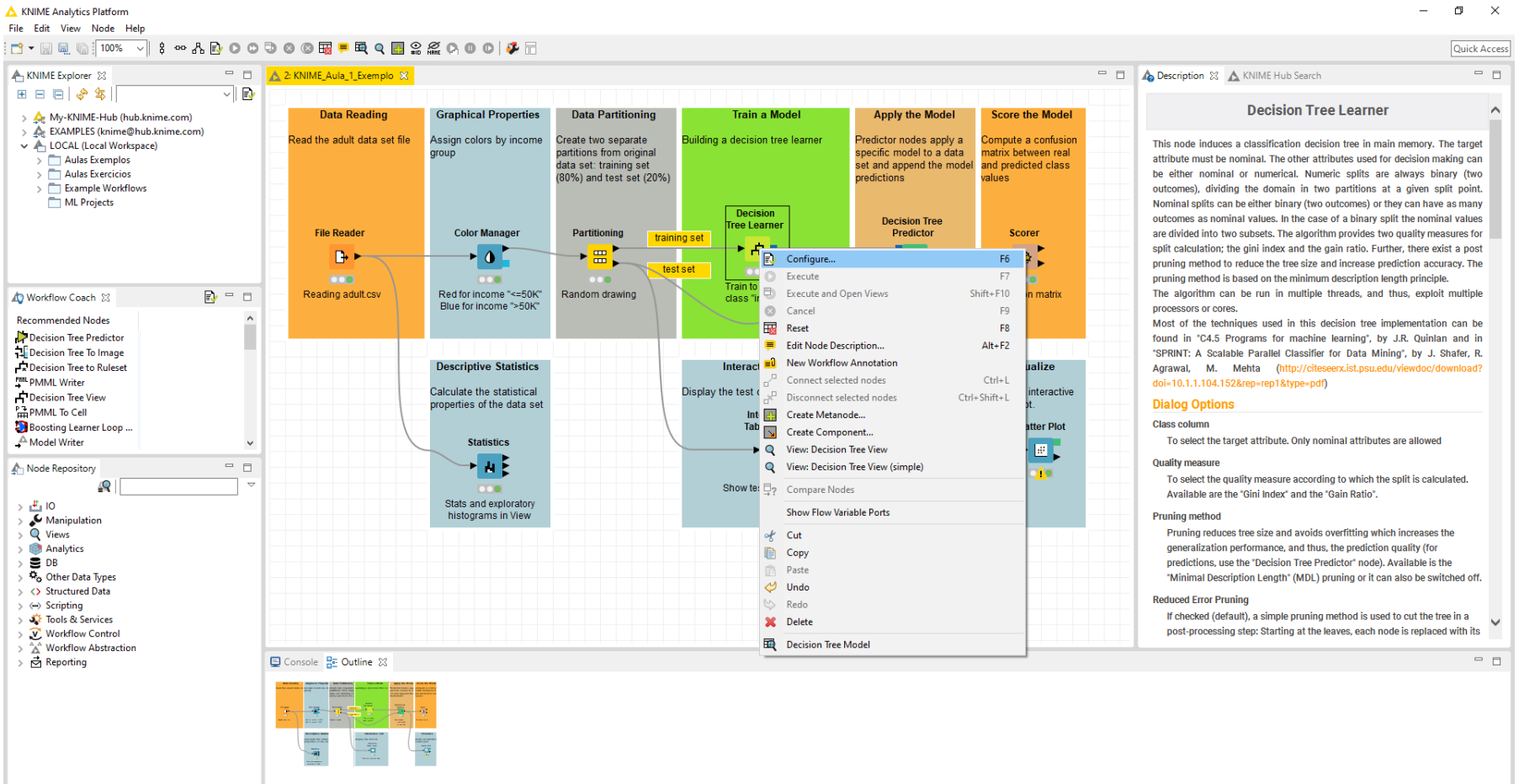
Node Context Options: Data Loader



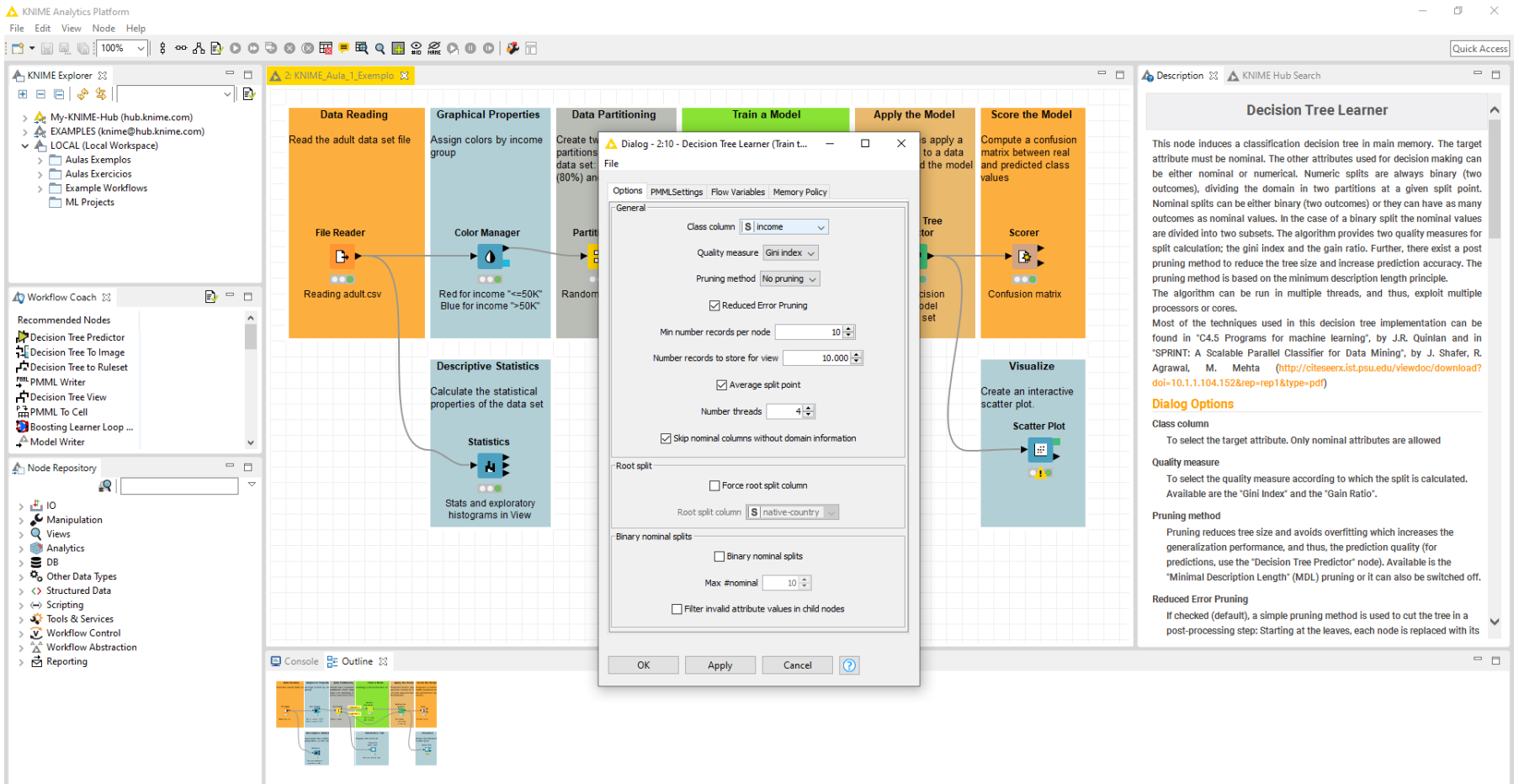
Node Context Options: Data Loader



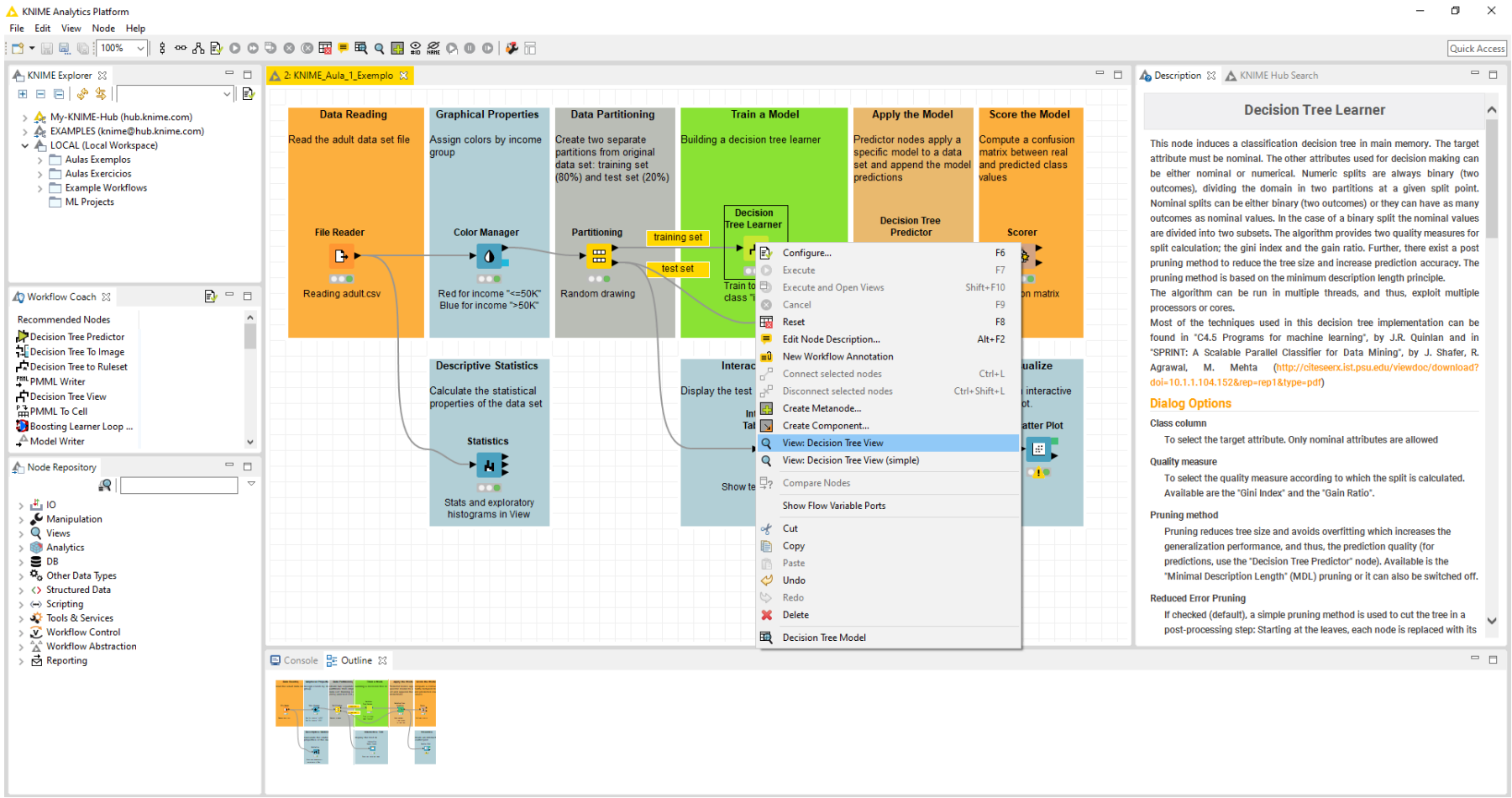
Node Context Options: Model Learner



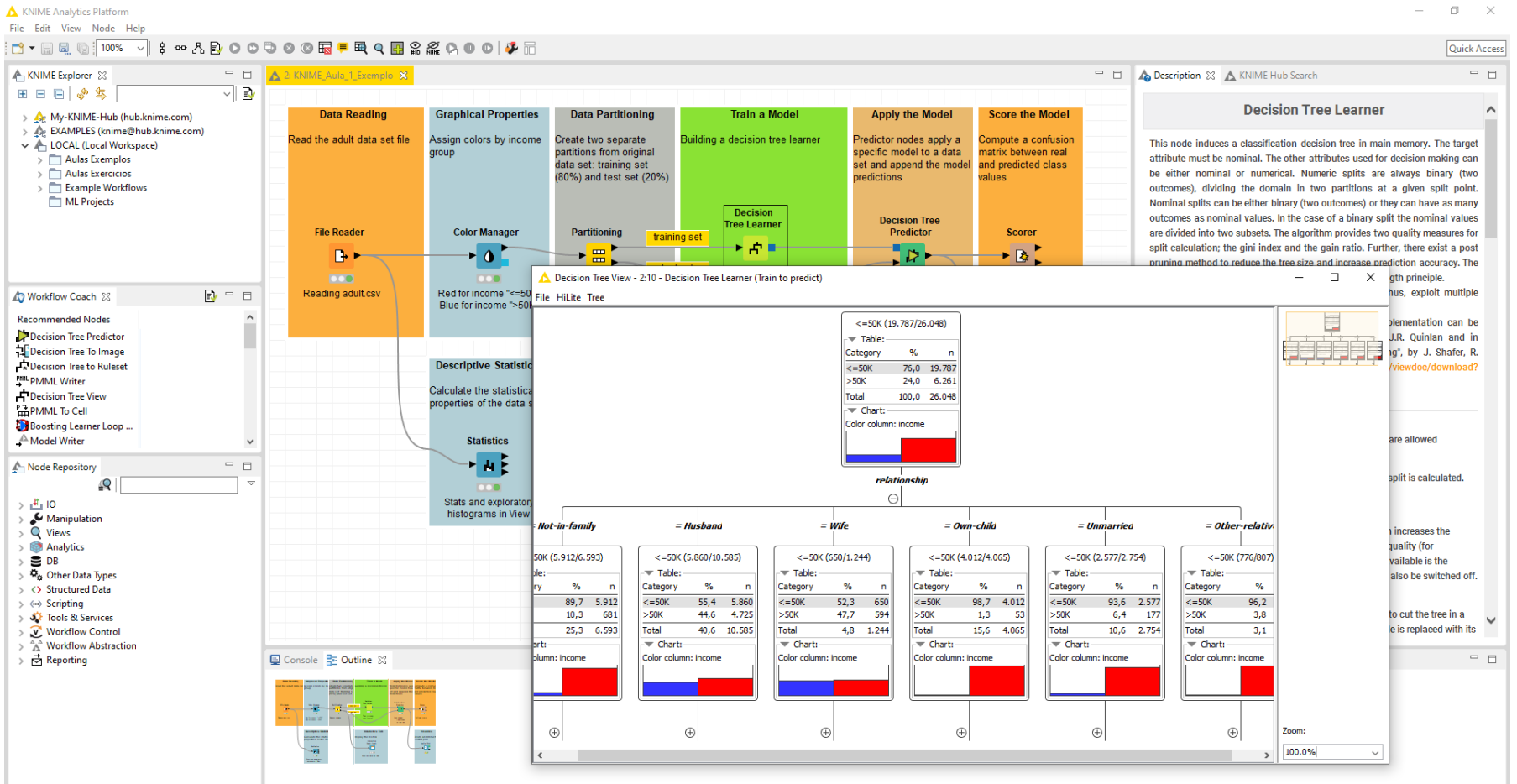
Node Context Options: Model Learner



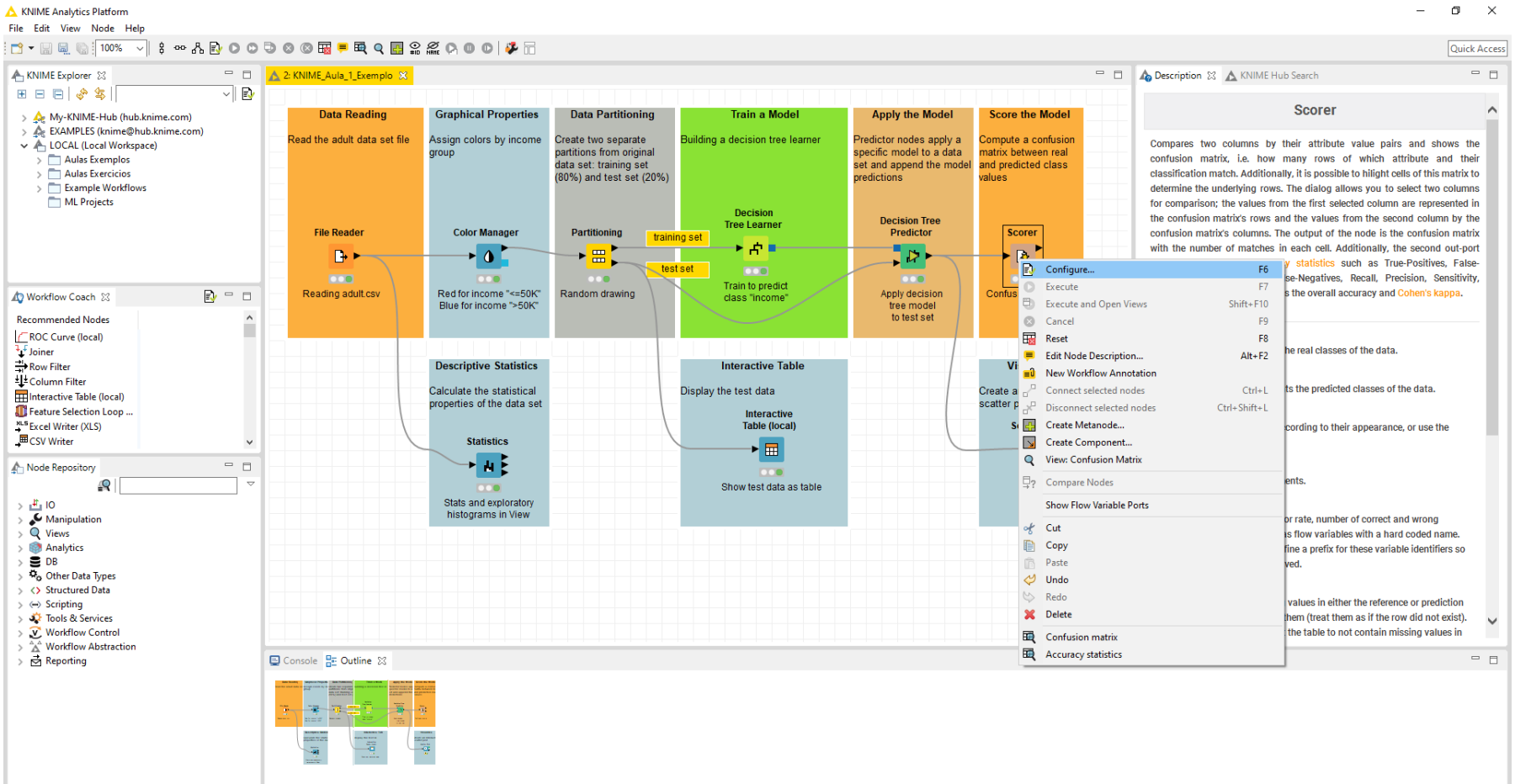
Node Context Options: Model Learner



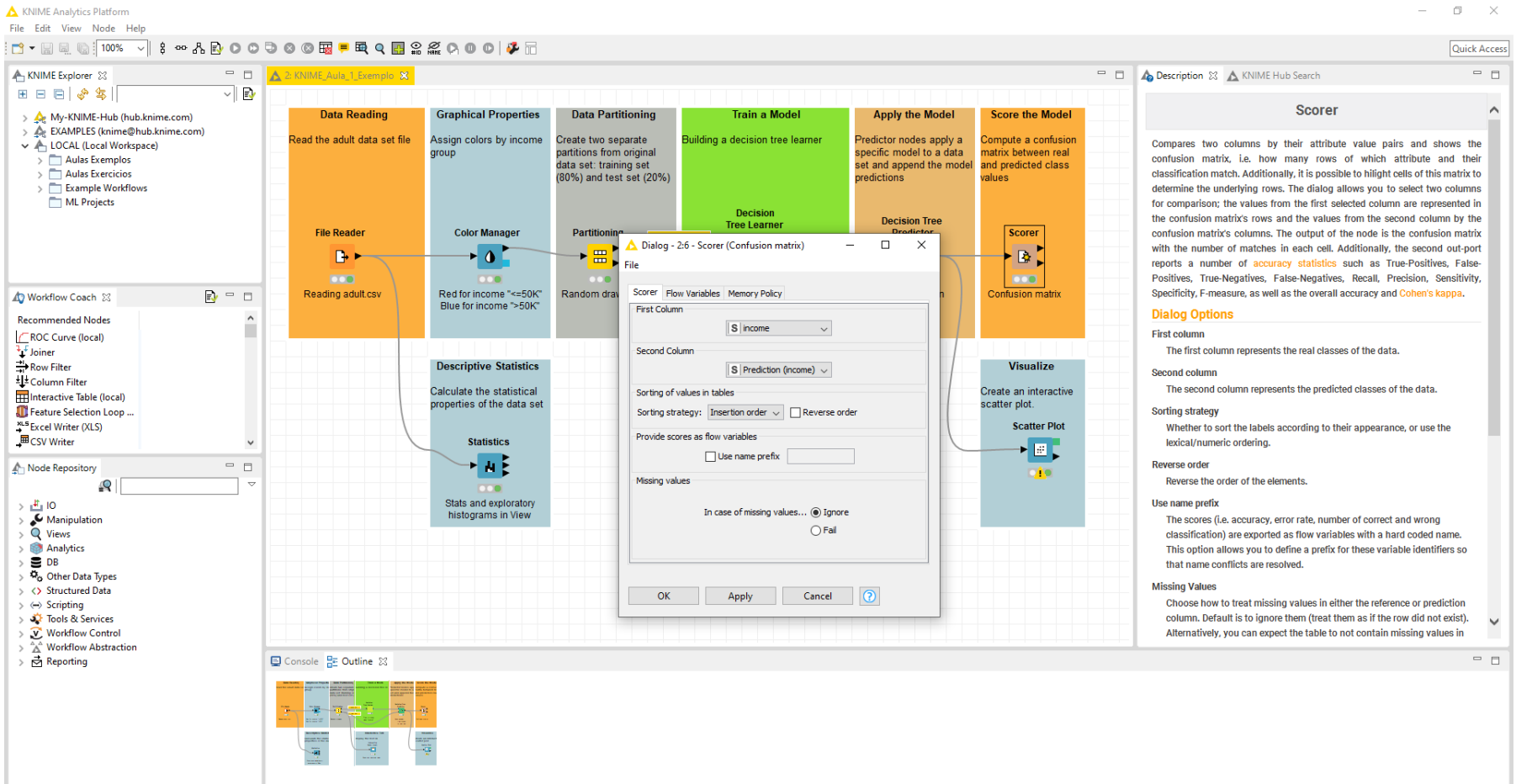
Node Context Options: Model Learner



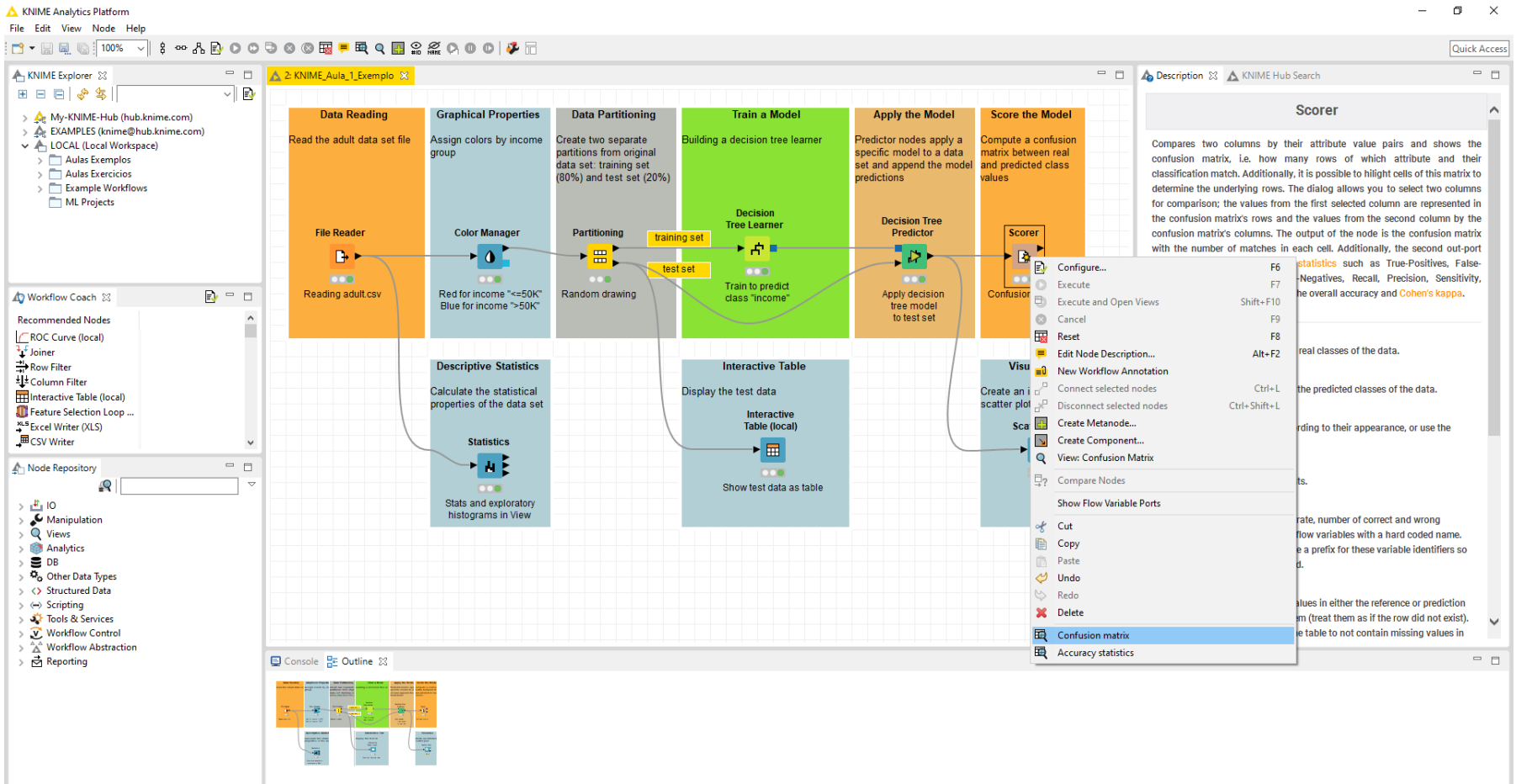
Node Context Options: Scorer



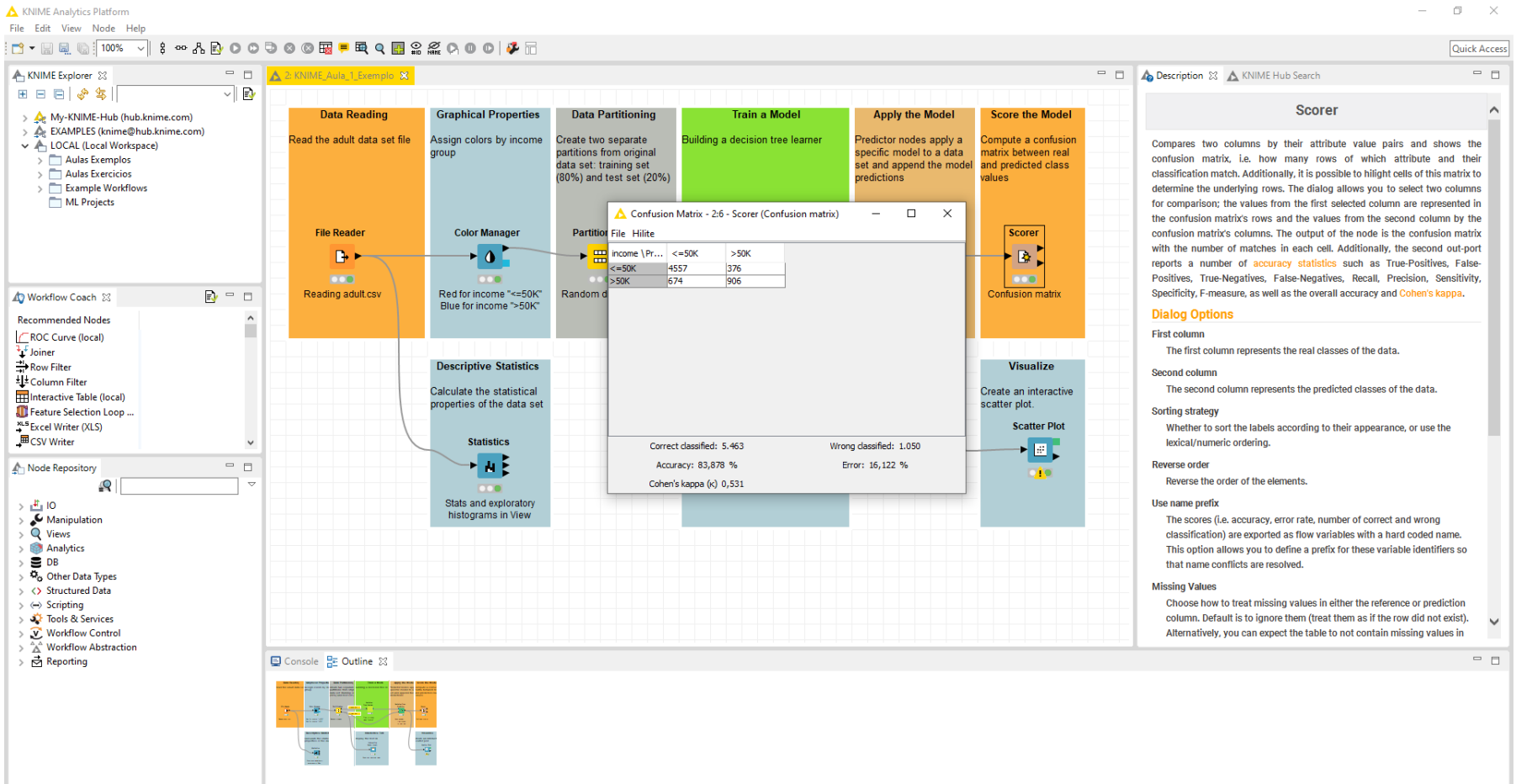
Node Context Options: Scorer

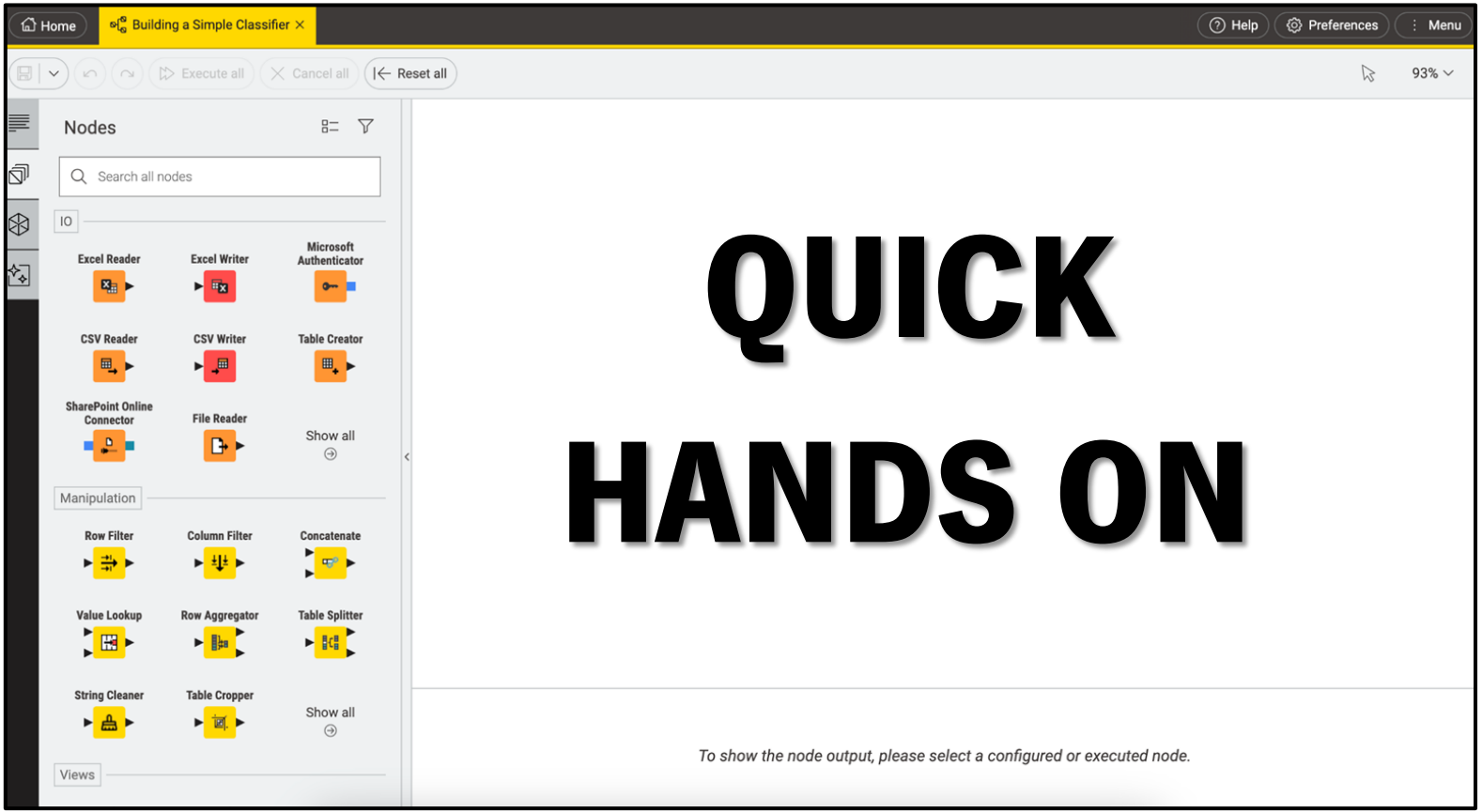


Node Context Options: Scorer



Node Context Options: Scorer




Home
Building a Simple Classifier
Help
Preferences
Menu
Execute all
Cancel all
Reset all
93%
Nodes
Search all nodes
IO
Excel Reader
Excel Writer
Microsoft Authenticator
CSV Reader
CSV Writer
Table Creator
SharePoint Online Connector
File Reader
Show all
Manipulation
Row Filter
Column Filter
Concatenate
Value Lookup
Row Aggregator
Table Splitter
String Cleaner
Table Cropper
Show all
Views
QUICK
HANDS ON
To show the node output, please select a configured or executed node.

Universidade do Minho
Departamento de Informática

Ferramentas de Aprendizagem por Máquina

(Machine Learning Tools)

LEI/MiEI @ 2024/2025, 2º sem