GUIDED ANALYTICS LEARNATHON

#ODSC

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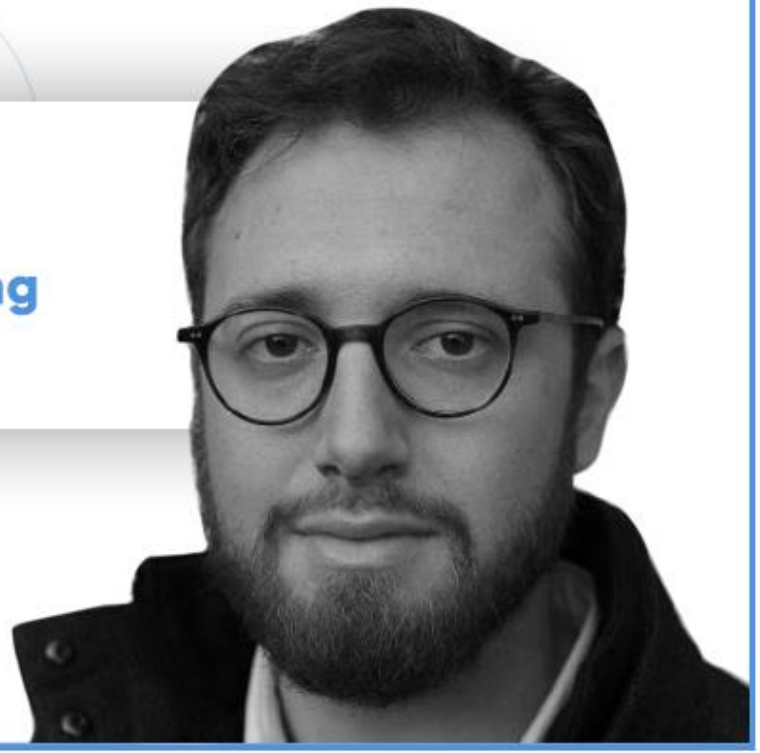
@KNIME

Boston | April 30 - May 4, 2019

#ODSC

BOSTON
APR 30 – MAY 3

Guided Analytics Learnathon: Building Applications for Automated Machine Learning



Paolo Tamagnini

Data Scientist,
KNIME, Inc.

#ODSC

BOSTON
APR 30 – MAY 3

Guided Analytics Learnathon: Building Applications for Automated Machine Learning

Scott Fincher
Data Scientist,
KNIME, Inc.

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Guided Analytics Learnathon

Sessions
Introduction to KNIME Analytics Platform and KNIME Server
Building Applications for Automated Machine Learning
Let's build a guided analytics workflow!
Wrap-up Session and Demo of Solution

#KNIME
#ODSCEast

Paolo Tamagnini, KNIME
Scott Fincher, KNIME

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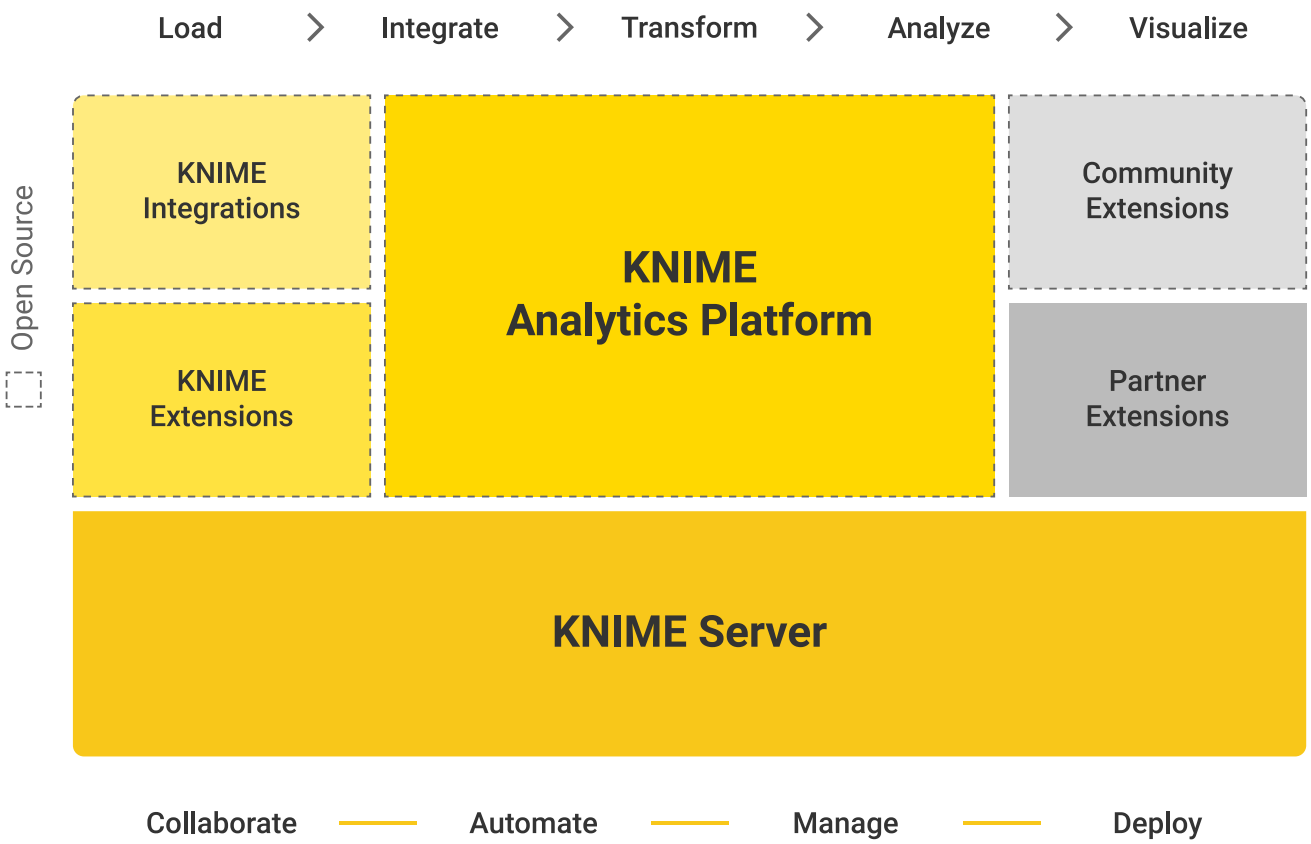
Introduction to KNIME Analytics Platform and KNIME Server

Paolo Tamagnini, KNIME

#KNIME
#ODSCEast

KNIME® Software



Guided Analytics Learnathon

Building Applications for Automated ML

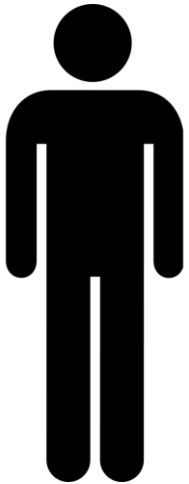
Paolo Tamagnini, KNIME

#KNIME
#ODSCEast

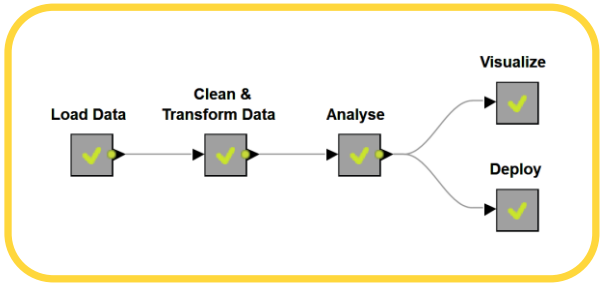
The CRISP-DM Cycle

In theory..

tadaahh!

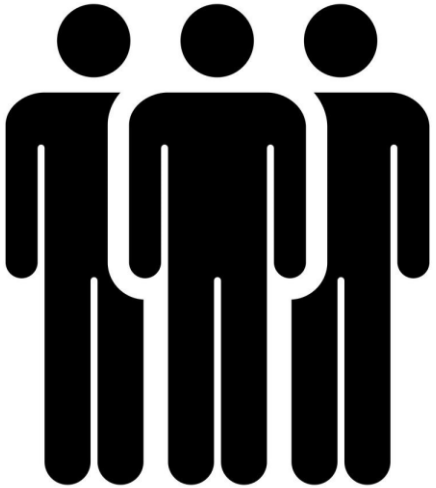


Data Scientist



Great! *Good Job!*

Awesome!

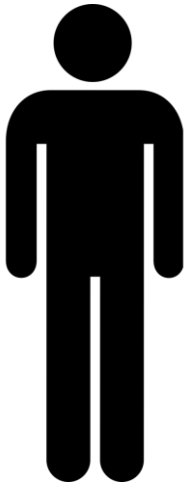


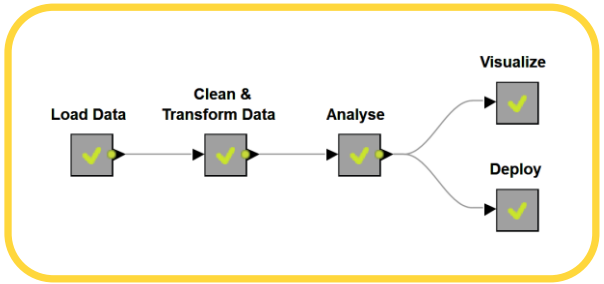
Business Analysts

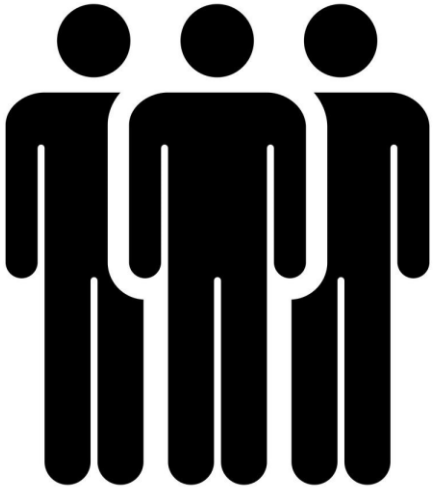
In practice..

*Can I use a **neural network** instead of a **decision tree**?*
*Can I **upload** my own file? Can I optimize the **model parameters**?*
*Would it be possible to add some **feature engineering**?*

!?



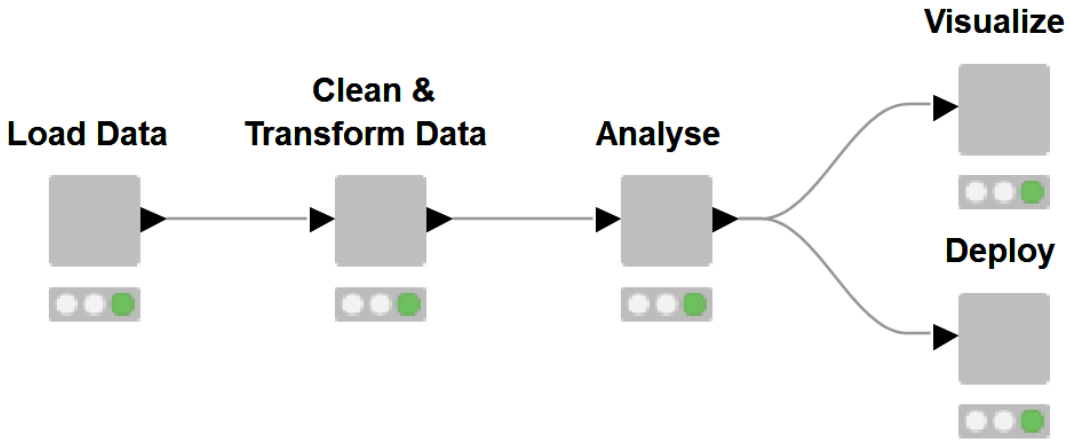




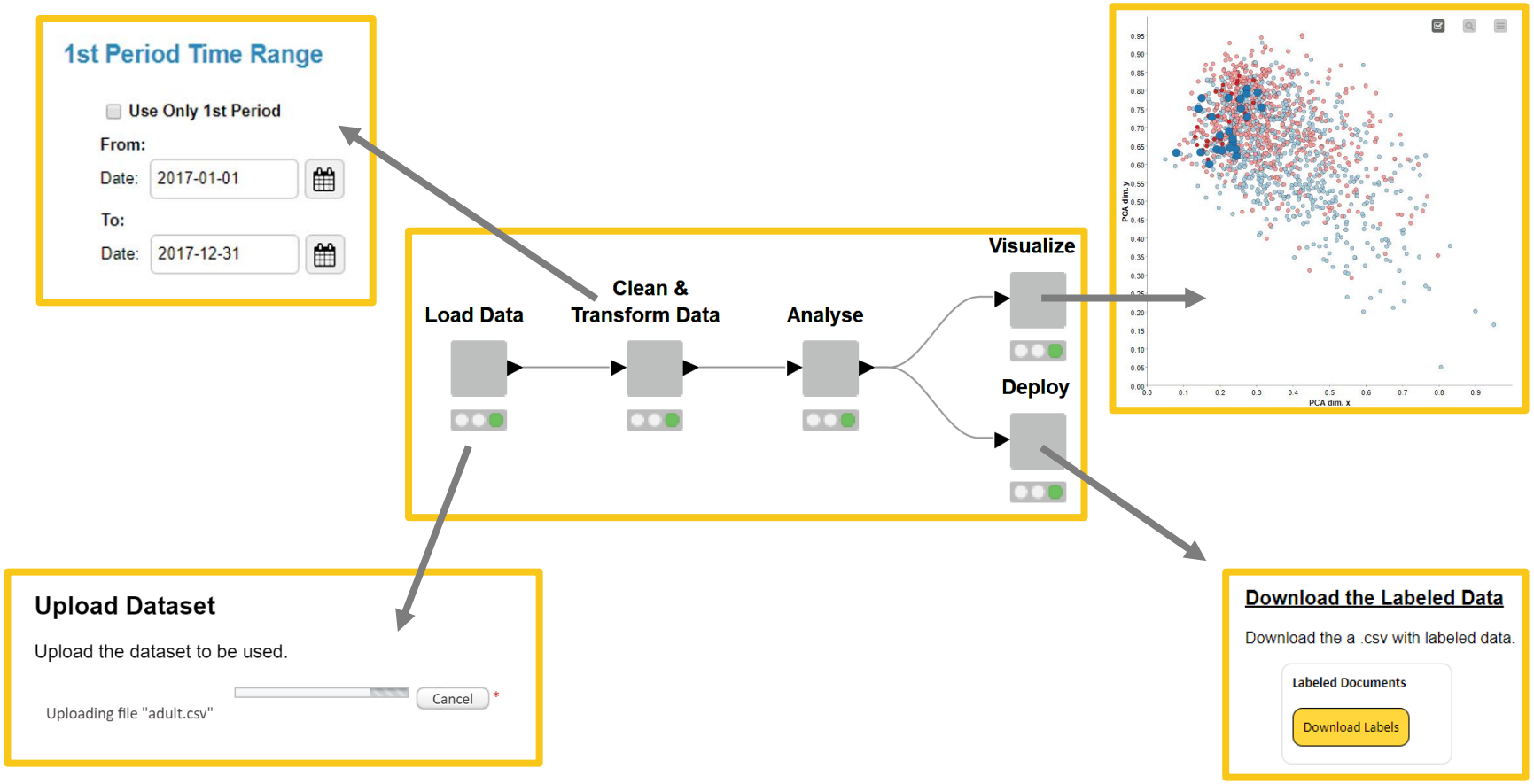
Data Scientist

Business Analysts

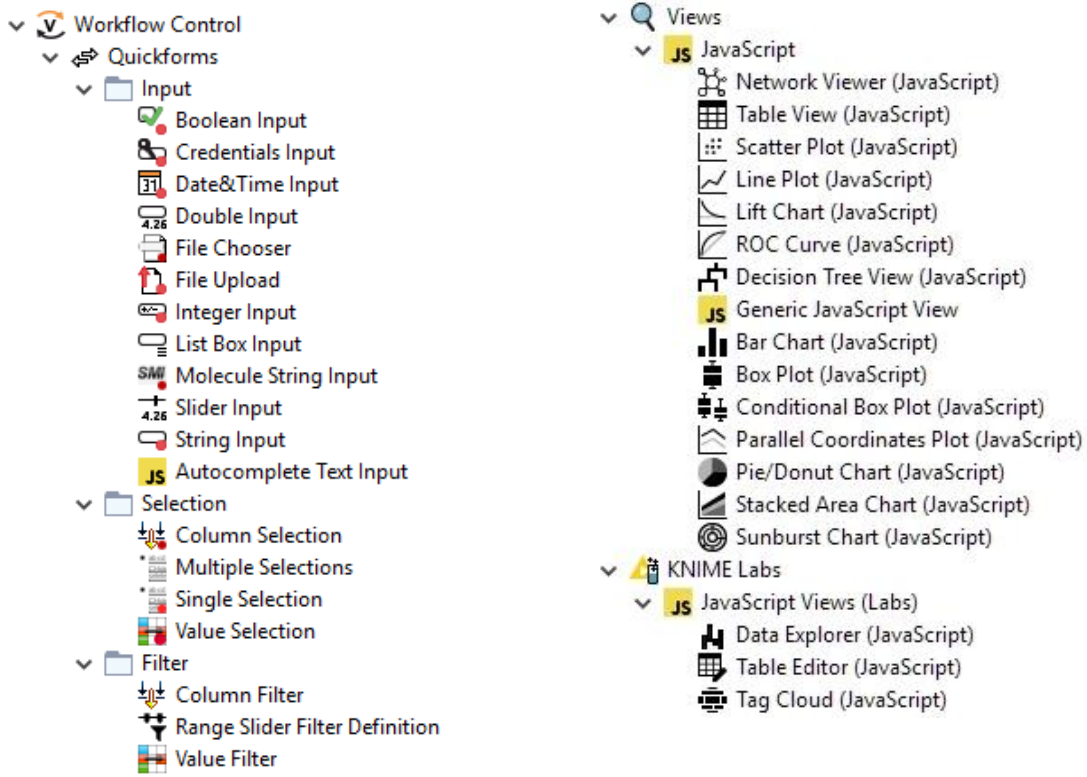
The CRISP-DM Cycle with Wrapped Metanodes



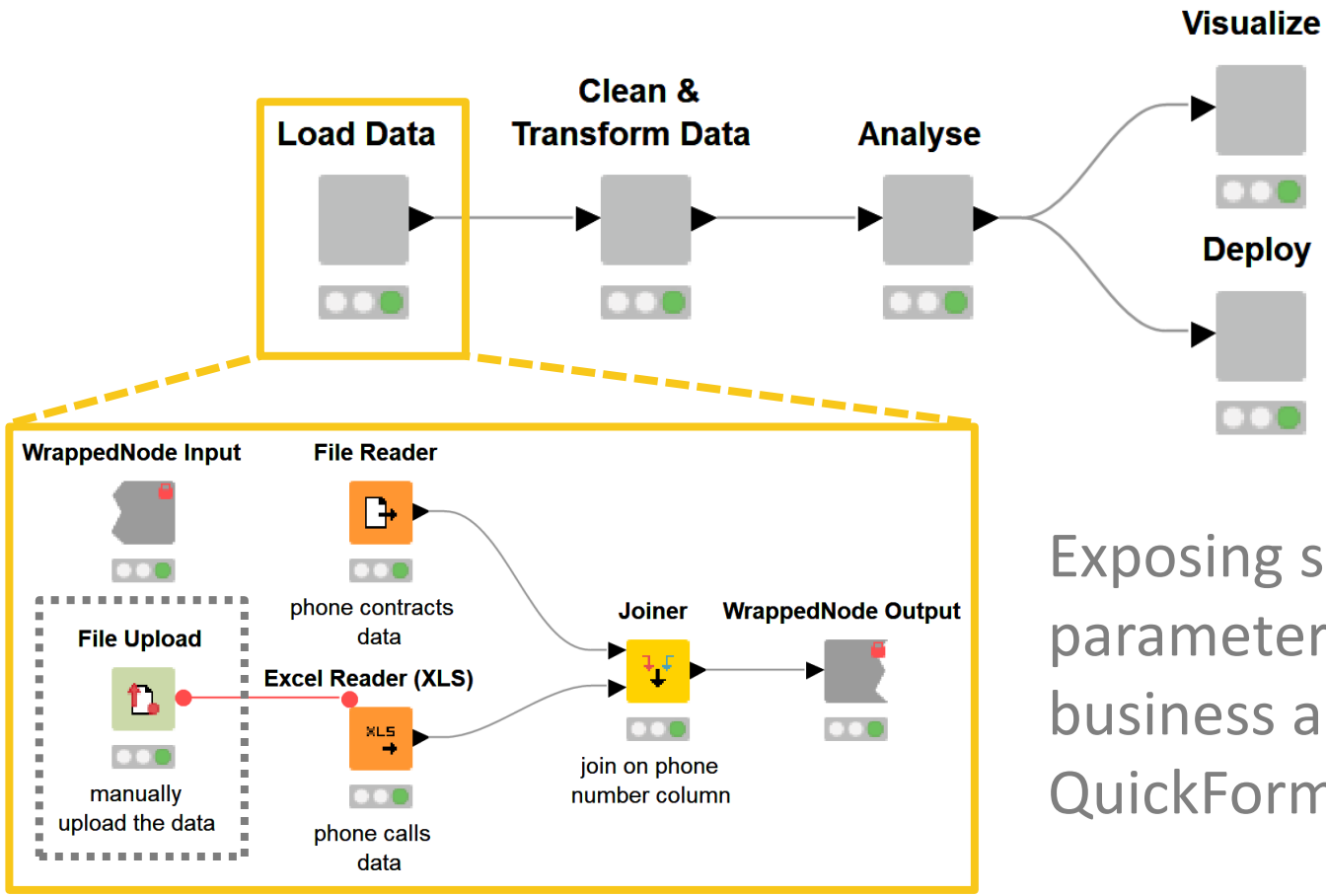
Examples of Wrapped Metanode Views



Quickforms and JavaScript Nodes

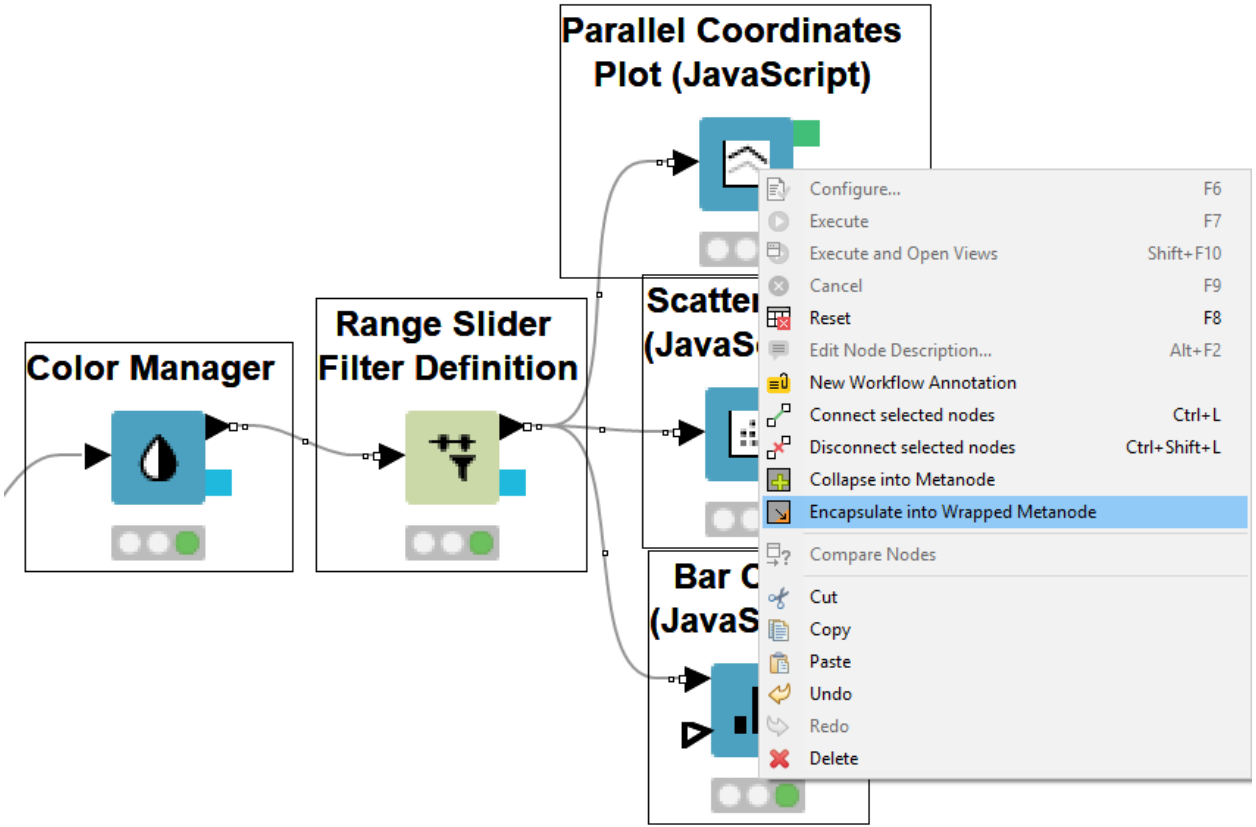


Data Access

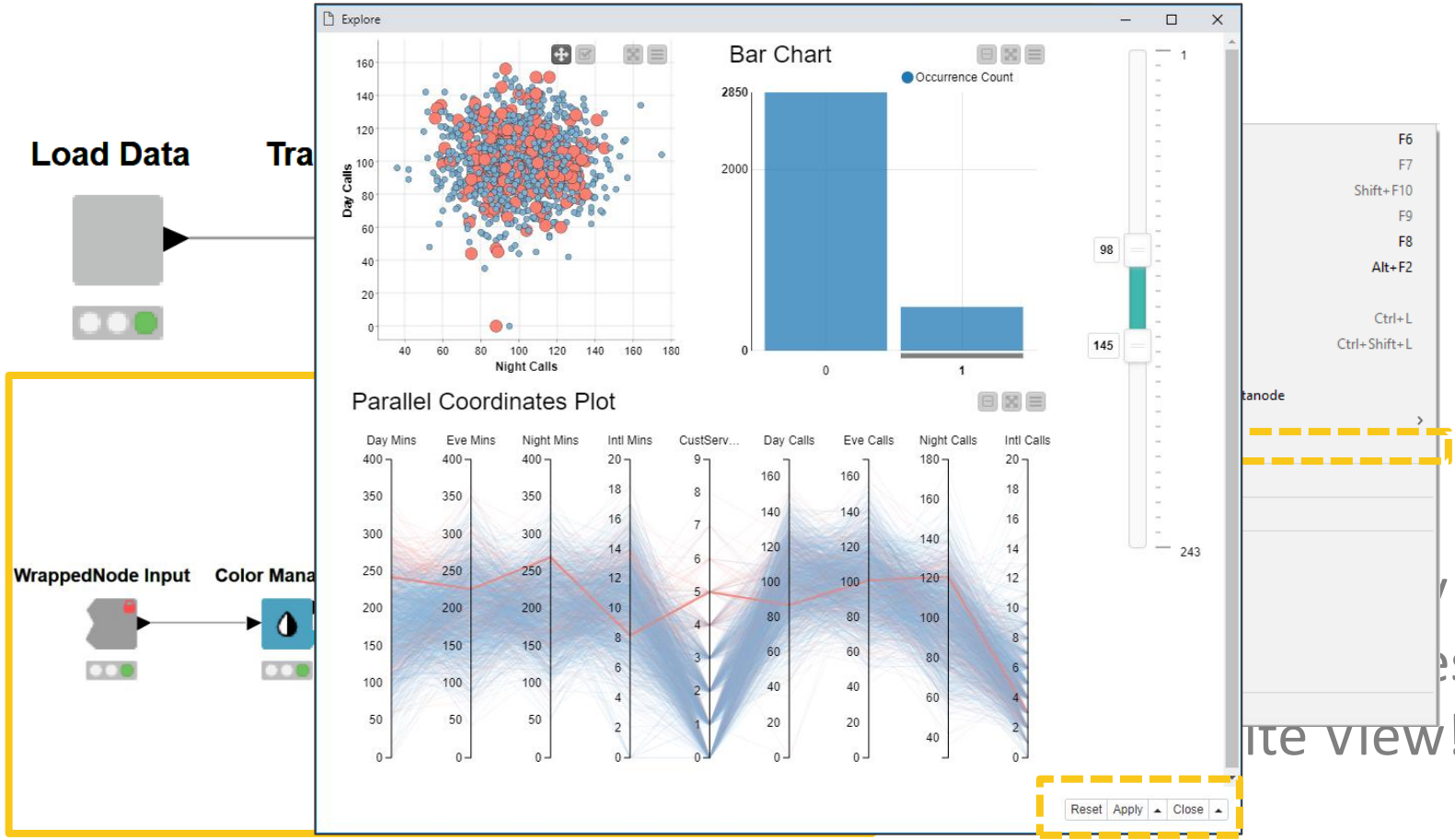


Exposing some parameters to the business analyst using QuickForms nodes!

How to Make a Wrapped Metanode

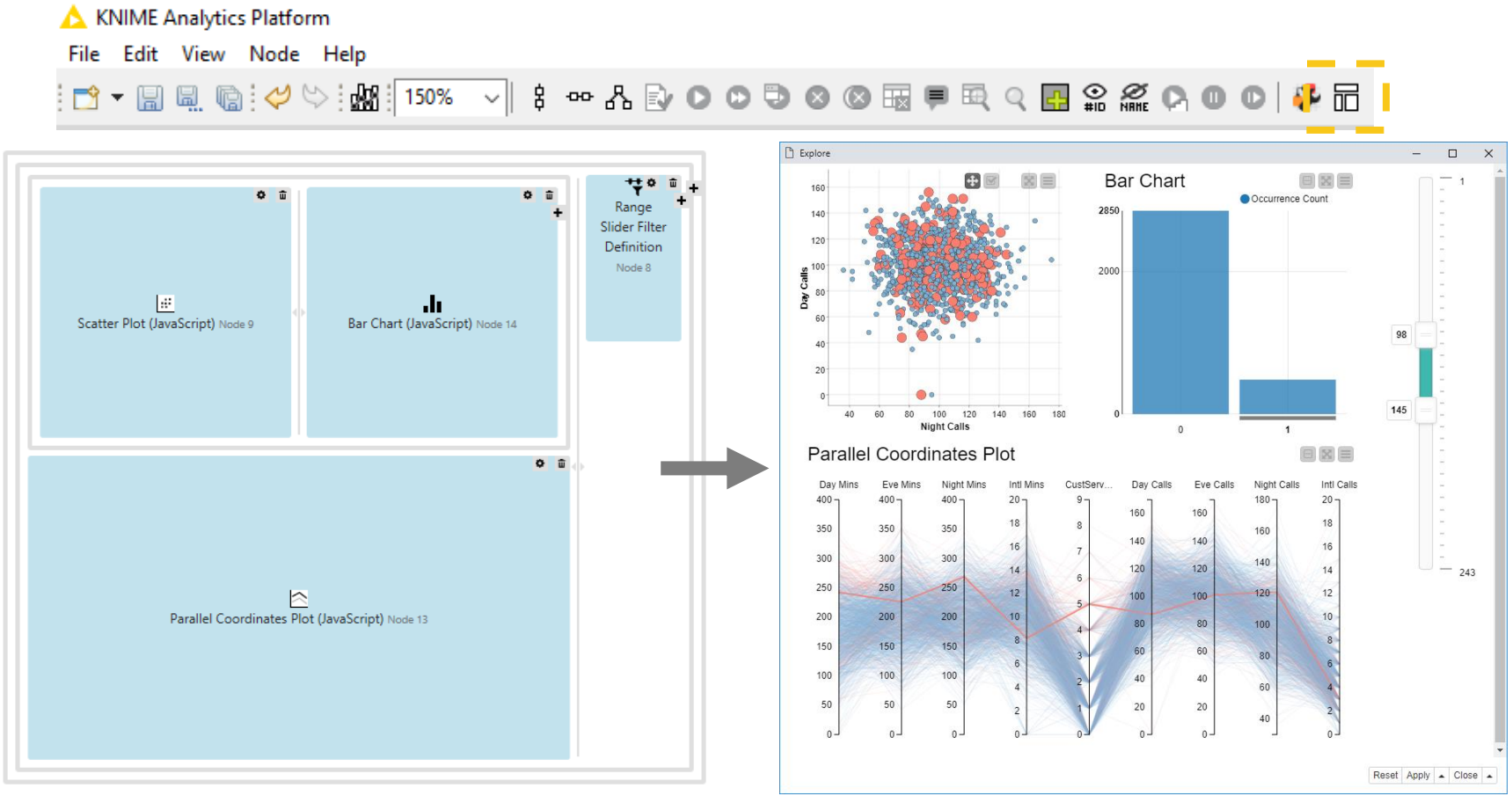


Data Visualization of Results

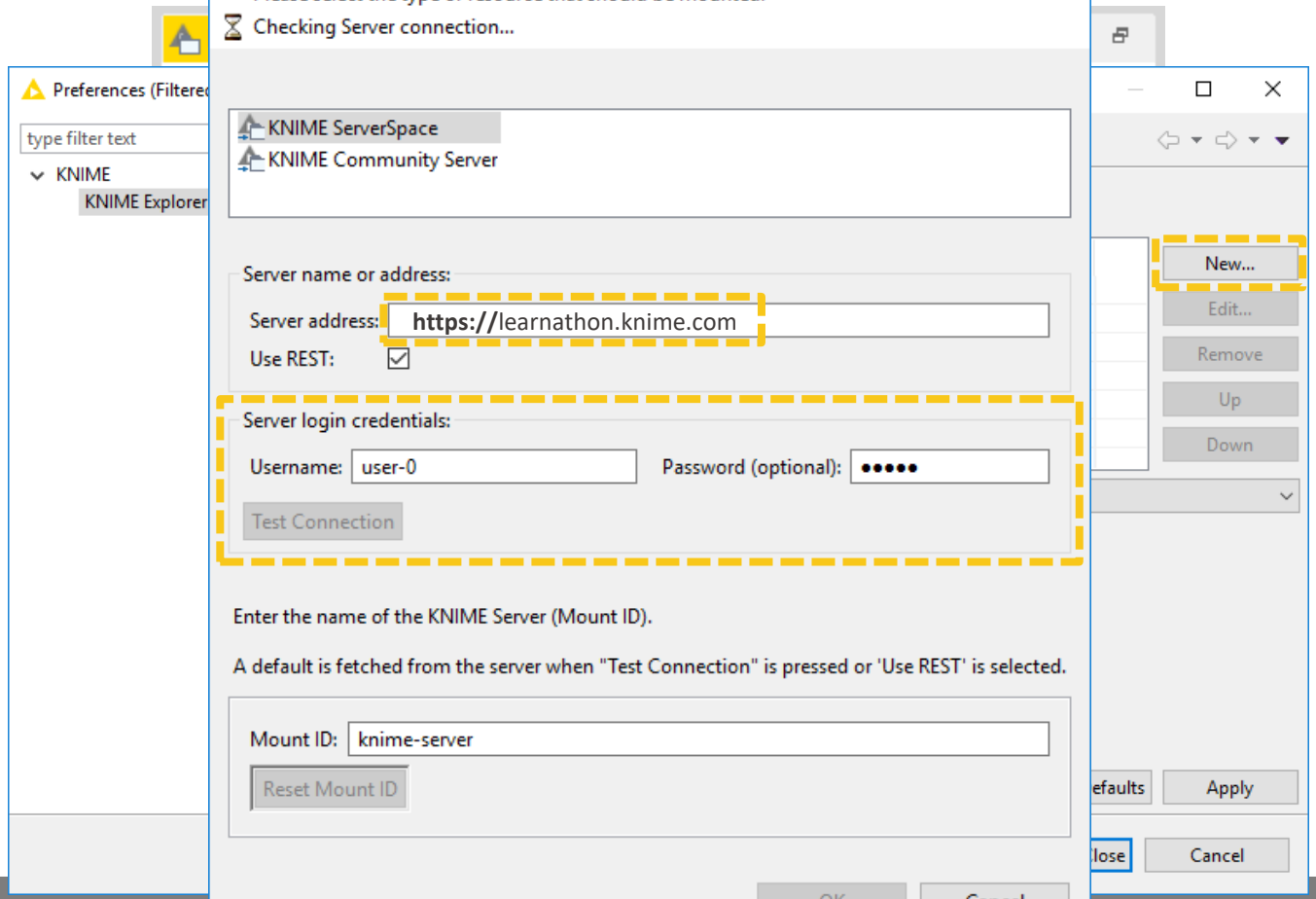


es in
ite view!

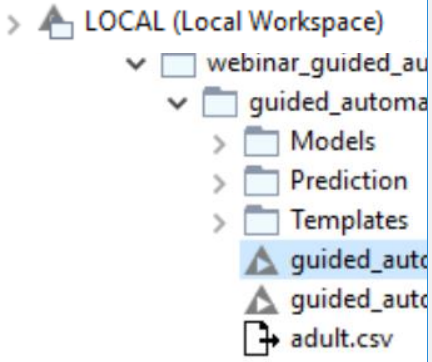
Customizing the View Layout

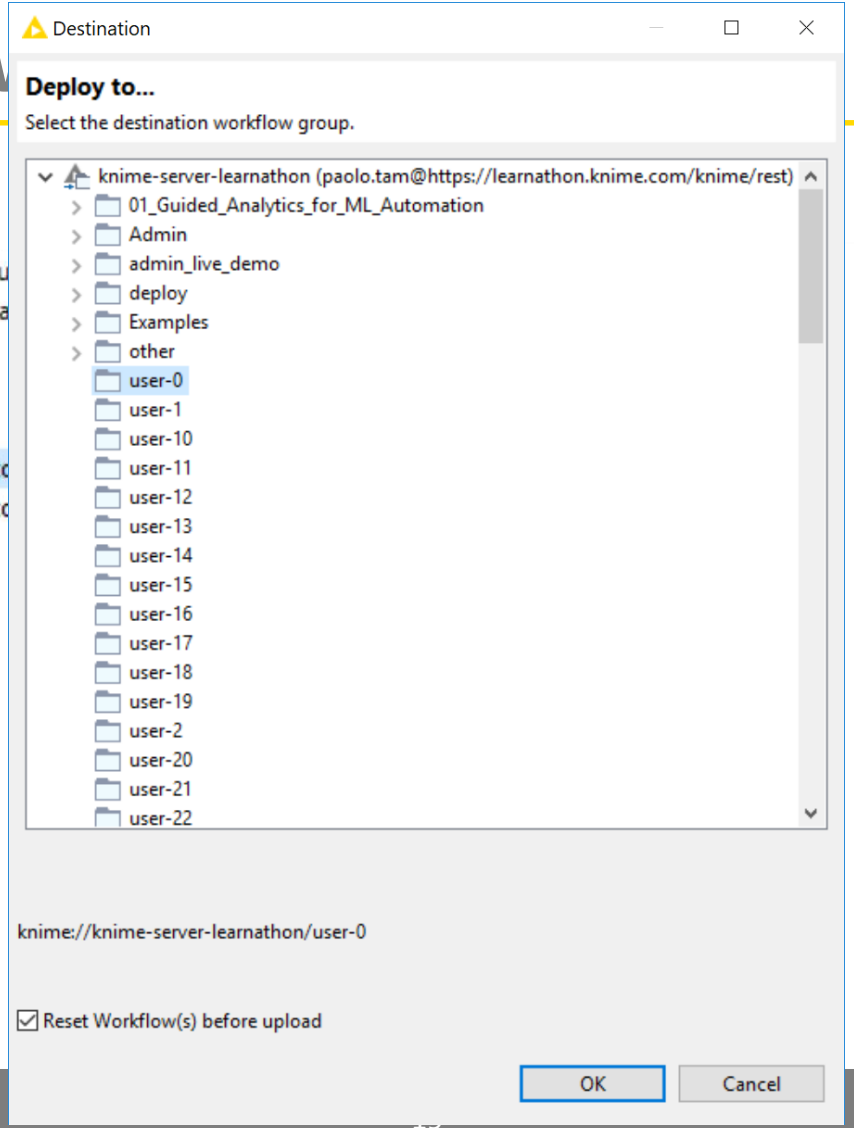


Connecting to K



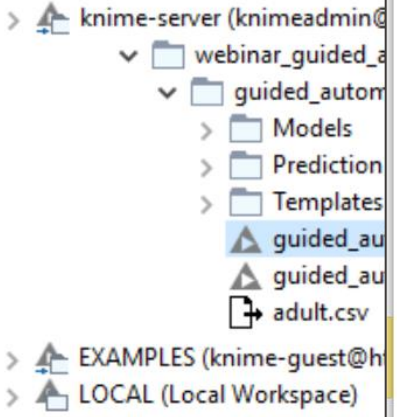
Deploying your W

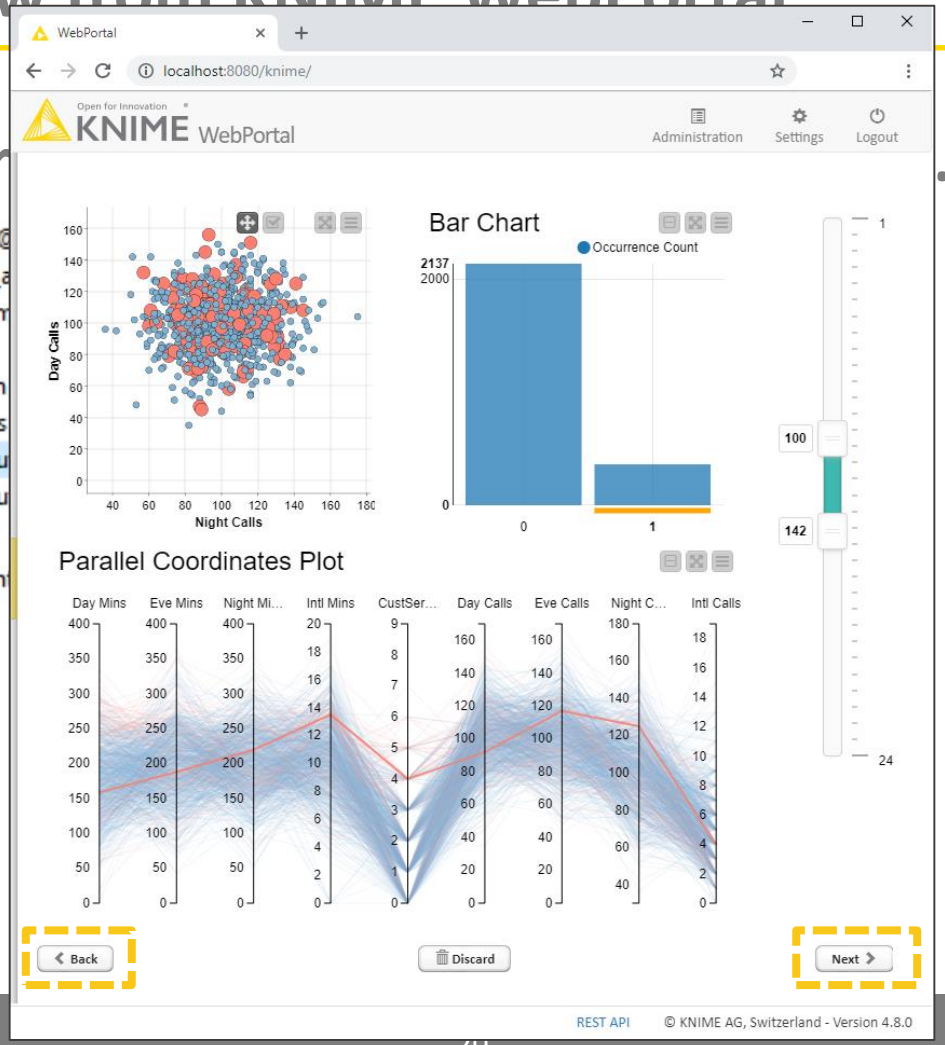




Composite View from KNIME WebPortal

From the wor





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Interactivity across Charts: Selection and Filter Events

A Solution to Automated Machine Learning

What is Guided Analytics?

Developing interactive systems assisting the business analyst in finding new insights and predict future outcomes

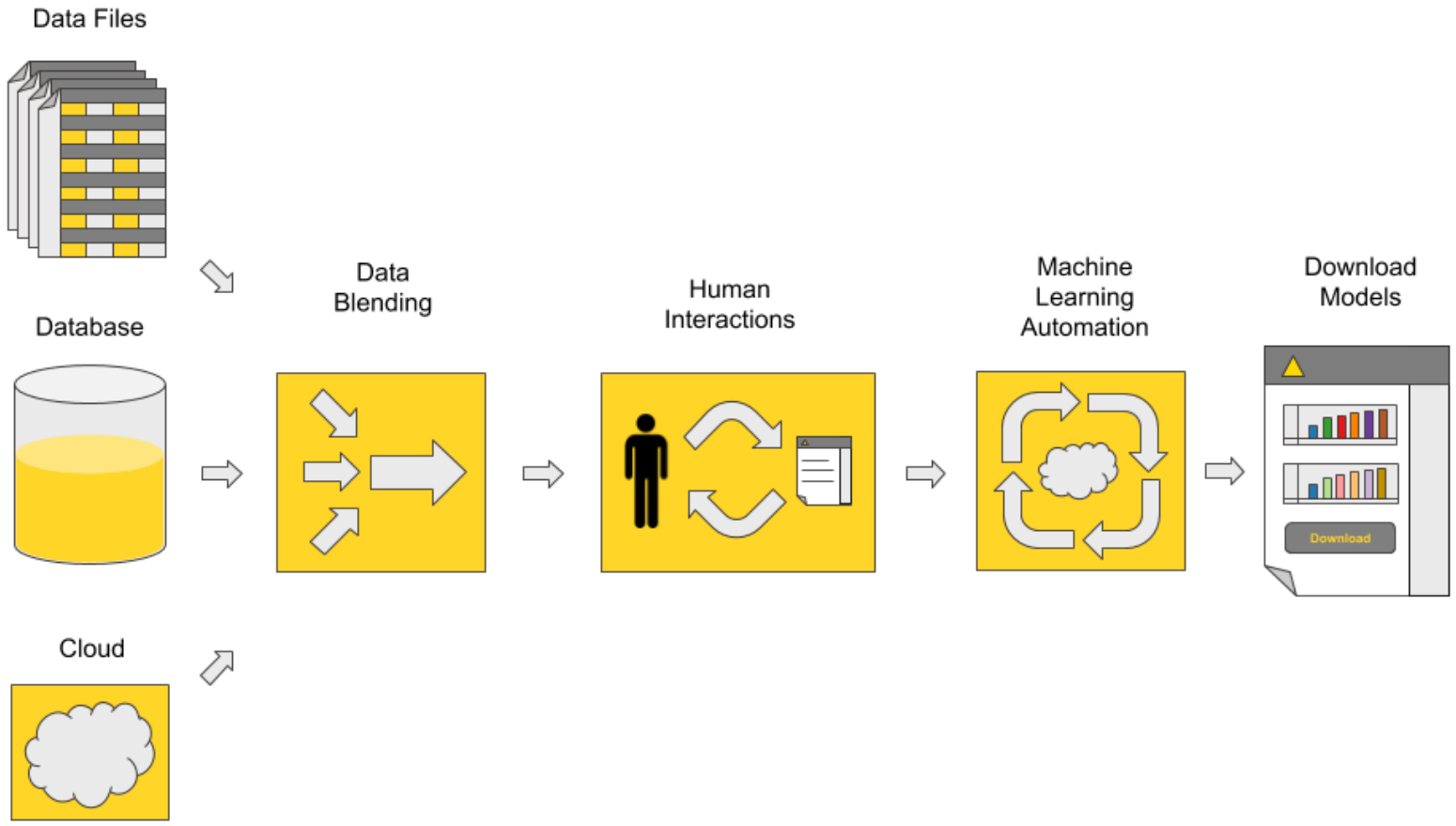
Guided Automation is a special instance of **Guided Analytics** aimed at *intelligently* automating the ML cycle

Two Key Questions

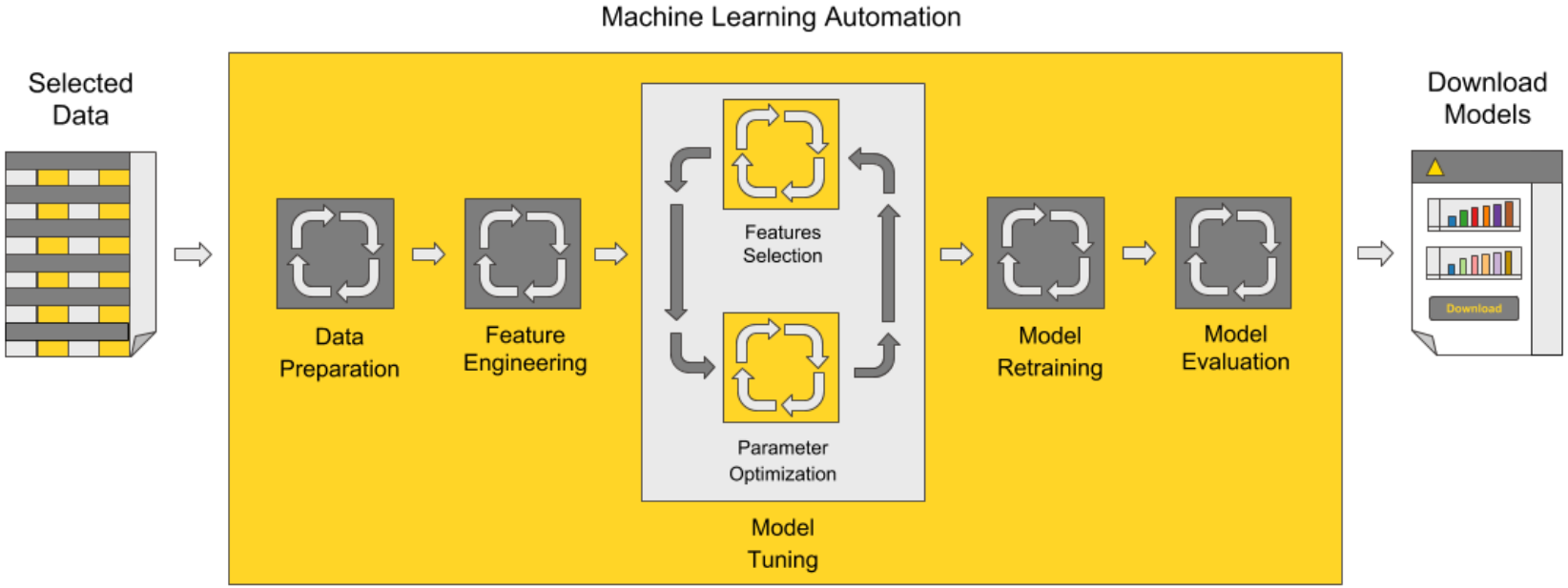
Can we automate the ML cycle in KNIME?

Is it useful to automate the ML cycle?

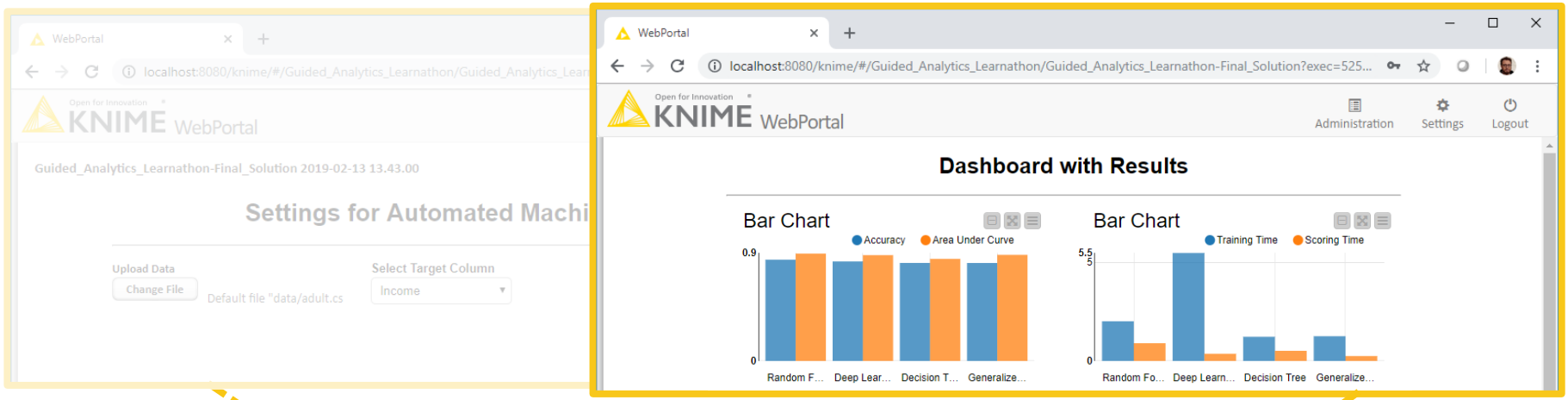
A General Recipe for Guided Automation

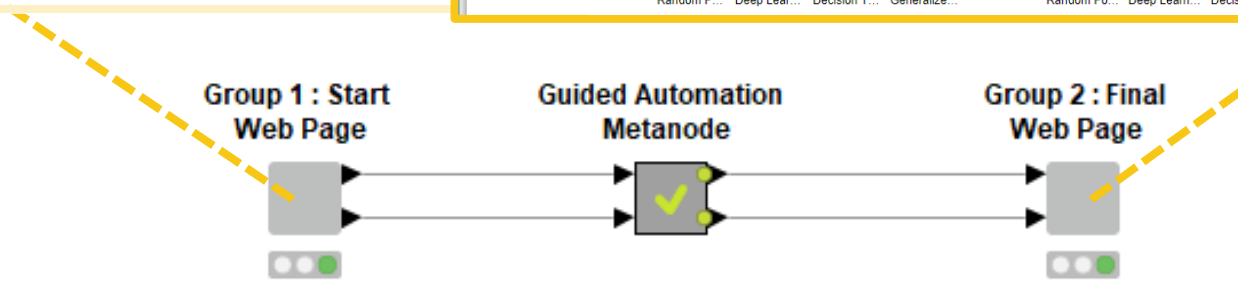


Machine Learning Automation



Today Exercise: a simple example of ML automation





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Today Exercise: Adult Dataset

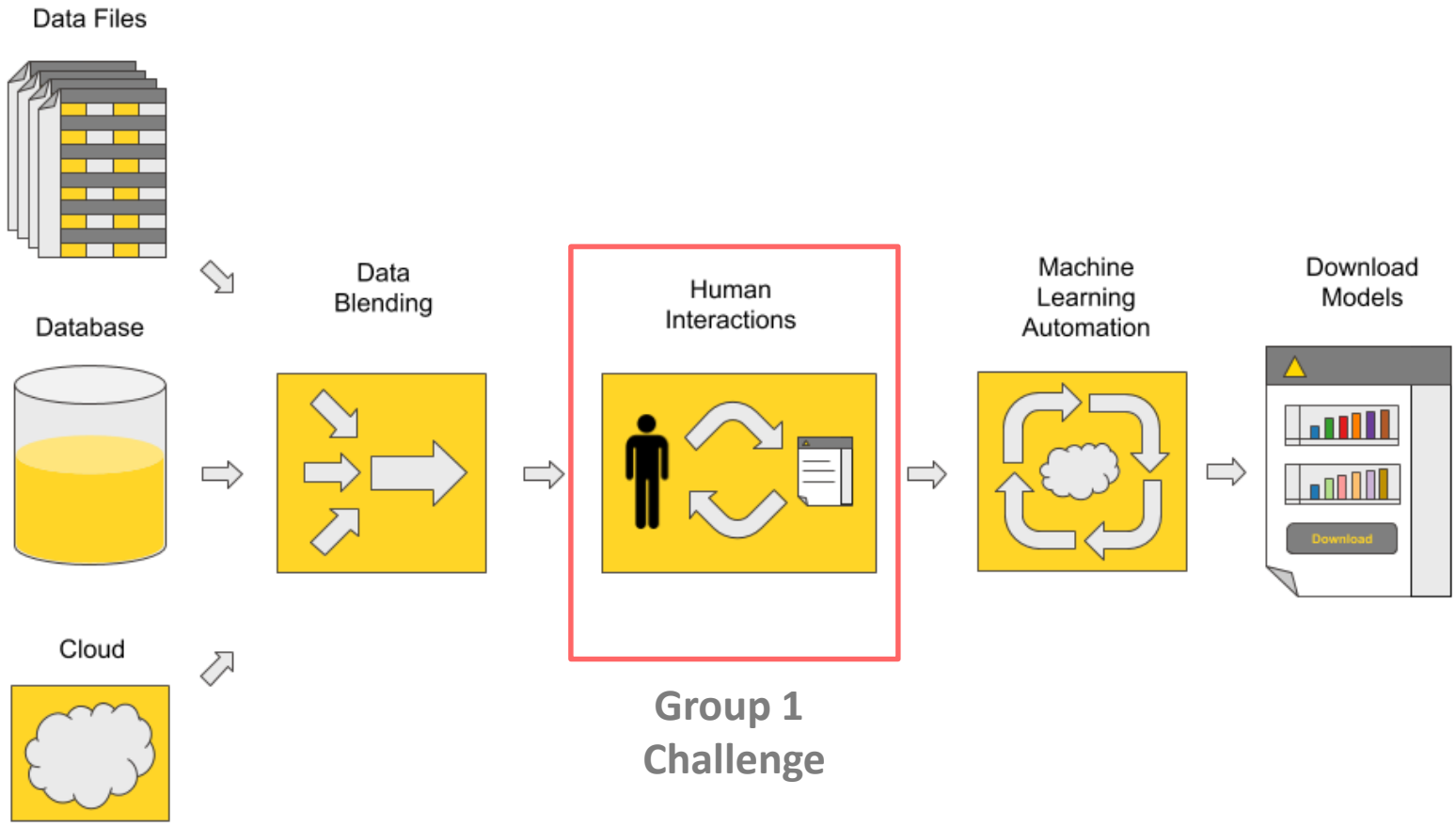
Source: archive.ics.uci.edu/ml/datasets/adult

• Age	• Race
• Workclass	• Sex
• fnlwgt	• Capital Gain
• Education	• Capital Loss
• Education-Num	• Hours per week
• Marital Status	• Country
• Occupation	• ***Income***
• Relationship	• Gender with Income

Income ---------> > 50K $

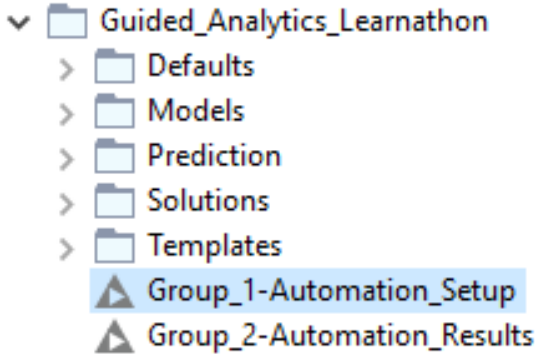
<= 50K $

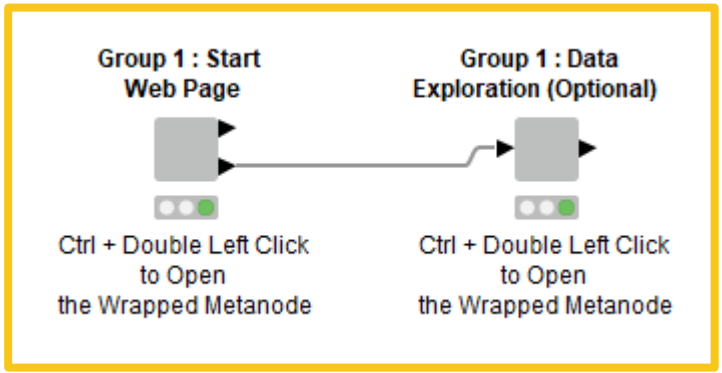
Group 1: User Interface for Automated ML Settings



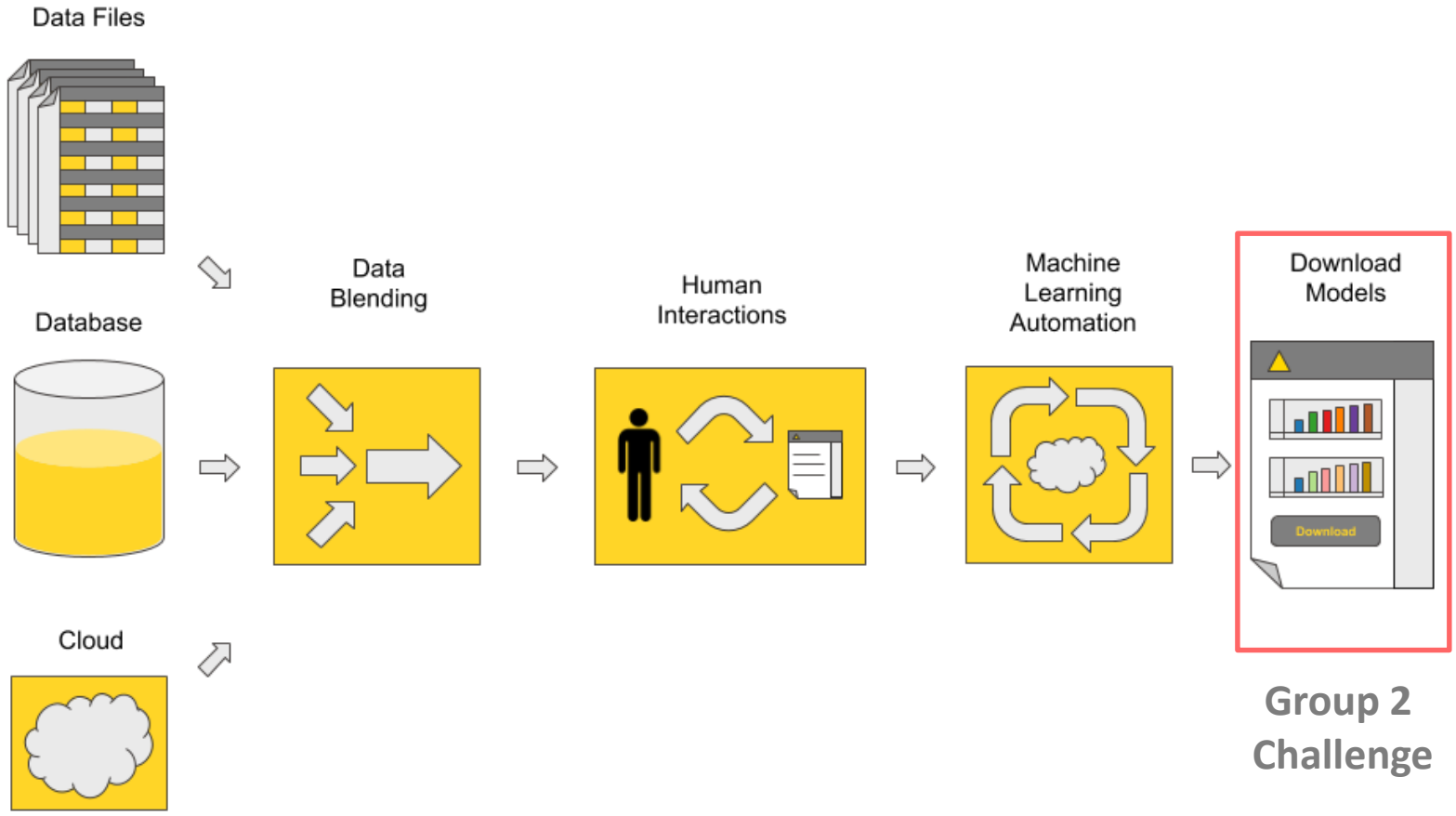
Group 1: User Interface for Automated ML Settings

- Read and inspect the data
- Define target variable
- Select which ML models to train
- Exclude certain columns from model training
- Create an interactive composite view **[OPTIONAL]**





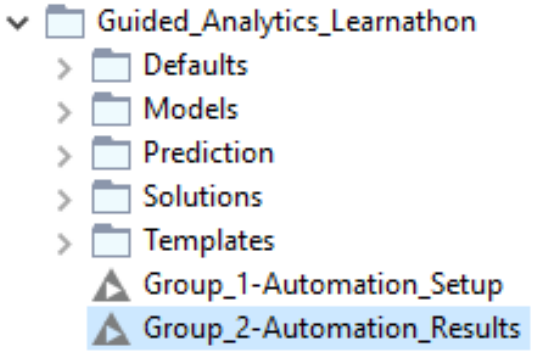
Group 2: Dashboard with Models Performance

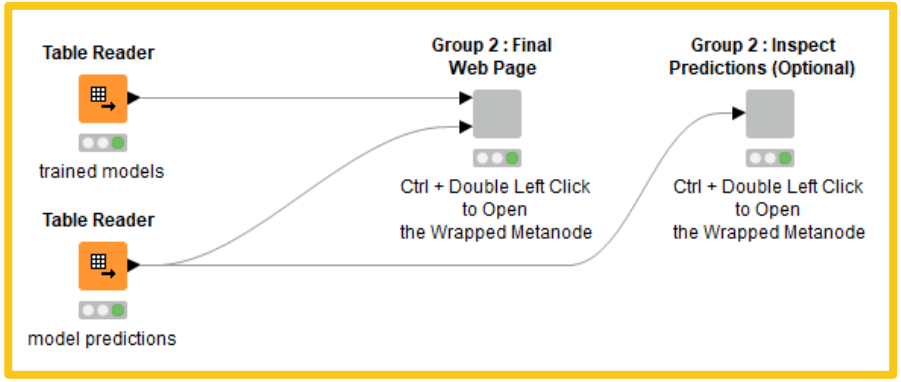


Group 2 Challenge

Group 2: Dashboard with Models Performance

- Visualize and compare models by:
  - accuracies of models
  - training and scoring time
- Create buttons for model and prediction download
- Create an dashboard to inspect predictions **[OPTIONAL]**





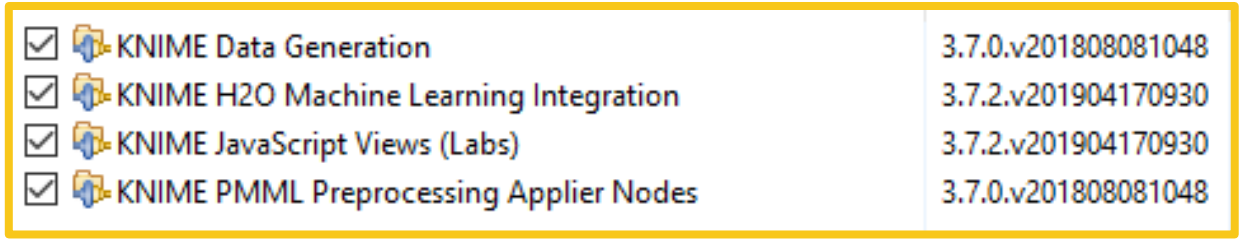
Time to import the workflows from the USB sticks!

From the USB stick or from **tinyurl.com/ODSC-Learnathon**
import file ***Guided_Analytics_Learnathon.knar***
into your workspace:

1. File > Import KNIME Workflows..
2. “Browse” in the *Select File* field
3. Select *Guided_Analytics_Learnathon.knar* from the USB stick or where ever else you saved it

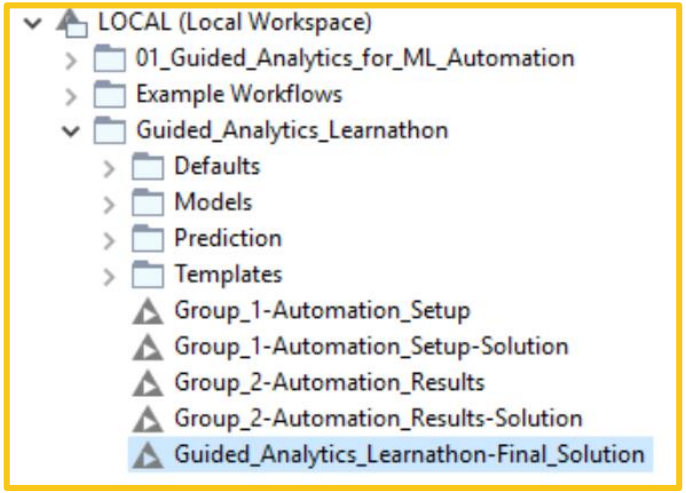
Installing Required Extensions..

- **OPTION 1**: File > Install KNIME Extensions..



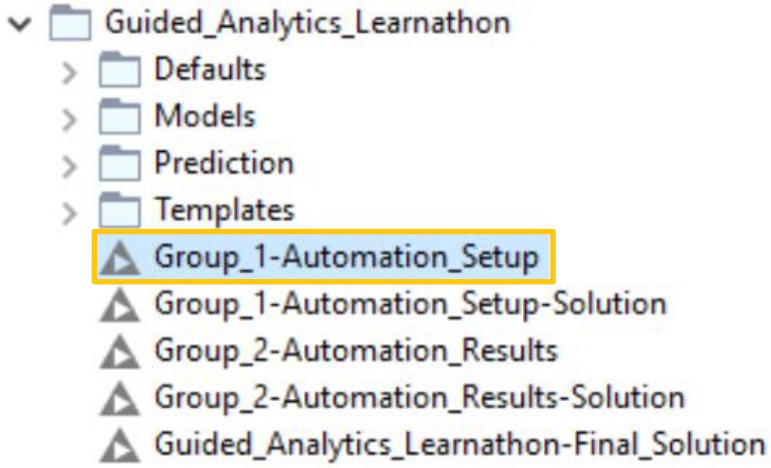
OR..

- **OPTION 2**: Just open the solution workflow and follow the instructions..

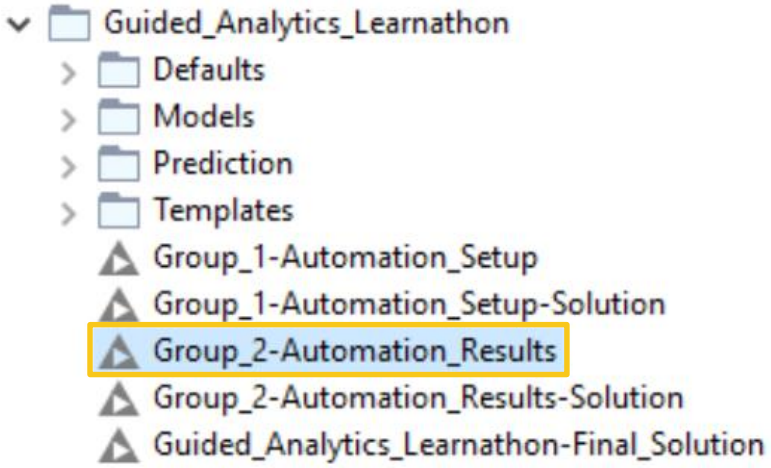


Pick your group!

- **Group 1.**
  User Interface for Automated ML Settings



- **Group 2.**
  Dashboard with Models Performance

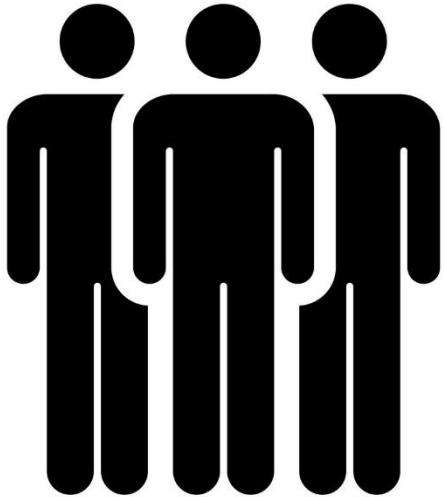


Ideally...

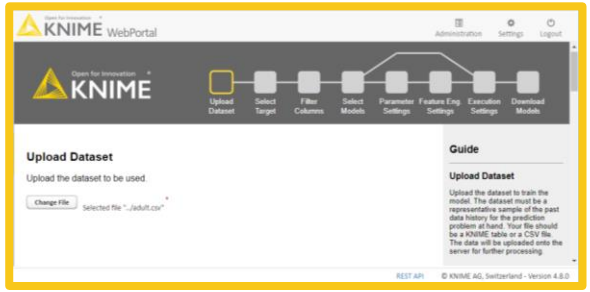
Data Scientist

That's it! Perfect!

Here we go!



Business Analysts



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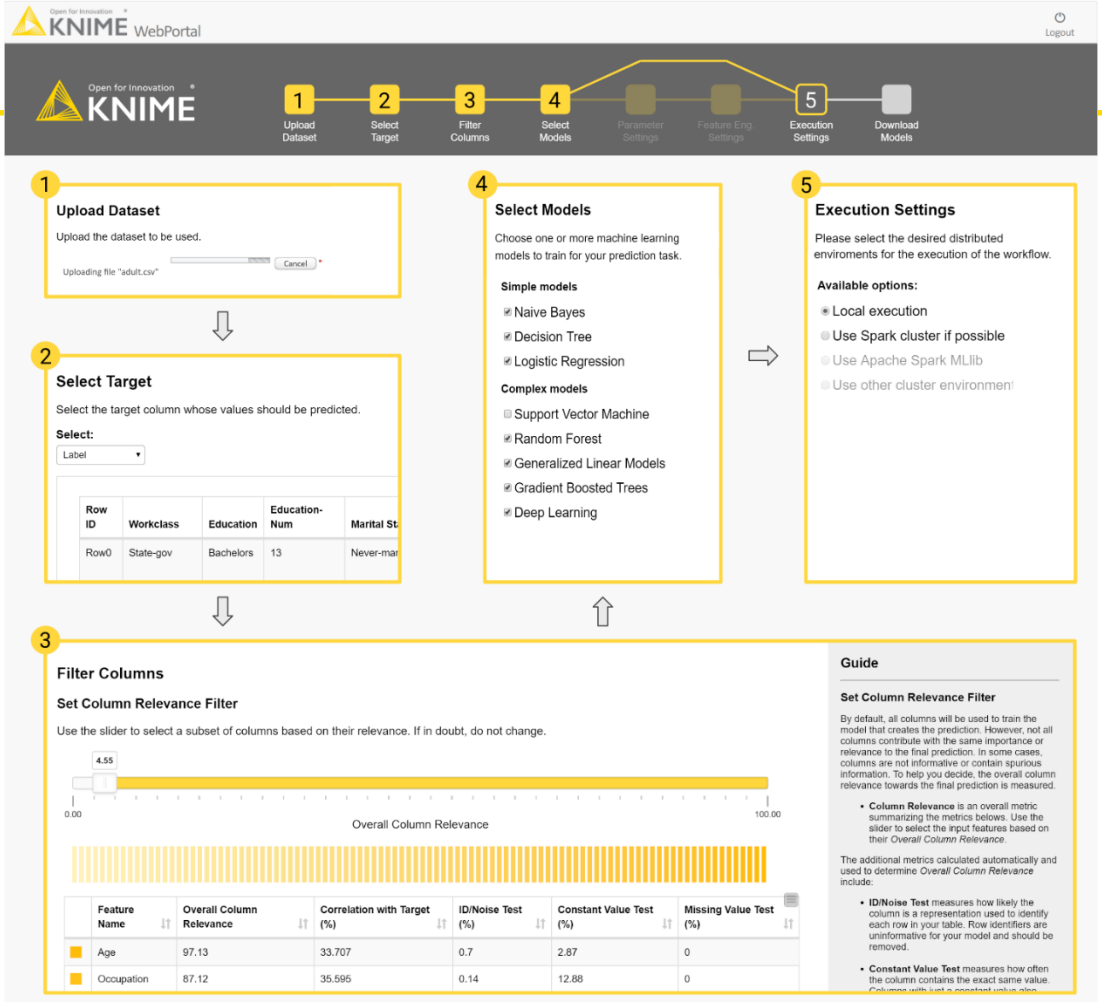
User Interactions

Business analysts will simply access the ***KNIME WebPortal*** from any web browser..



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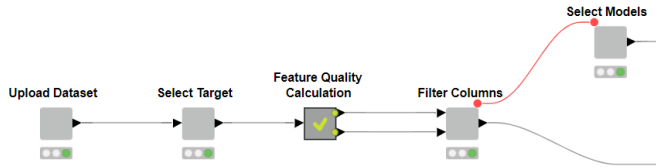
The Workflow

Guided Automation

This workflow defines a fully automated web based application to select, train, test, and optimize a number of machine learning models. The workflow was designed for business analysts to easily create predictive analytics solutions by applying their domain knowledge. Each of the wrapped metanodes outputs a web page with which the business analyst can interact.

Upload Data and Process Setup

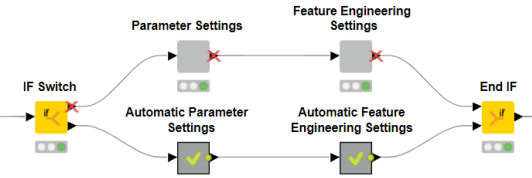
1. Upload your data / define file path
2. Select the target column for the prediction
3. Filter columns to exclude from the model
4. Select models and whether to fine-tune the model parameters



Fine-tune Model Parameters or Use Automatic Settings

If you selected to fine-tune the model parameters:
1. Define the parameter values used for optimization
2. Define feature engineering settings

Otherwise the settings will be automatically set.

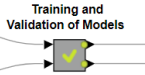


Execution Settings

Decide which execution environment you want to use.

ML Automation

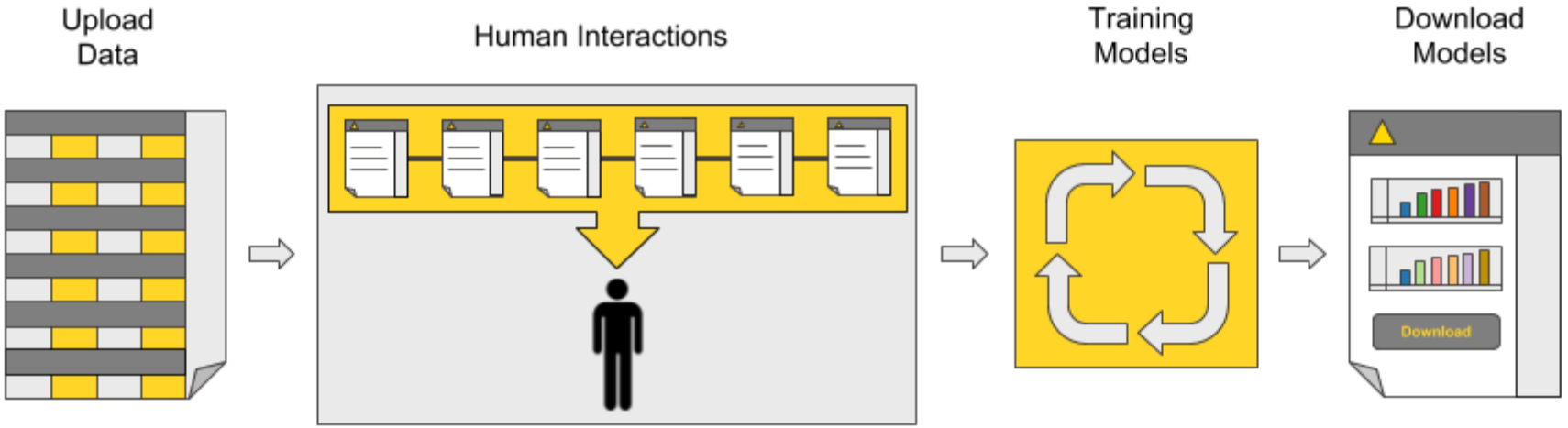
Model parameters are automatically optimized and features engineered.



Download Models

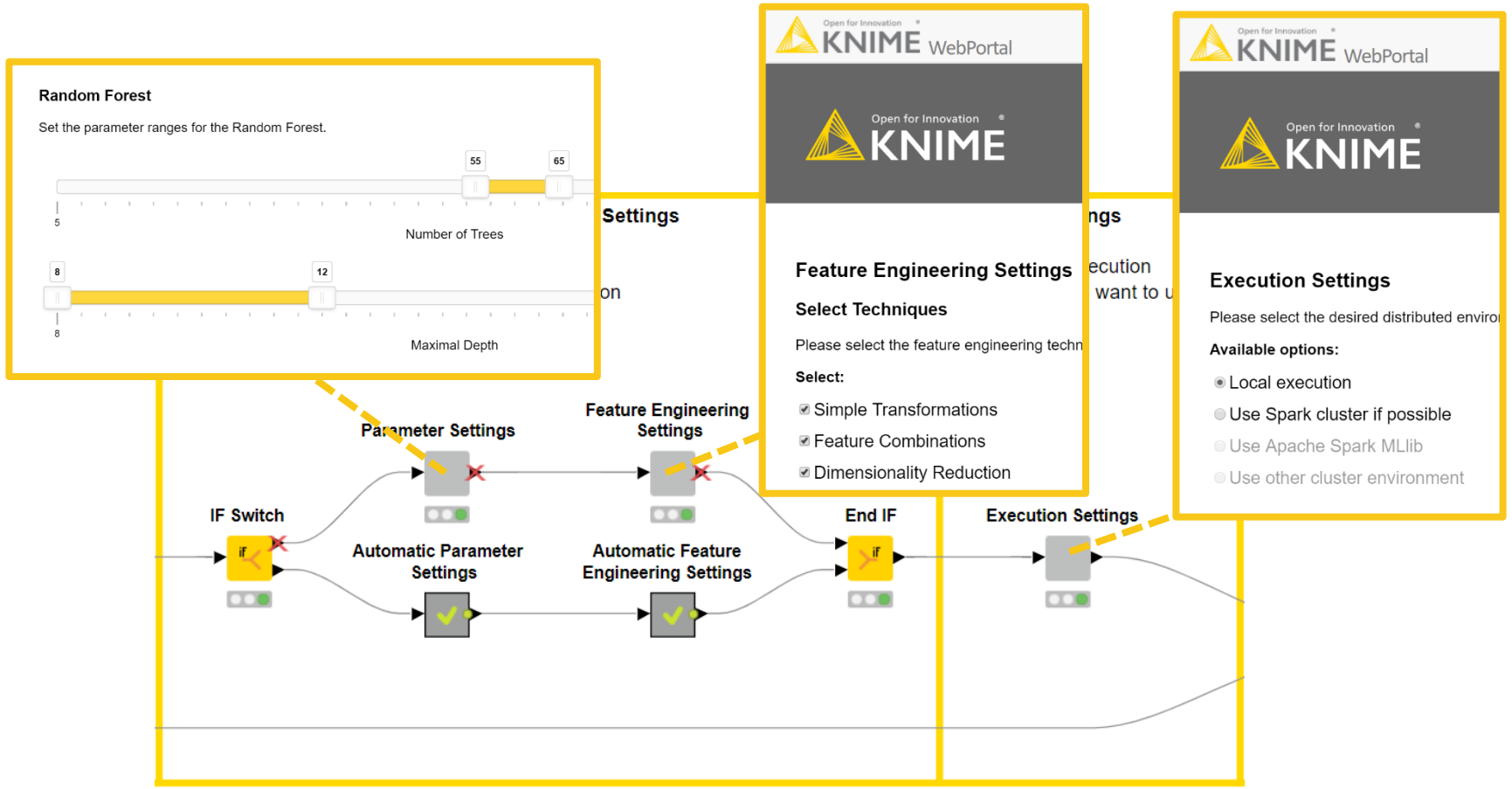
Compare and inspect the results of the models and download the desired ones.

A Blueprint for Guided Automation



The Workflow

The Workflow



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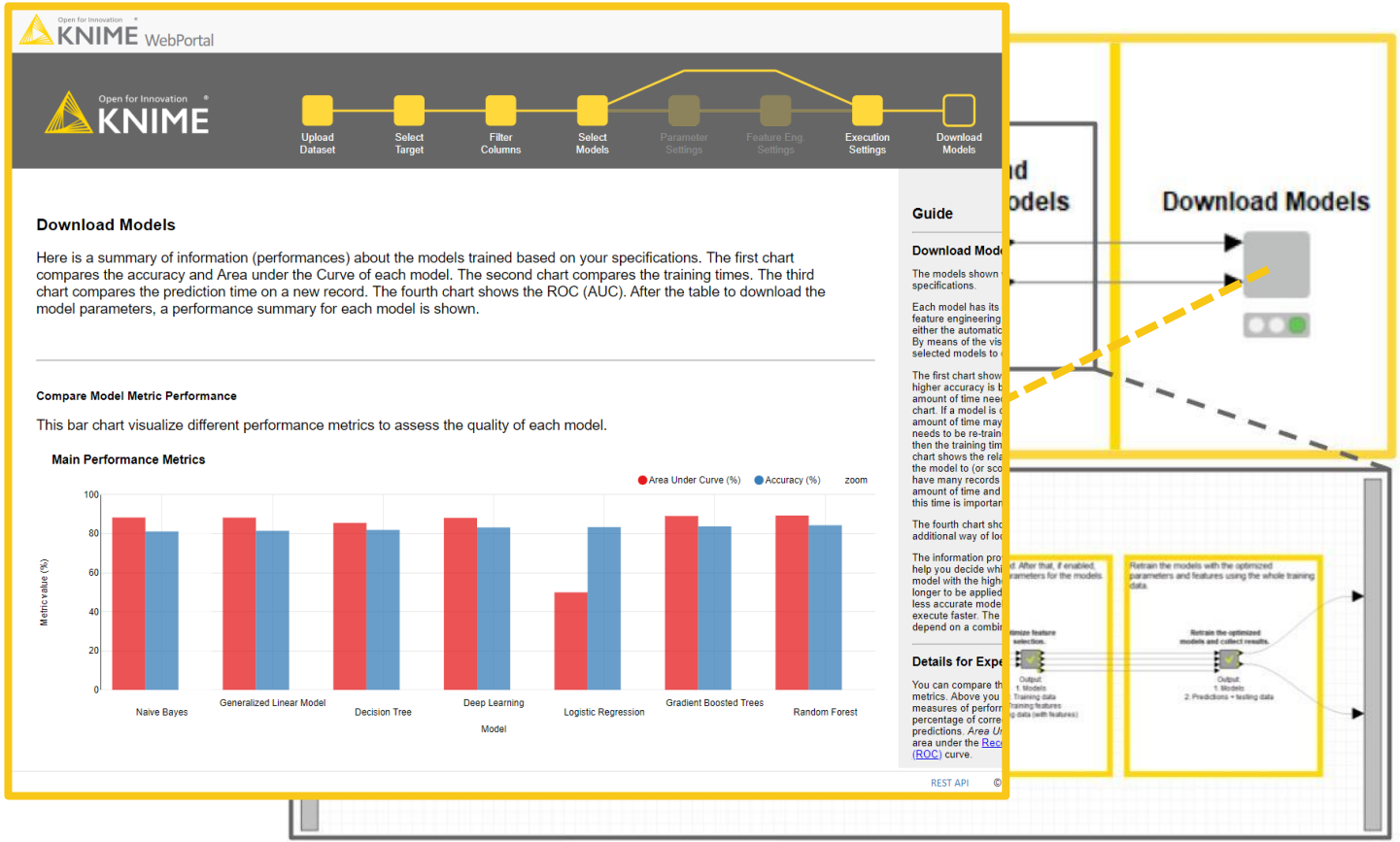
The Workflow



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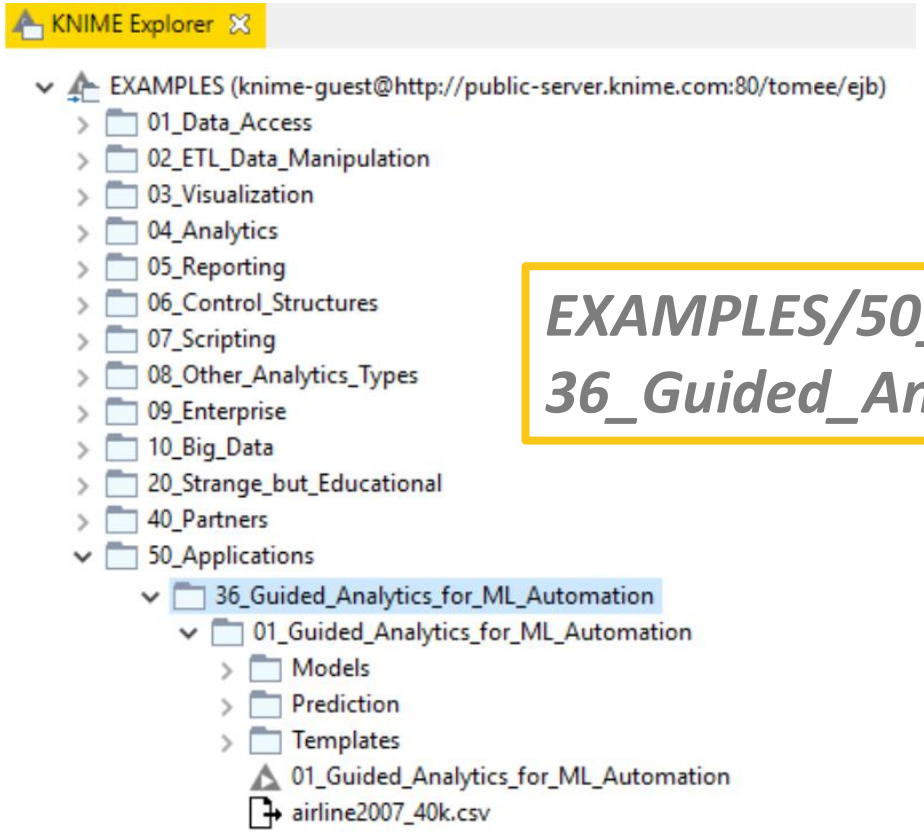
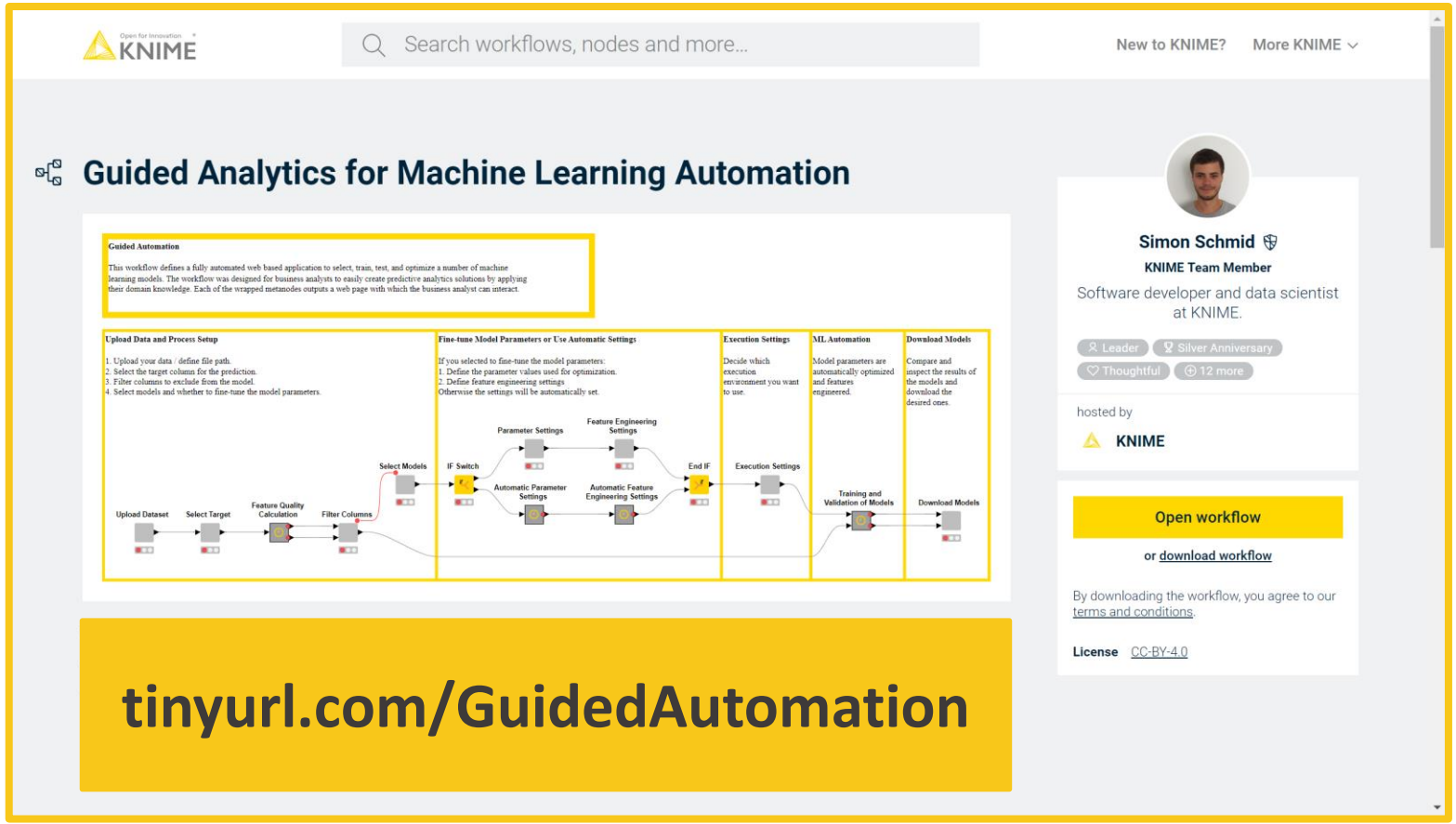
The Workflow



EXAMPLES/50_Applications/
36_Guided_Analytics_for_ML_Automation

On the Workflow Hub..



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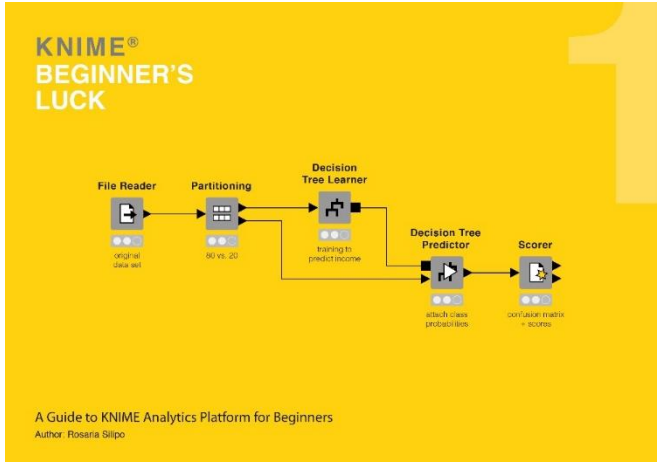

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