IBM Developer
SKILLS NETWORK

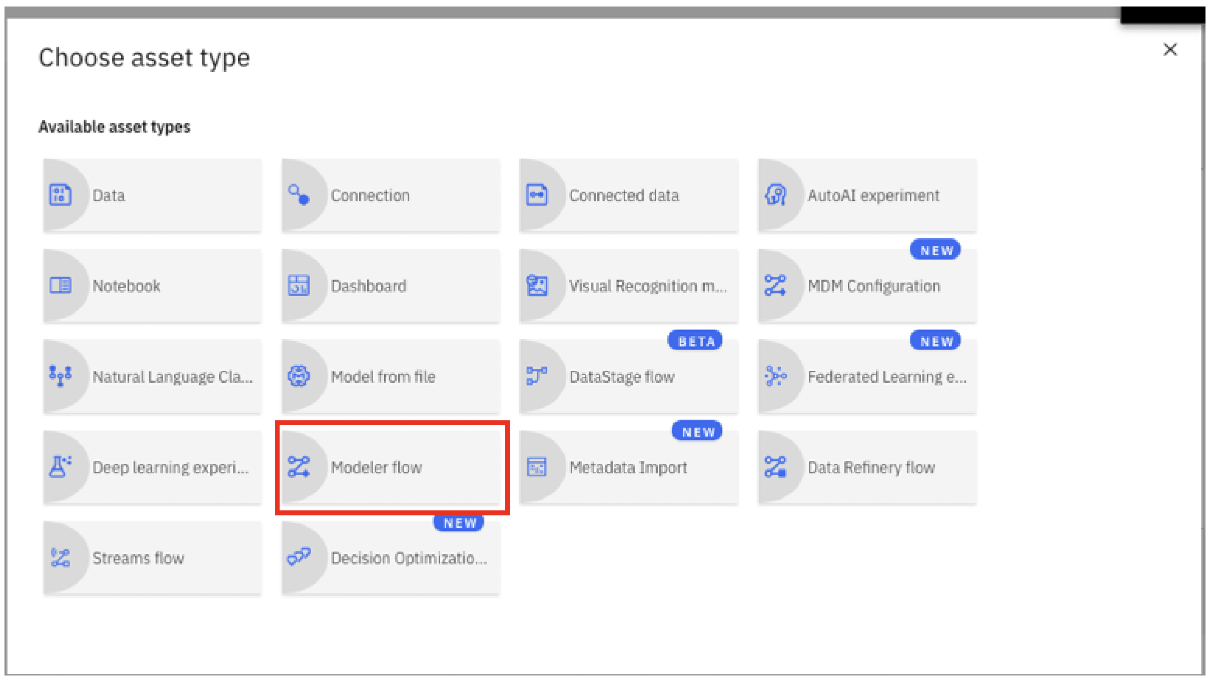
LAB: Modeler Flows in IBM Watson Studio (Updated)

For this lab, you will use the IBM Cloud Account and the Watson Studio project you created when you worked on the Lab in the previous lesson titled *Creating a Watson Studio Project with Jupyter Notebooks*. To create a free Watson Studio account, use the following link https://cloud.ibm.com/catalog/services/watson-studio

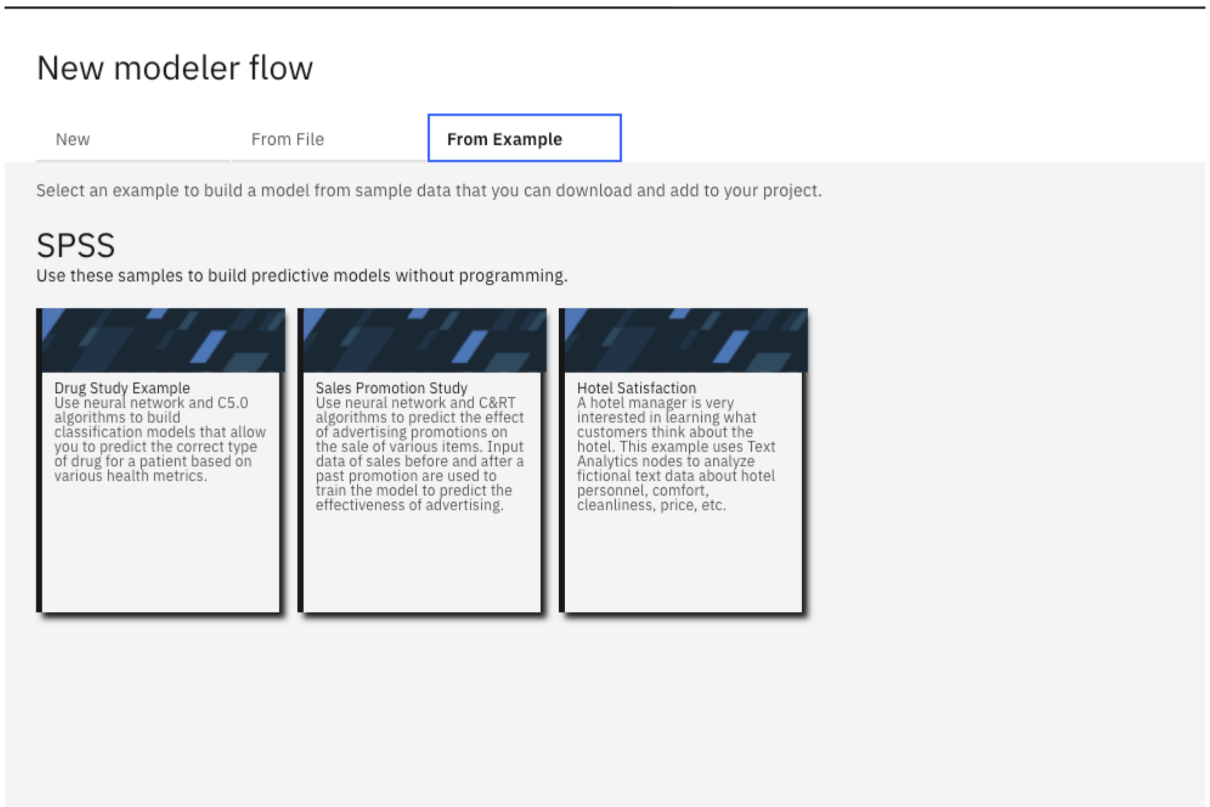
Objective for Exercise:

- Load an example flow, run it, and examine results.
- Add an Auto Numeric model, run it, and examine results.
- Get predictions for new cases using a model we built.

Step 1 - Open your project in Watson Studio, then click "Add Assets" by clicking the blue button on the top of the screen. In the panel that appears, select the "Modeler flow" option.



Step 2 - Next, select the tab "From example":



Select an example to build a model from sample data that you can download and add to your project.

SPSS

Use these samples to build predictive models without programming.

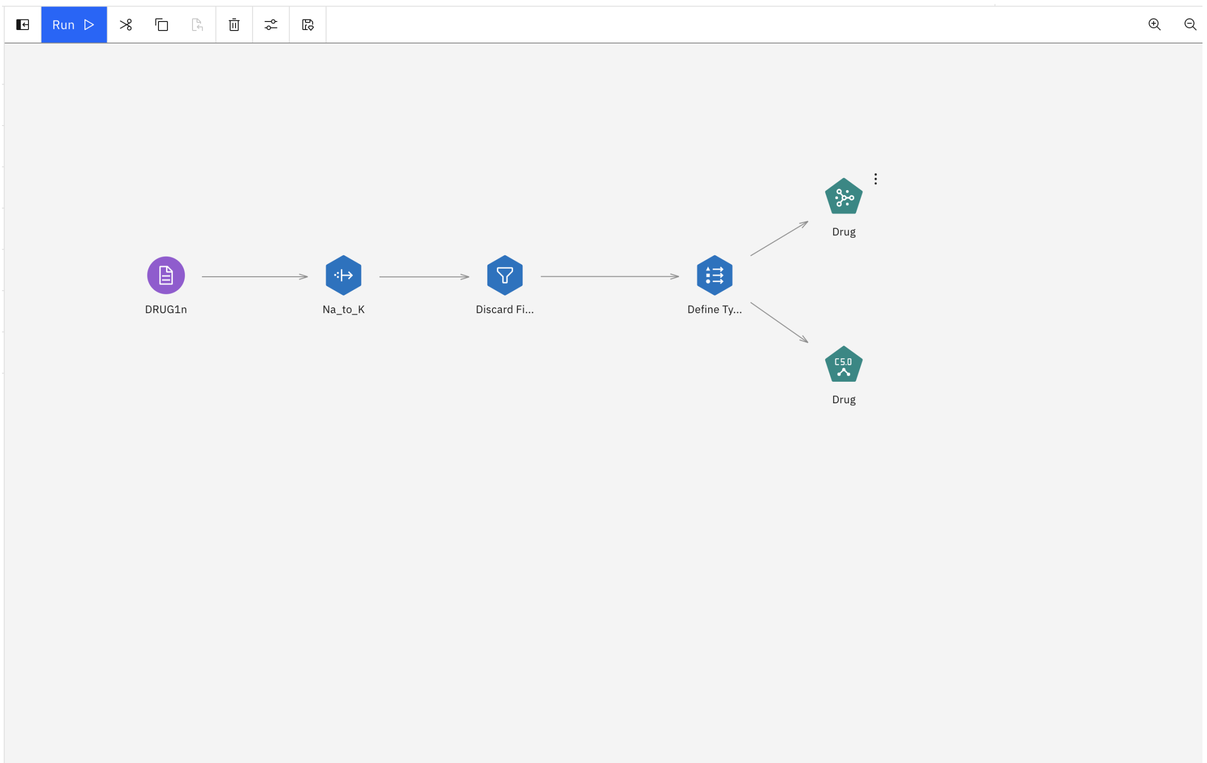
Drug Study Example
Use neural network and C5.0 algorithms to build classification models that allow you to predict the correct type of drug for a patient based on various health metrics.

Sales Promotion Study
Use neural network and C&RT algorithms to predict the effect of advertising promotions on the sale of various items. Input data of sales before and after a past promotion are used to train the model to predict the effectiveness of advertising.

Hotel Satisfaction
A hotel manager is very interested in learning what customers think about the hotel. This example uses Text Analytics nodes to analyze fictional text data about hotel personnel, comfort, cleanliness, price, etc.

Step 3 - Selecting the Drug study example on the left would give us the flow we have already seen in the previous section, then click "Create" button in the lower right corner.

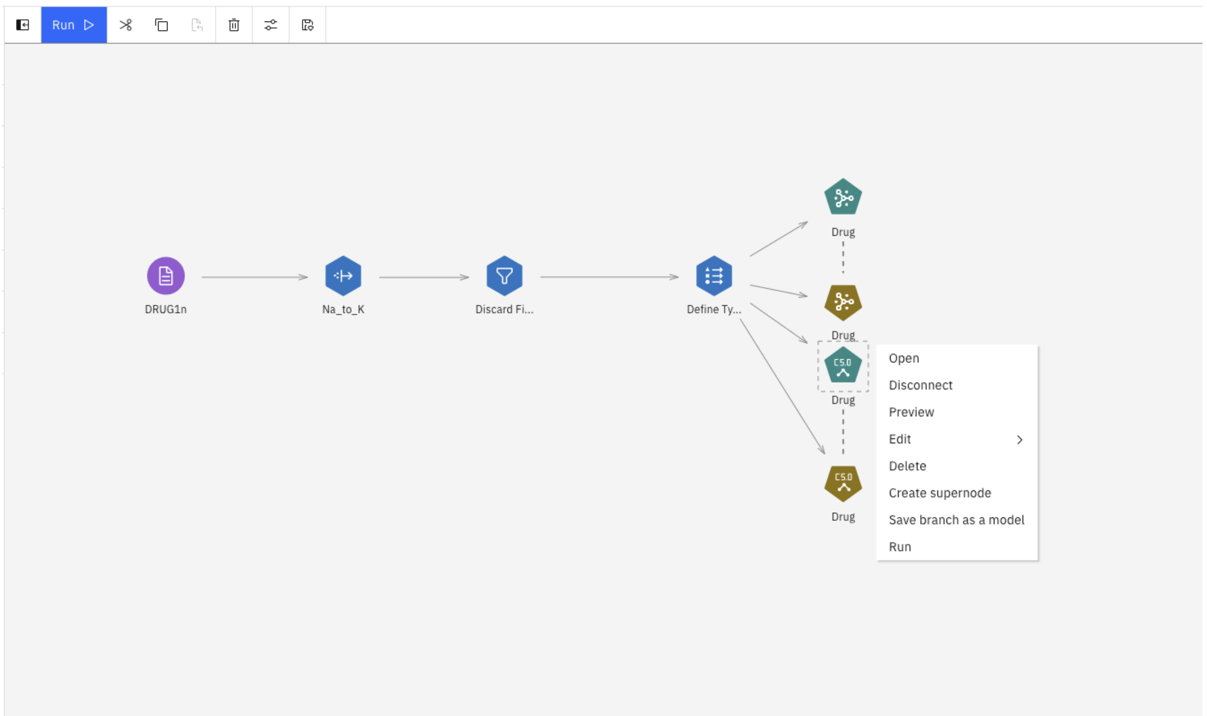
Once the flow loads, you will see an image similar to this:



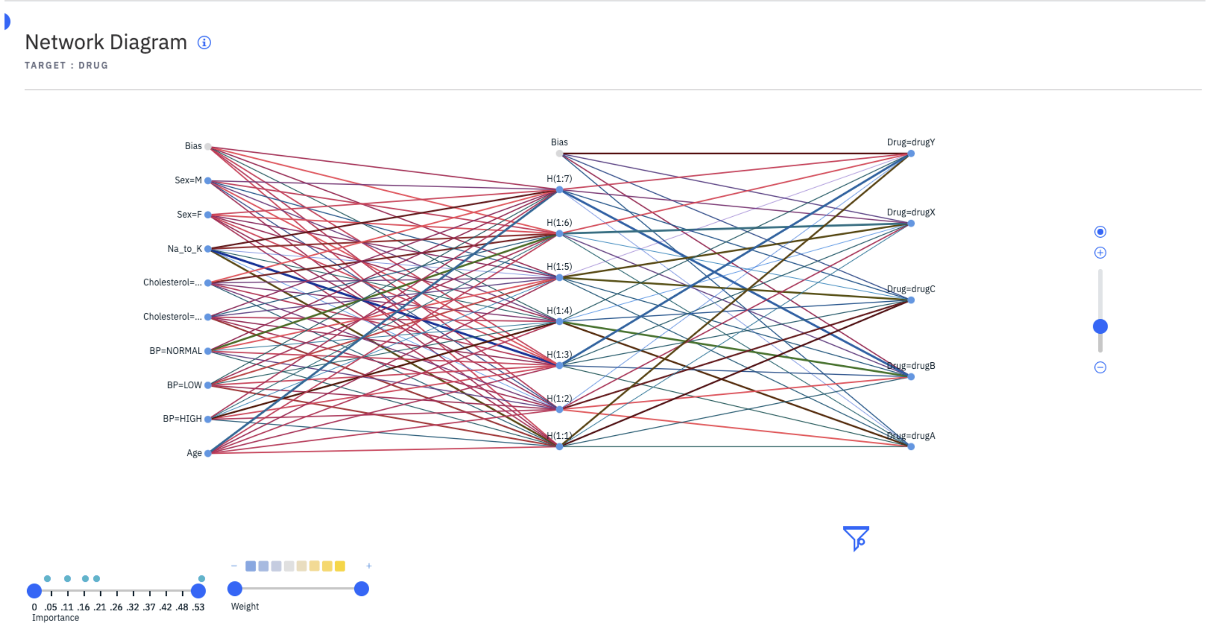
Step 4 - Reading from left to right, we can examine the flow. The purple circle corresponds to the data set of some fictional sales, the next node is deriving a field Increase that will be our target variable. It is based on the increase of sales. Then we see a type node which specifies our target variable and predictors. In this case our target variable is numeric and continuous. Finally, there are two models - a neural network and a C&RT decision tree. We can run the flow as is, or we can modify it to see other possibilities.

Step 5 - First, let's see what we can get with the existing models. Click **Run** button on the top of the canvas:

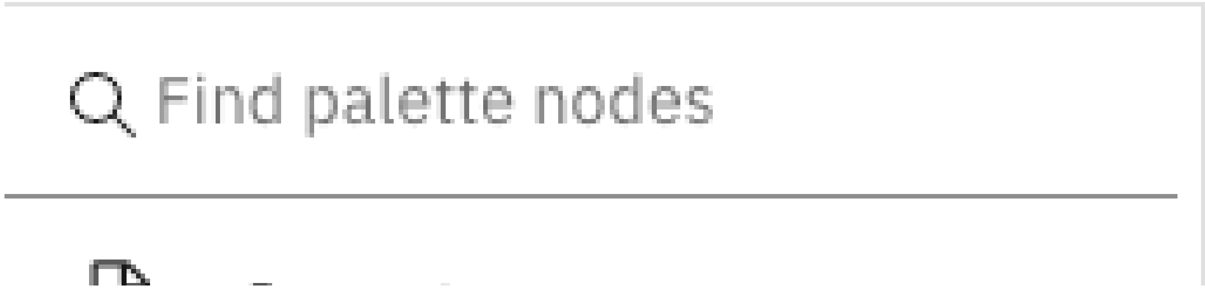
Step 6 - After some execution time, you'll get dark gold model nuggets for the two models. Clicking on three dots in the right side of one of them you can select "View model" and examine the information.

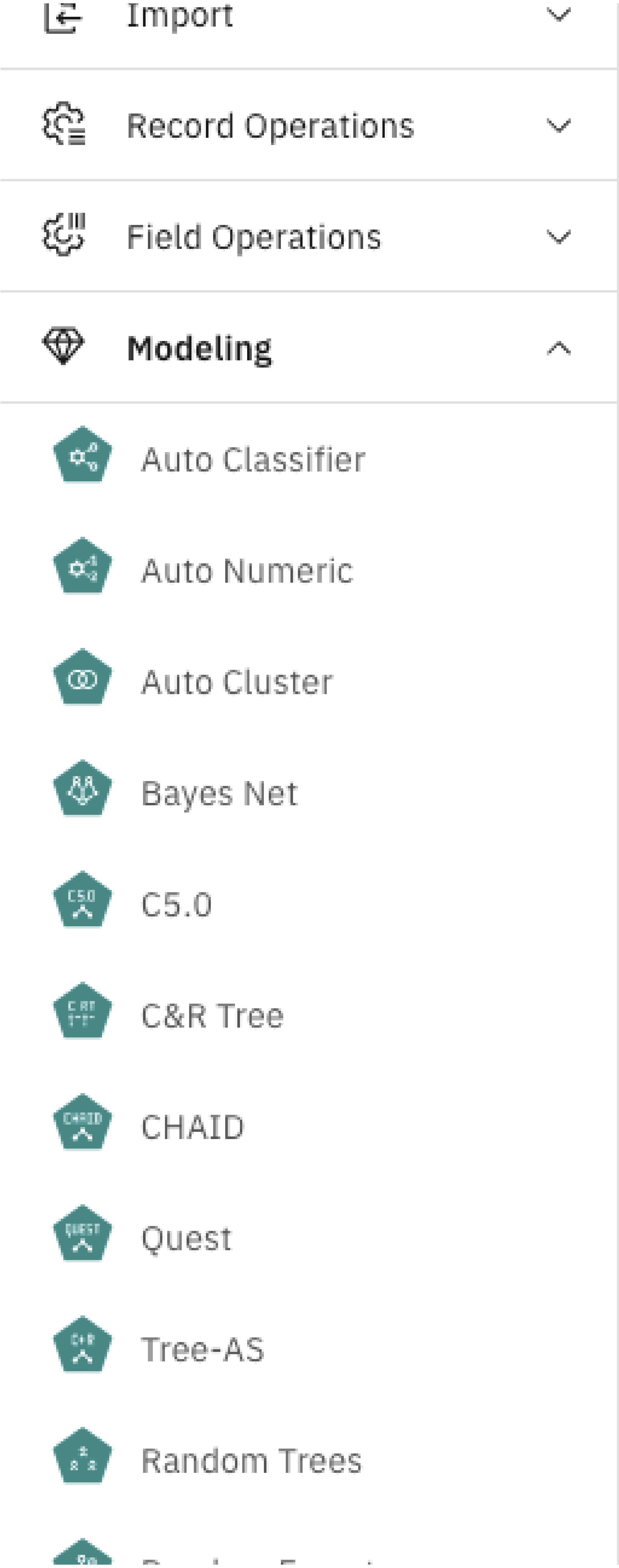


For example, the neural network diagram looks like this:

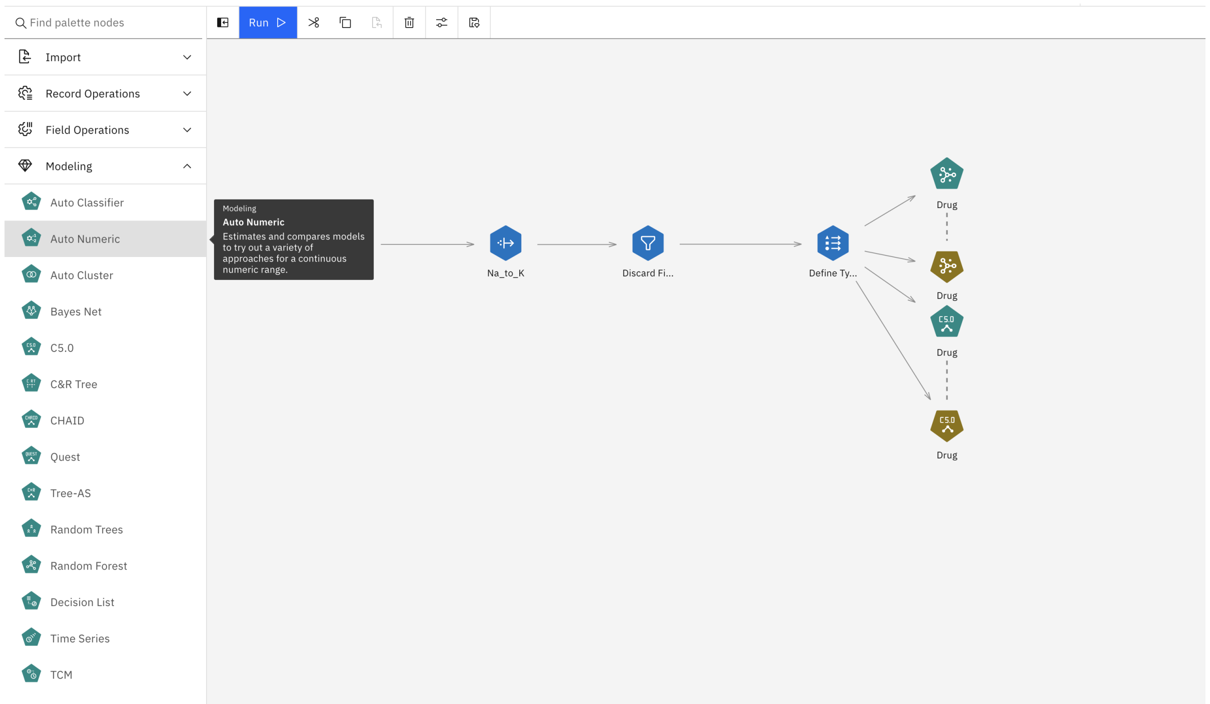


Step 7 - Now, let's add the "Auto-numeric" model to the flow. Open the modeling palette on the left side by clicking on Modeling:



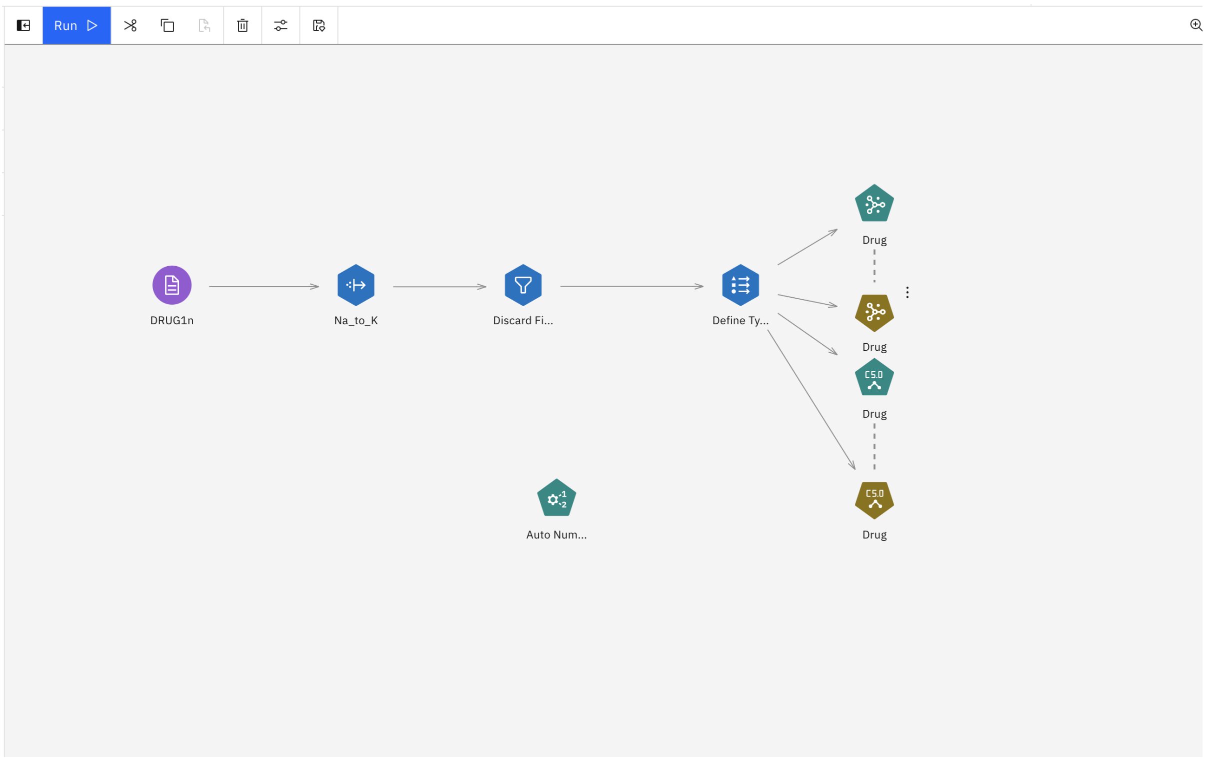

Import
Record Operations
Field Operations
Modeling
Auto Classifier
Auto Numeric
Auto Cluster
Bayes Net
C5.0
C&R Tree
CHAID
Quest
Tree-AS
Random Trees

Step 8 - In the resulting modeling palette, pick the Auto-Numeric model:

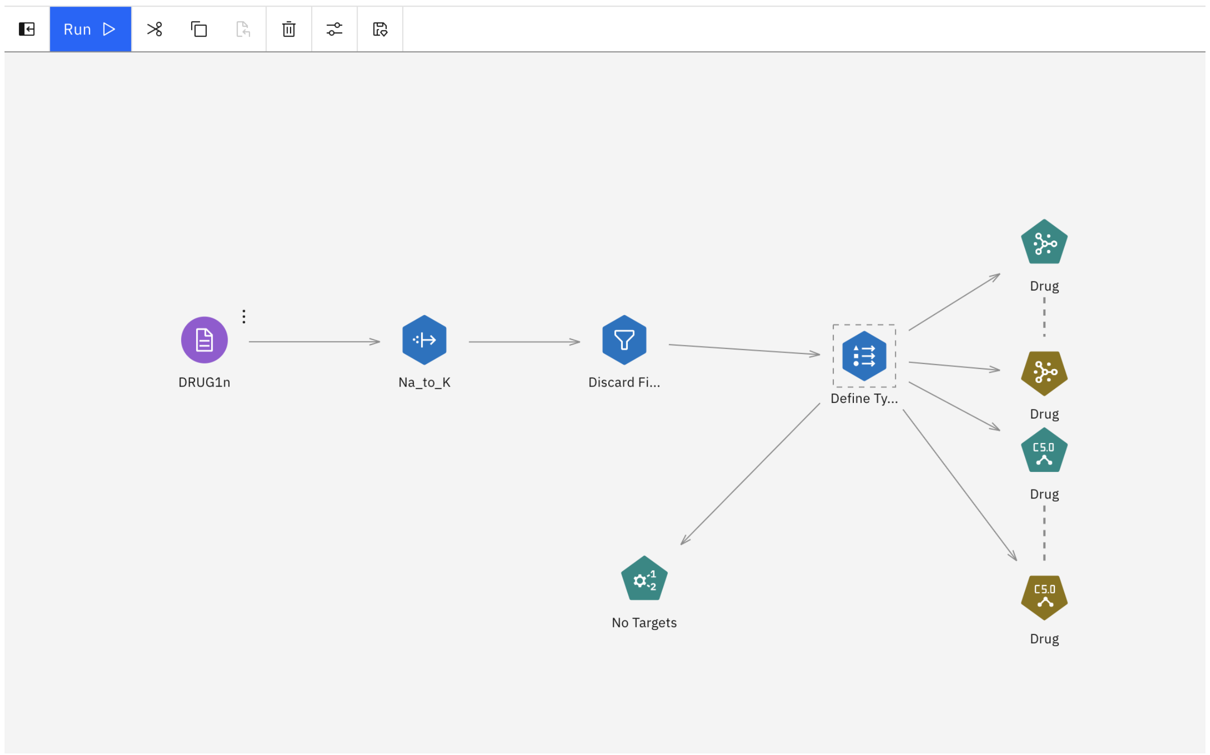


Modeling
Auto Numeric
Estimates and compares models to try out a variety of approaches for a continuous numeric range.

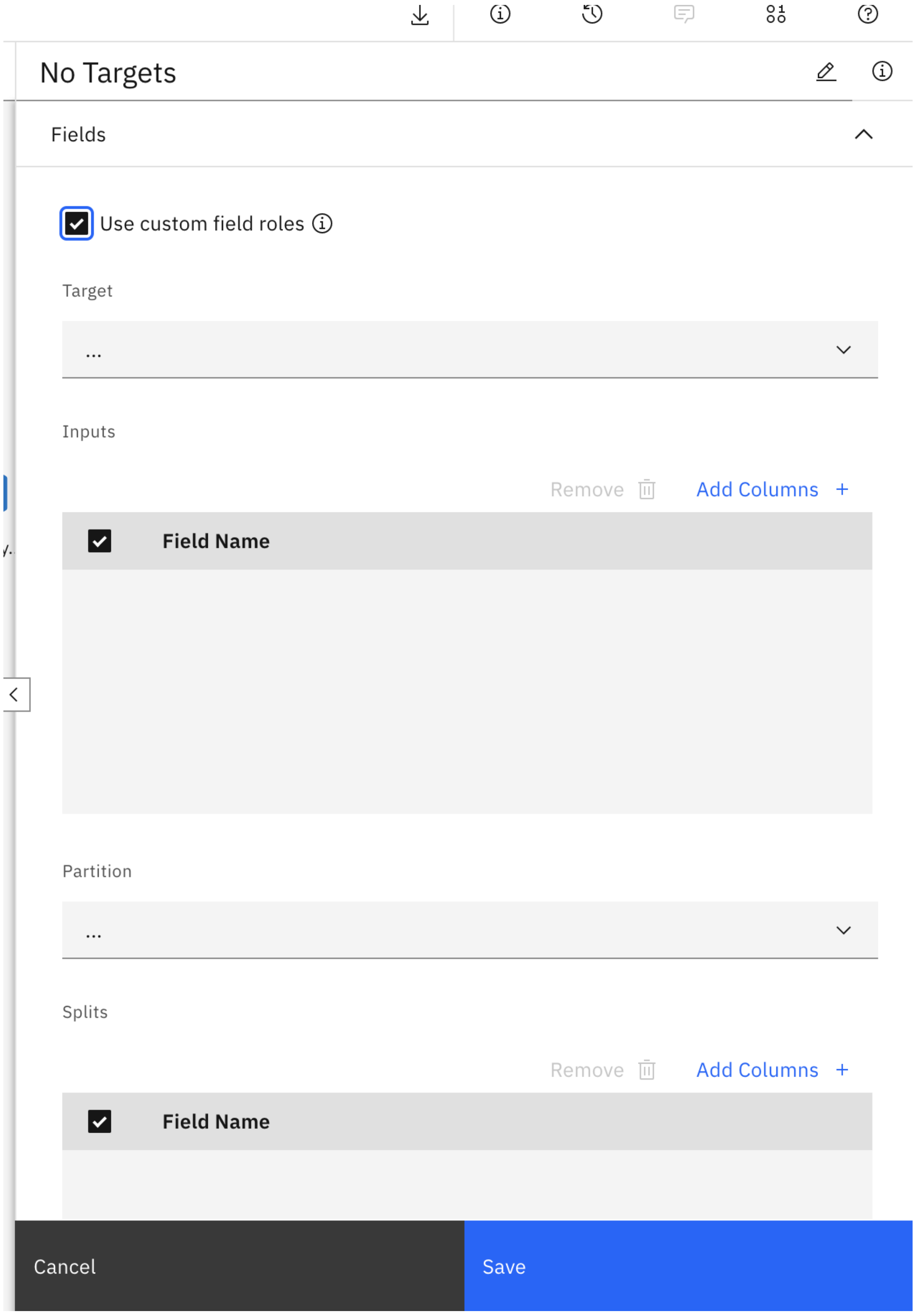
Step 9 - Click on the Auto Numeric node and while keeping the left mouse button pressed, drag it onto the canvas.



Step 10 - Now, hover over the type node with your mouse and click on the circle with an arrow that appears on the right side. Make a connection to the dot on the left side of the Auto Numeric node.



Step 11 - Double-click the "Auto-numeric" and click "Use custom field roles", use the drop-down to chose a target, we will use "Na_to_K". Click "Add Columns" next to Inputs to add inputs.



No Targets

Fields

☑ Use custom field roles

Target

...

Inputs

Remove Add Columns +

☑	Field Name

Partition

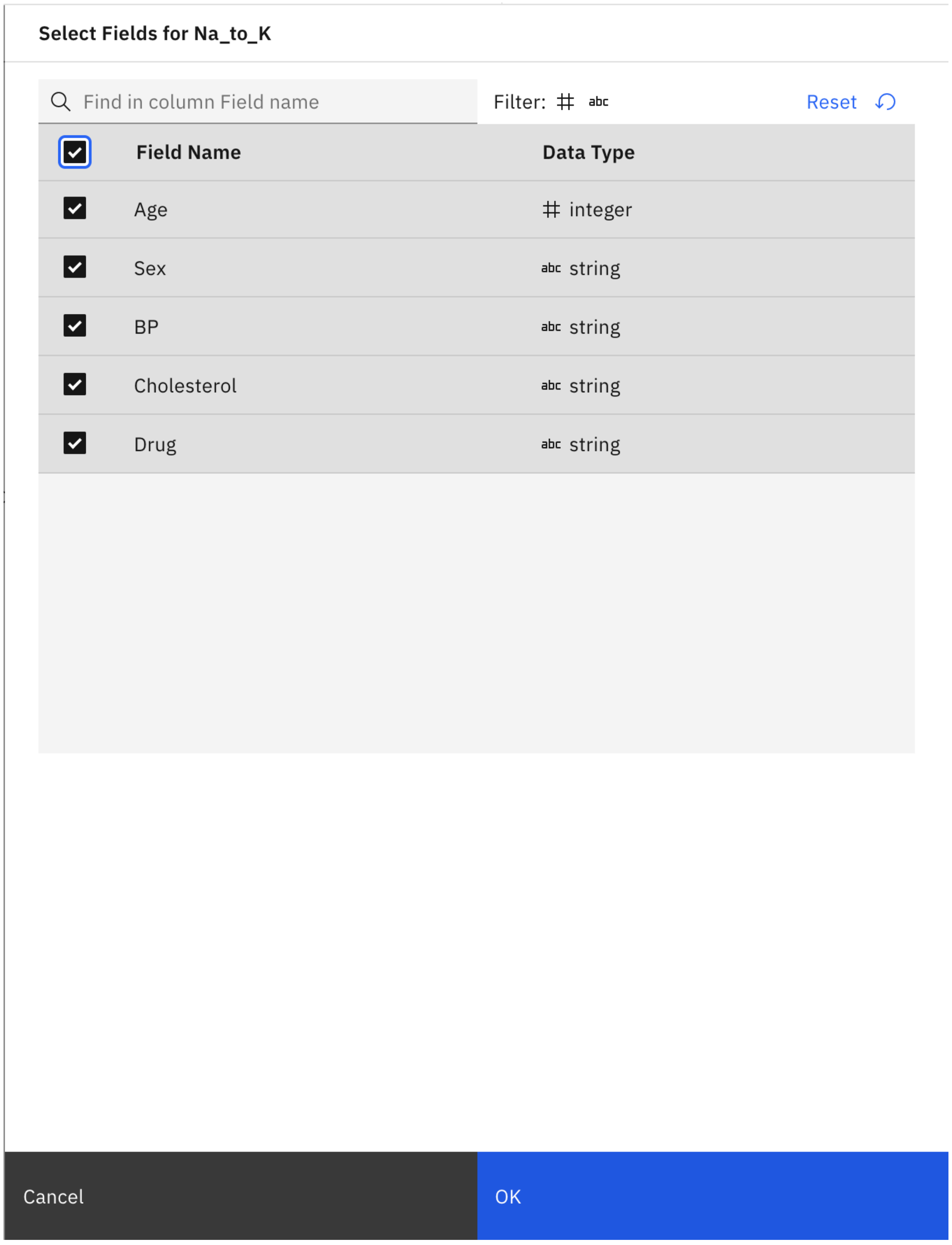
...

Splits

Remove Add Columns +

☑	Field Name

Step 12 - Check all. the fieldswe want to use for the input and click "OK" then "Save"



Select Fields for Na_to_K

Find in column Field name

Filter: # abc

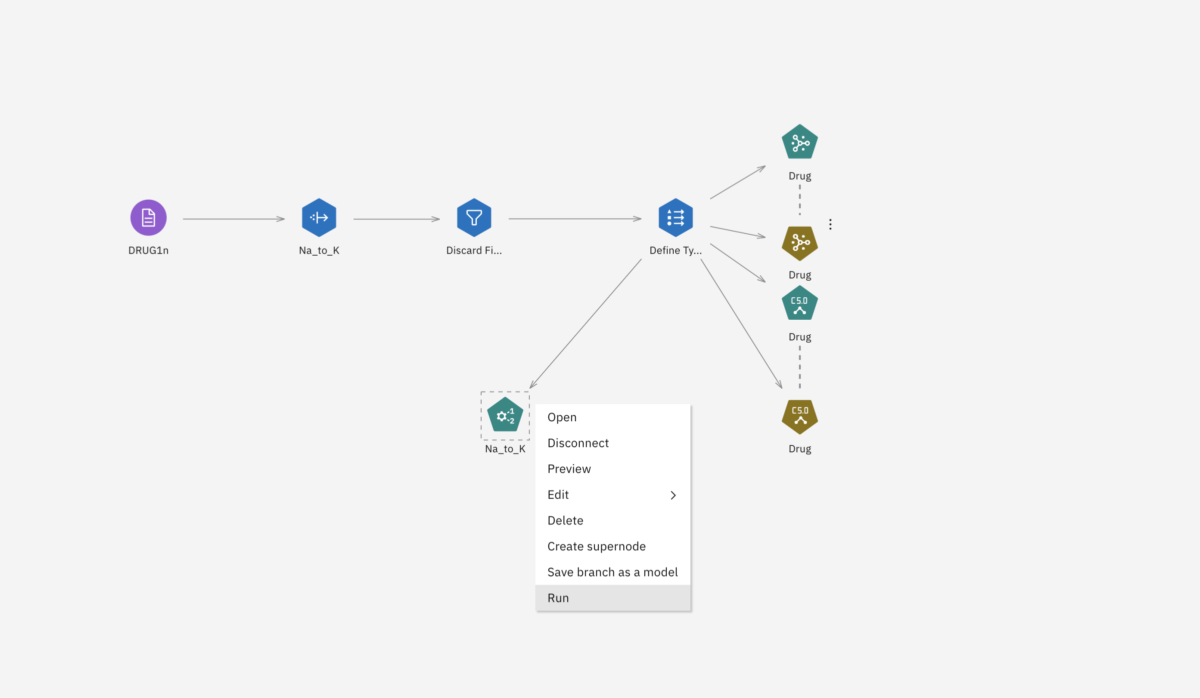
Reset

☑	Field Name	Data Type
☑	Age	# integer
☑	Sex	abc string
☑	BP	abc string
☑	Cholesterol	abc string
☑	Drug	abc string

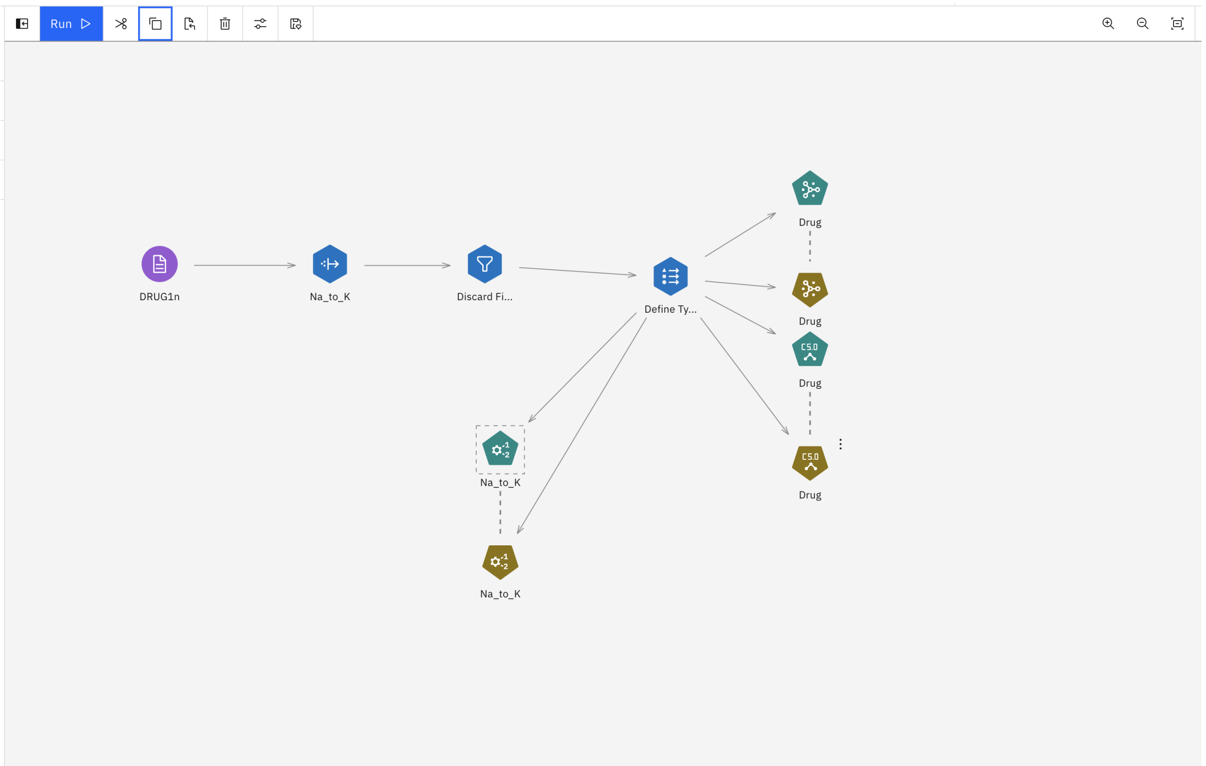
Cancel

OK

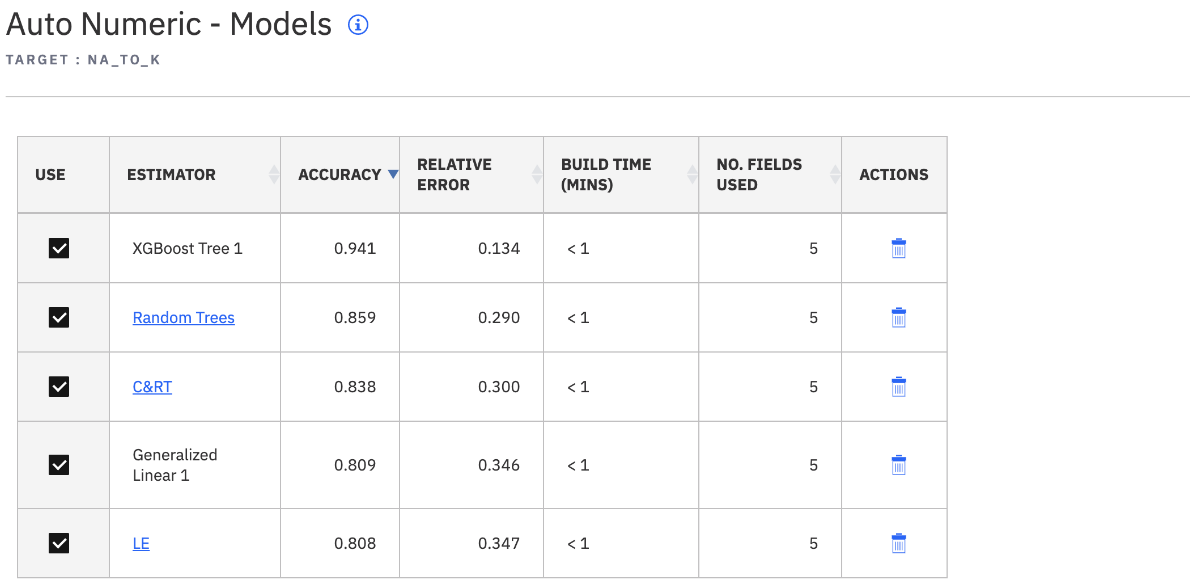
Step 13 - Finally, run the new branch of the flow by clicking on the three dots on the upper right part of Auto Numeric node and selecting the last option in the menu, "Run".



Step 14 - After the execution ends, we get a model nugget:



and viewing the model, we see the following table:



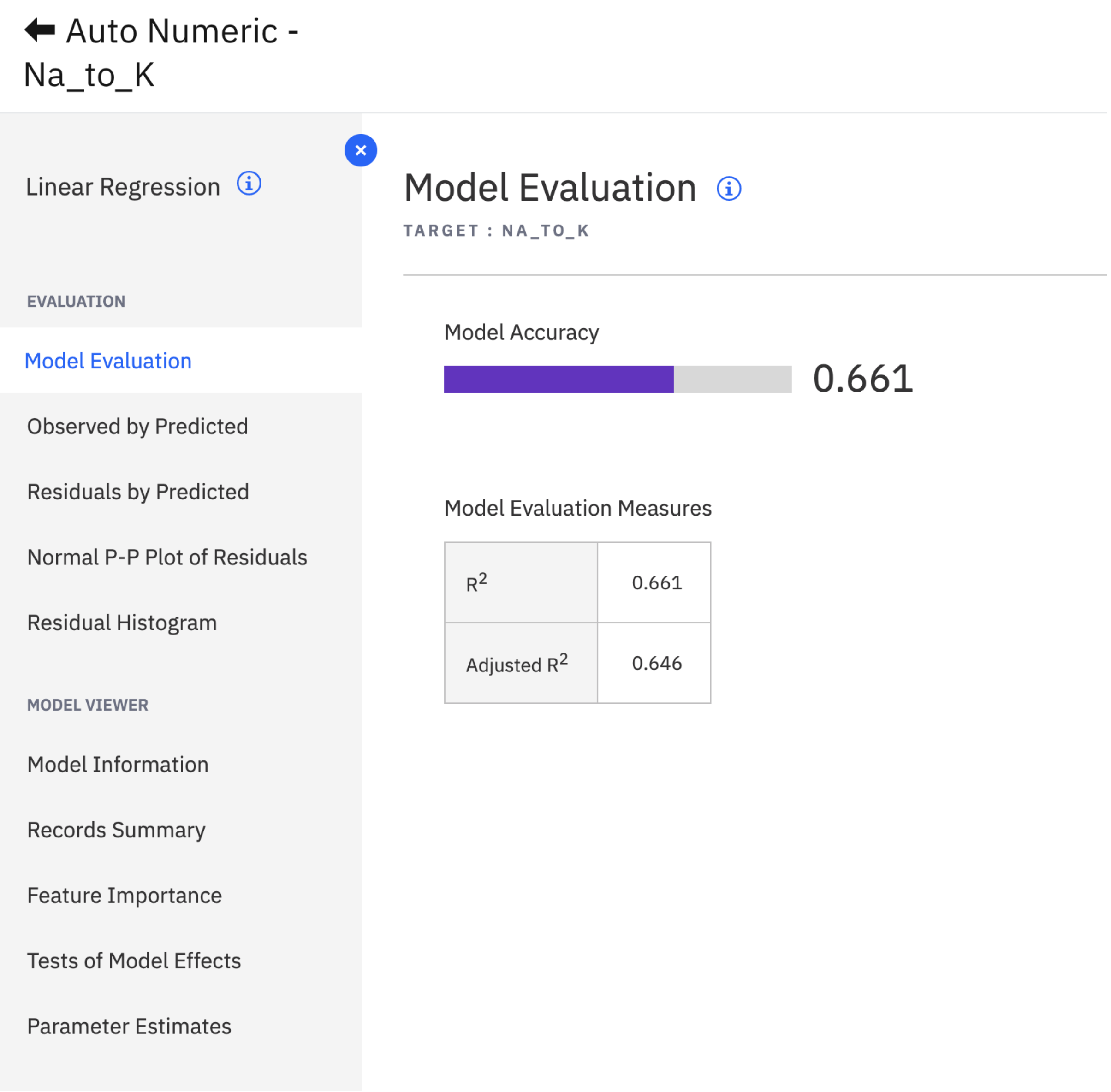
Auto Numeric - Models

TARGET : NA_TO_K

USE	ESTIMATOR	ACCURACY	RELATIVE ERROR	BUILD TIME (MINS)	NO. FIELDS USED	ACTIONS
☑	XGBoost Tree 1	0.941	0.134	< 1	5	🗑
☑	Random Trees	0.859	0.290	< 1	5	🗑
☑	C&RT	0.838	0.300	< 1	5	🗑
☑	Generalized Linear 1	0.809	0.346	< 1	5	🗑
☑	LE	0.808	0.347	< 1	5	🗑

This tells us that five different models have been built, and also some properties of the models.

XGBoost is a very popular model, representing gradient-boosted ensemble of decision trees. The algorithm was discovered relatively recently and has been used in many solutions and winning data science competitions. In this case, it created a model with the highest accuracy, which "won" as well. "C&RT" stands for Classification and Regression Tree", a decision tree algorithm that is widely used. This is the same decision tree we saw earlier when we built it separately. "LE" is "linear engine", an IBM implementation of linear regression model that includes automatic interaction detection. The model coefficients are shown in **Parameter Estimates** table. We can see that several coefficients correspond to a combination of one category of variable *class* with continuous variable *Promotion*. This is called "an interaction effect". You will not see such features in simple linear regression models.



Model Evaluation

TARGET : NA_TO_K

Model Accuracy 0.661

Model Evaluation Measures

R^2	0.661
Adjusted R^2	0.646

Step 15 - Now you can experiment with Modeler flows on your own. You can use various nodes, just don't forget to put a Type node before any modeling node and to specify your inputs and targets.

There are several other models to predict a continuous target, for categorical targets, you can try Logistic Ragression, Support Vector Machines etc.

You will learn more about various models when you take a course on Machine Learning.

Author(s)

Aije Egwaikhide

Changelog

Date	Version	Changed by	Change Description
2021-01-07	2.1	Aije	Created new example and updated screenshuots
2020-08-25	2.0	Lavanya	Migrated Lab to Markdown and added to course repo in GitLab