

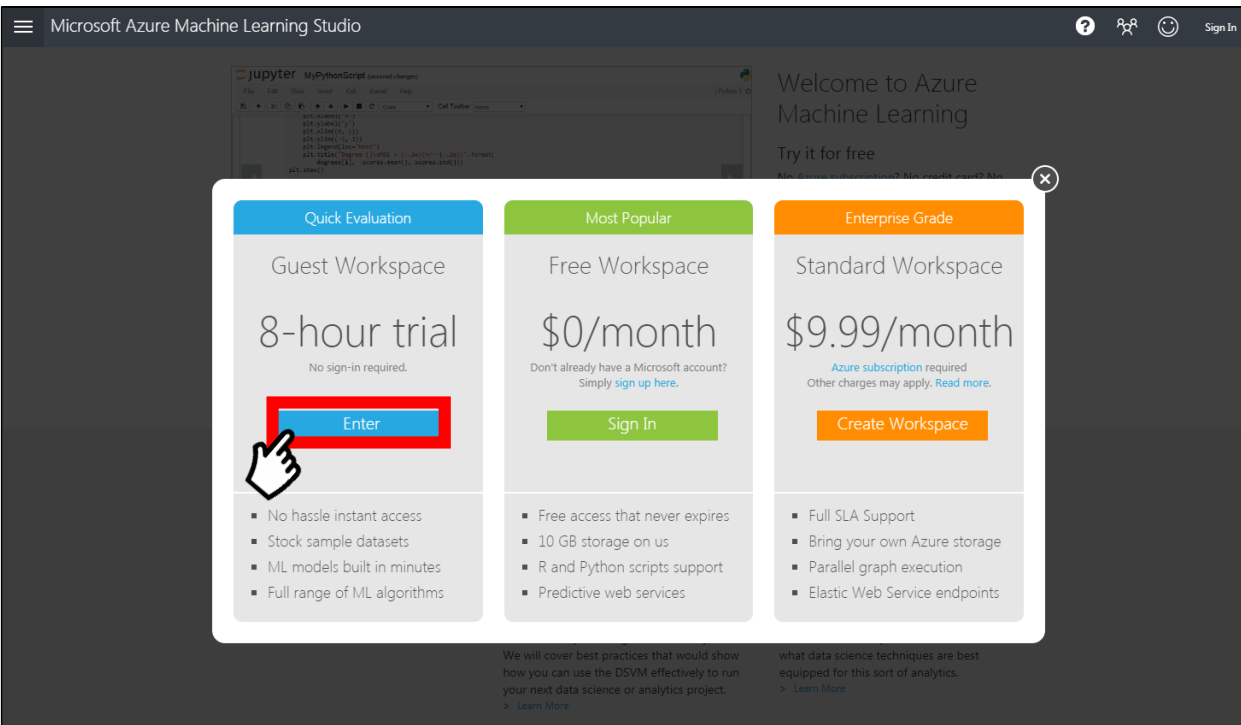
Machine Learning with Microsoft Azure ML Studio

Microsoft Student Partner

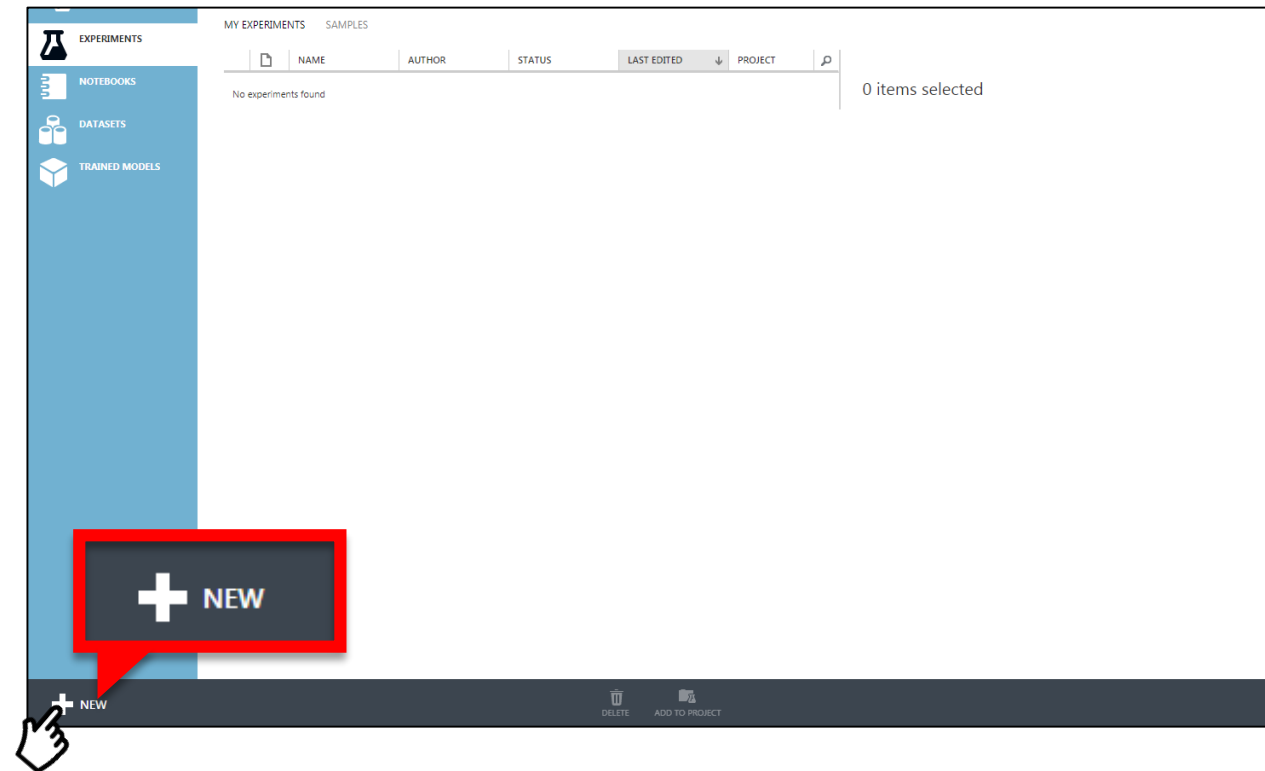
차주연 강민수

Start ML Studio

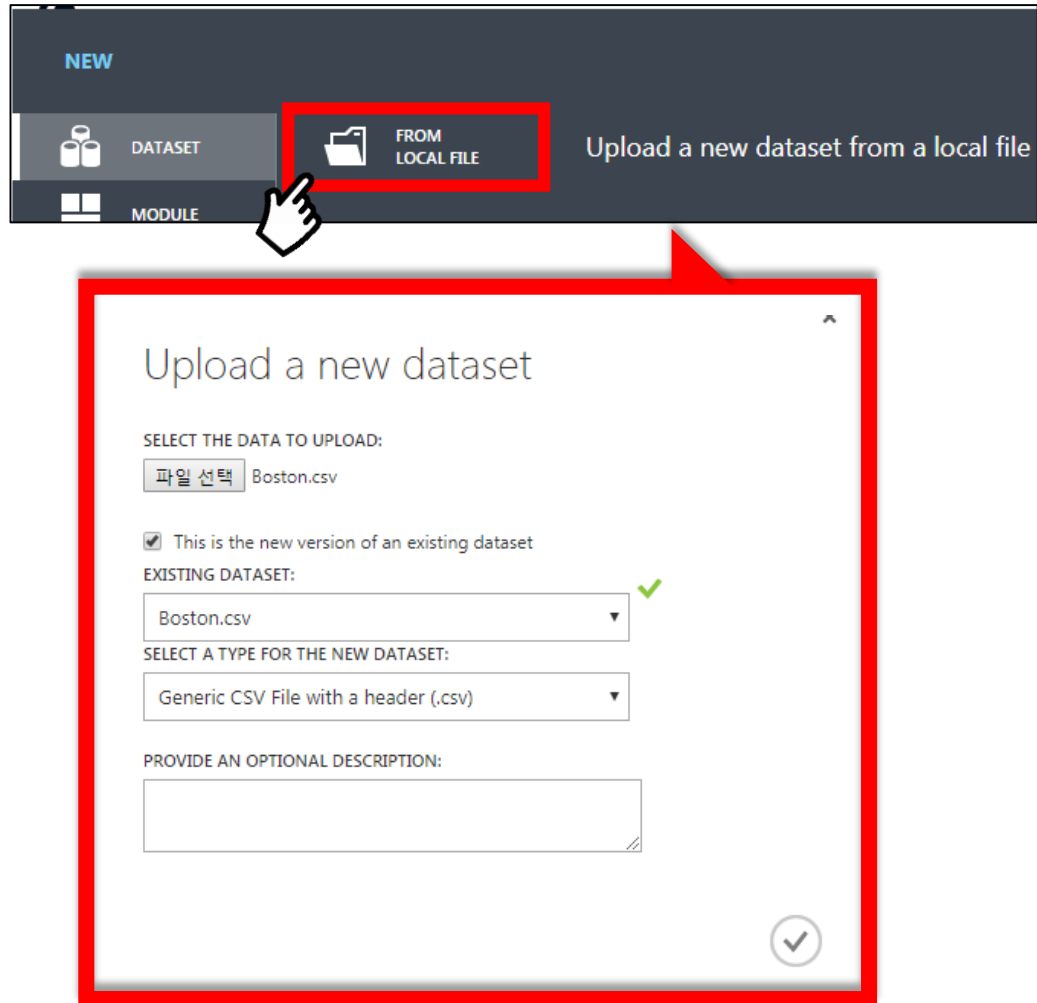
1. Start ML Studio Free trial →
<https://studio.azureml.net/?selectAccess=true&o=1>



2. Click the NEW button



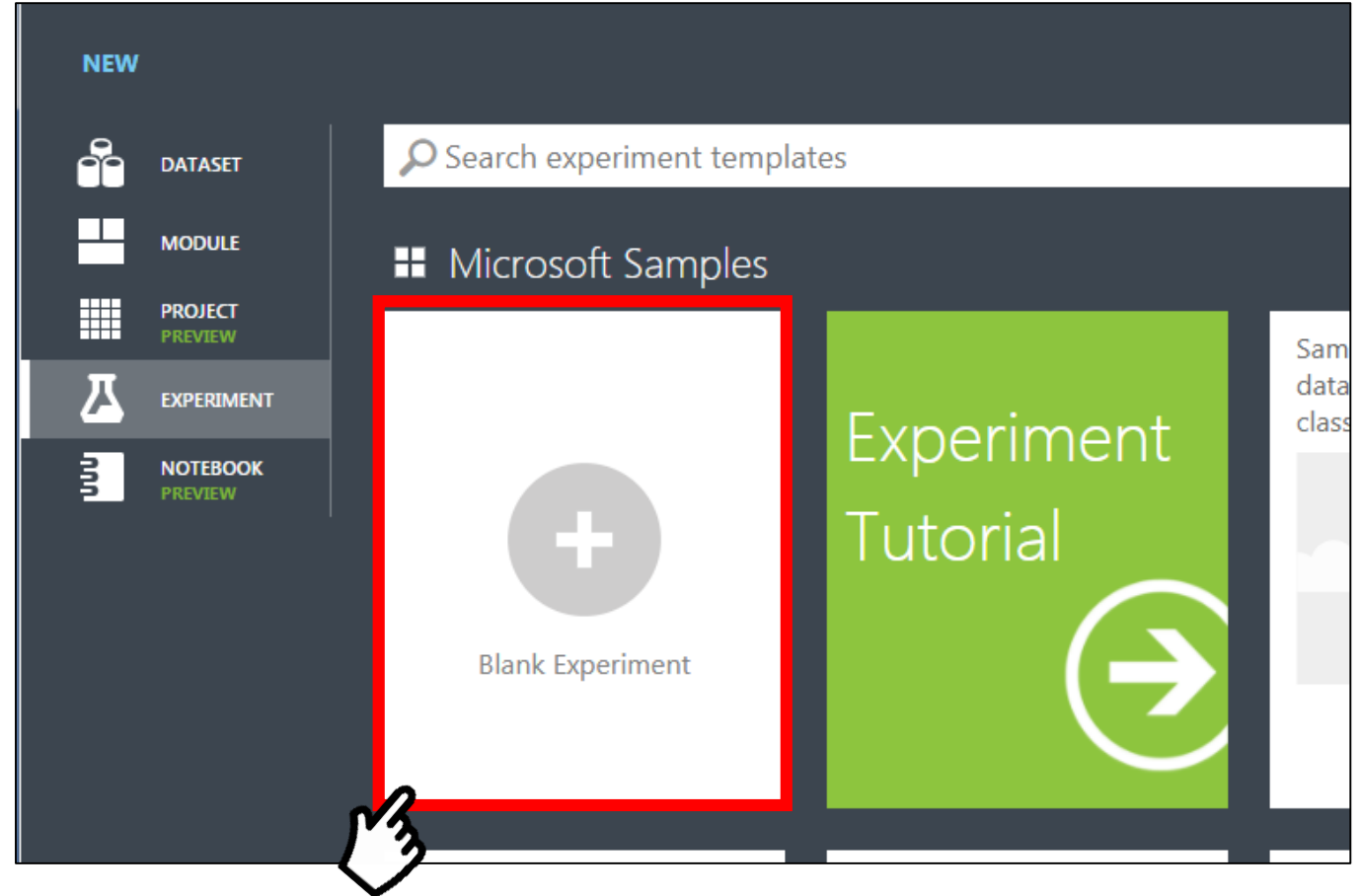
3. Upload a Boston dataset



The screenshot shows the 'NEW' menu at the top with options for DATASET, FROM LOCAL FILE (highlighted with a red box and a hand cursor), and MODULE. Below the menu is a dialog titled 'Upload a new dataset'. The dialog contains the following fields:

- SELECT THE DATA TO UPLOAD:** A button labeled '파일 선택' (File Select) followed by 'Boston.csv'.
- ☒ This is the new version of an existing dataset
- EXISTING DATASET:** A dropdown menu showing 'Boston.csv' with a green checkmark to its right.
- SELECT A TYPE FOR THE NEW DATASET:** A dropdown menu showing 'Generic CSV File with a header (.csv)'.
- PROVIDE AN OPTIONAL DESCRIPTION:** A text input field.
- A confirmation button with a checkmark icon at the bottom right.

4. Make a Blank Experiment



Linear Regression

Linear Regression

Solution method

Ordinary Least Squares

L2 regularization weight

0.001

☒ Include intercept term

Random number seed

☒ Allow unknown categ...

to reduce model overfitting

Linear Regression

Train Model

Label column

Selected columns:

Column names: medv

Launch column selector

contains the values you want to predict

to separate data into training and testing sets

Boston.csv

Split Data

Train Model

Score Model

to generate predictions

Evaluate Model

to measure the accuracy of a trained model

Properties

Project

Split Data

Splitting mode

Split Rows

Fraction of rows in the first...

0.8

☒ Randomized split

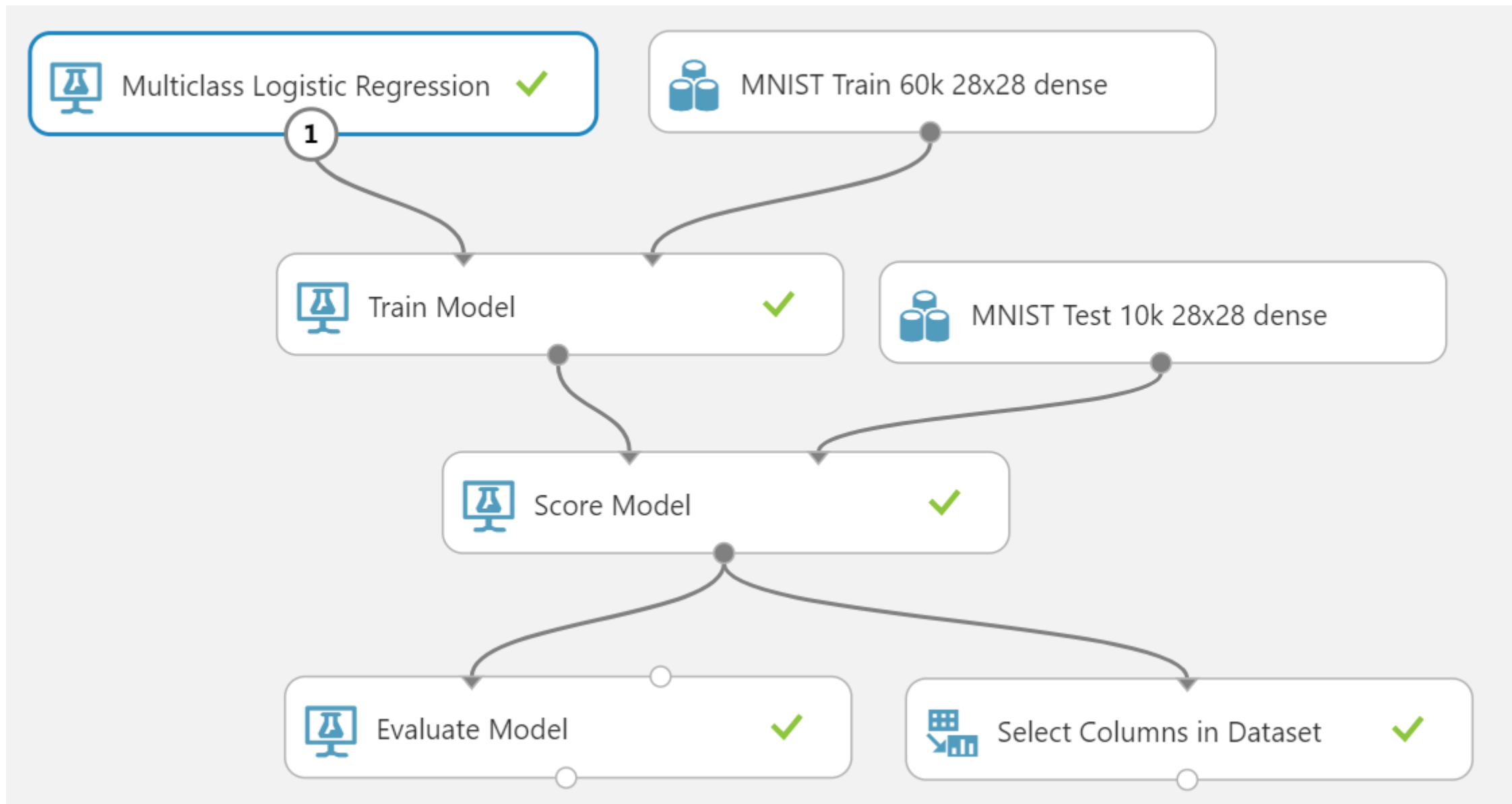
Random seed

0

Stratified split

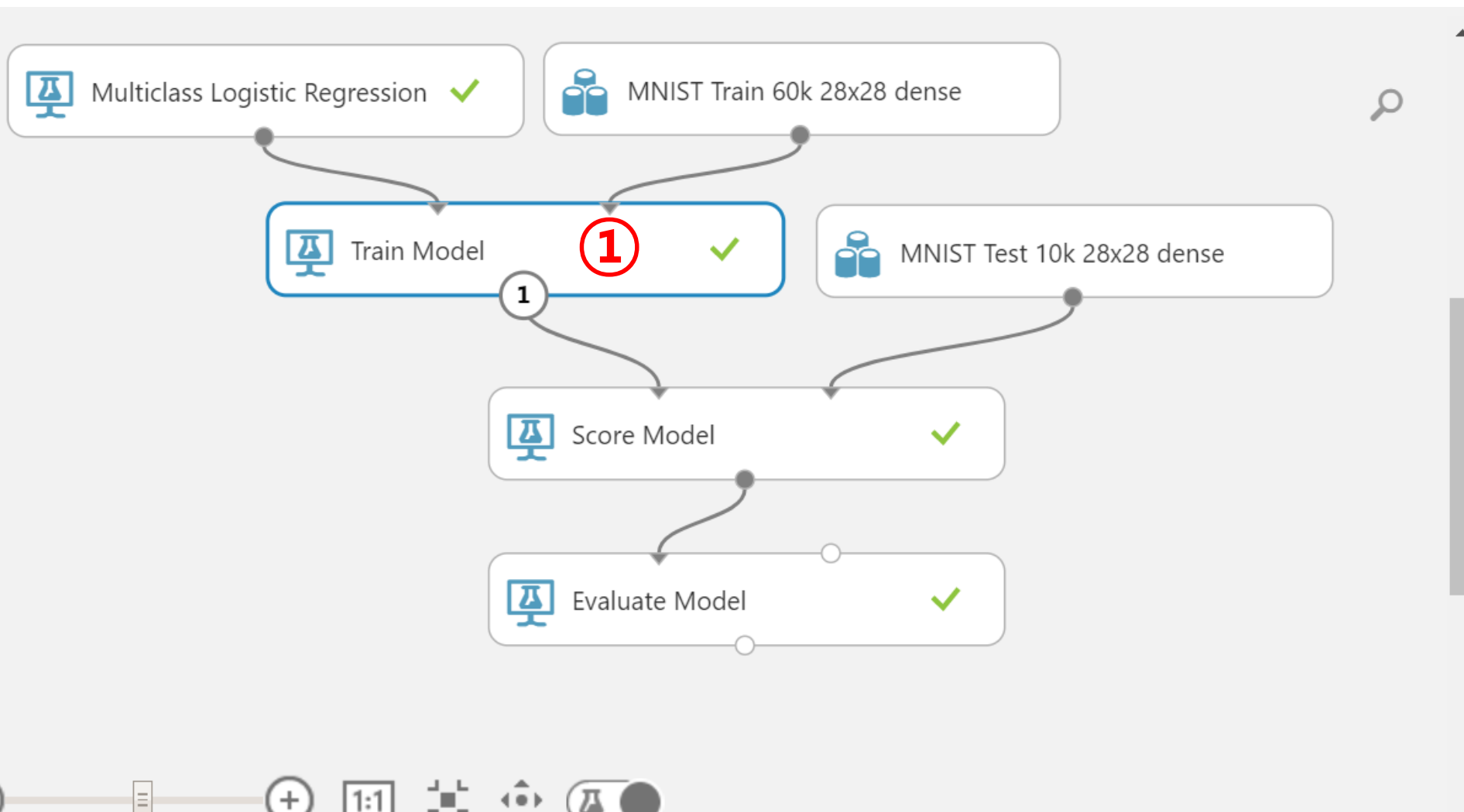
False

Logistic regression



Logistic regression

Train Model



Train Model

Label column

Selected columns:

Column names: Label

Launch column selector

START TIME	11/20/2...
END TIME	11/20/2...
ELAPSED TIME	0:00:00.0...
STATUS CODE	Finished
STATUS DETAILS	Task output was present in

? Quick Help

Train a previously created classification or regression model
([more help...](#))

Logistic regression

Train Model

Select a single column

BY NAME

WITH RULES

AVAILABLE COLUMNS

All Types ▼ search columns 🔍

1

Label

f0

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

...

785 columns available

SELECTED COLUMNS

All Types ▼ search columns 🔍

2

>

<

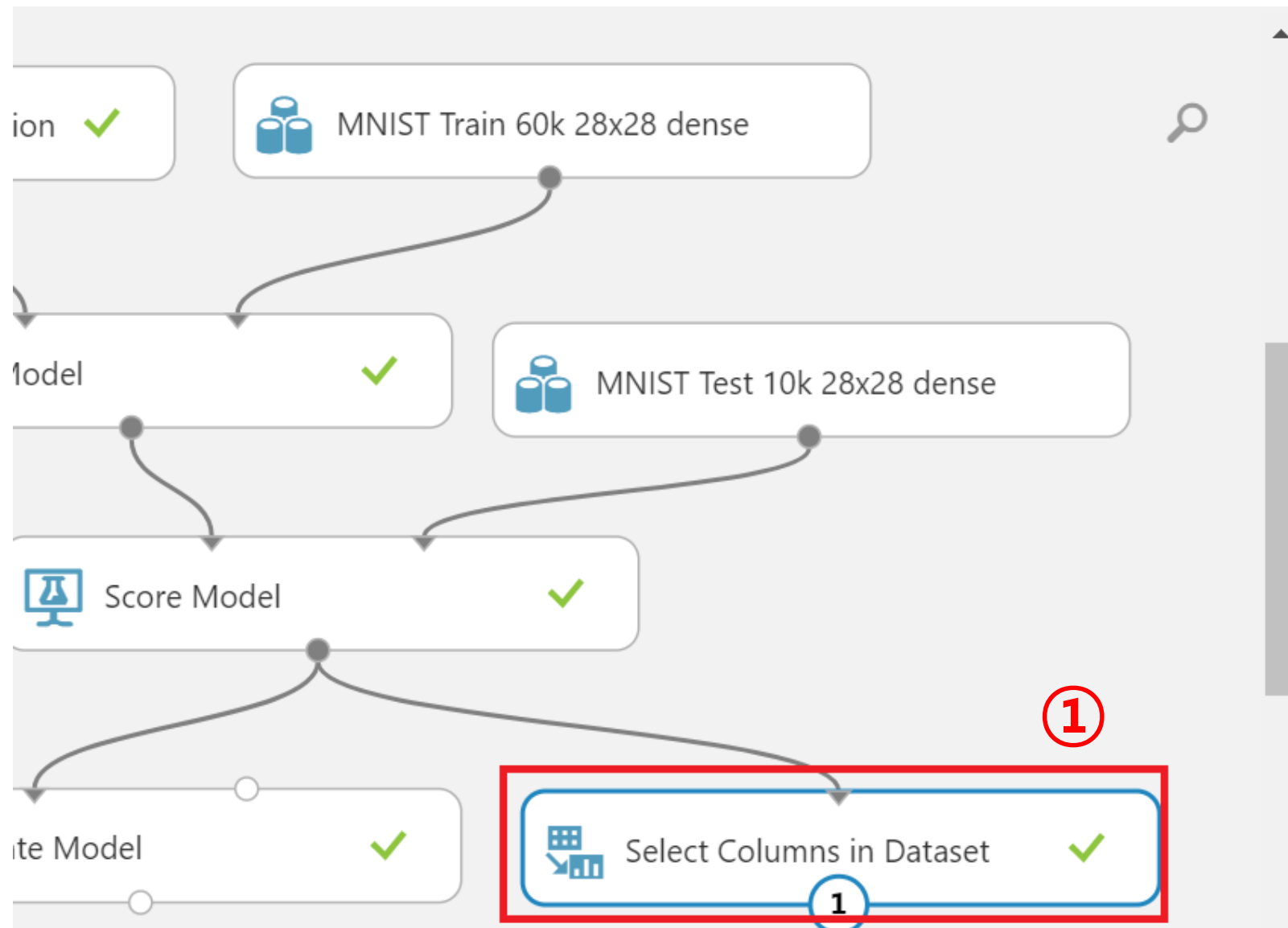
0 columns selected

3

✓

Logistic regression

Select Columns in Dataset



Select Columns in Dataset

Select columns

Selected columns:

Column names:

Label, Scored Labels

Launch column selector

START TIME	11/25/2...
END TIME	11/25/2...
ELAPSED TIME	0:00:00.0...
STATUS CODE	Finished
STATUS DETAILS	Task output was

Quick Help

Selects columns to include or exclude from dataset in an operation. Formerly known as

Logistic regression

Select Columns in Dataset

Select columns

BY NAME

WITH RULES

AVAILABLE COLUMNS

All Types ▼

search columns



f0
f1
f2
f3
f4
f5
f6
f7
f8
f9
f10
f11
f12
f13
f14
...

794 columns available

>

<

SELECTED COLUMNS

All Types ▼

search columns

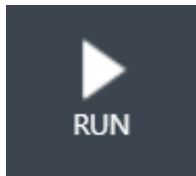


Label
Scored Labels

2 columns selected



Logistic regression 결과 확인

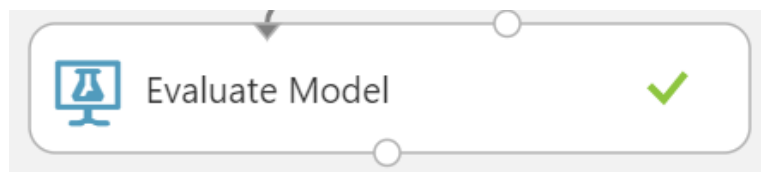


버튼을 누른 후

Finished running ✓

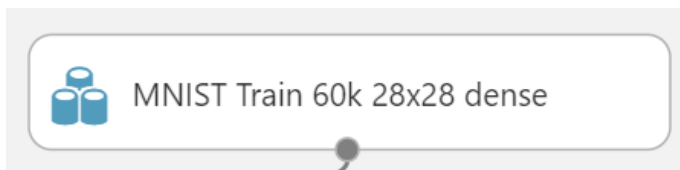
이 뜰 때까지 대기

결과 확인



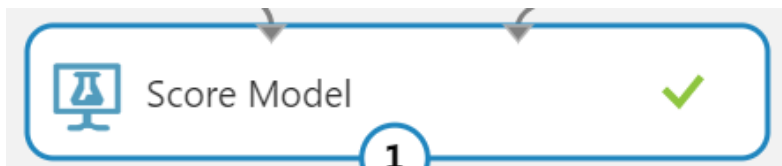
오른쪽 버튼 클릭>Evaluation results>Visualize

참고) MNIST data 확인



오른쪽 버튼 클릭>dataset>Visualize

참고) f0~f783을 통해 Label을 예측한 결과를 확인



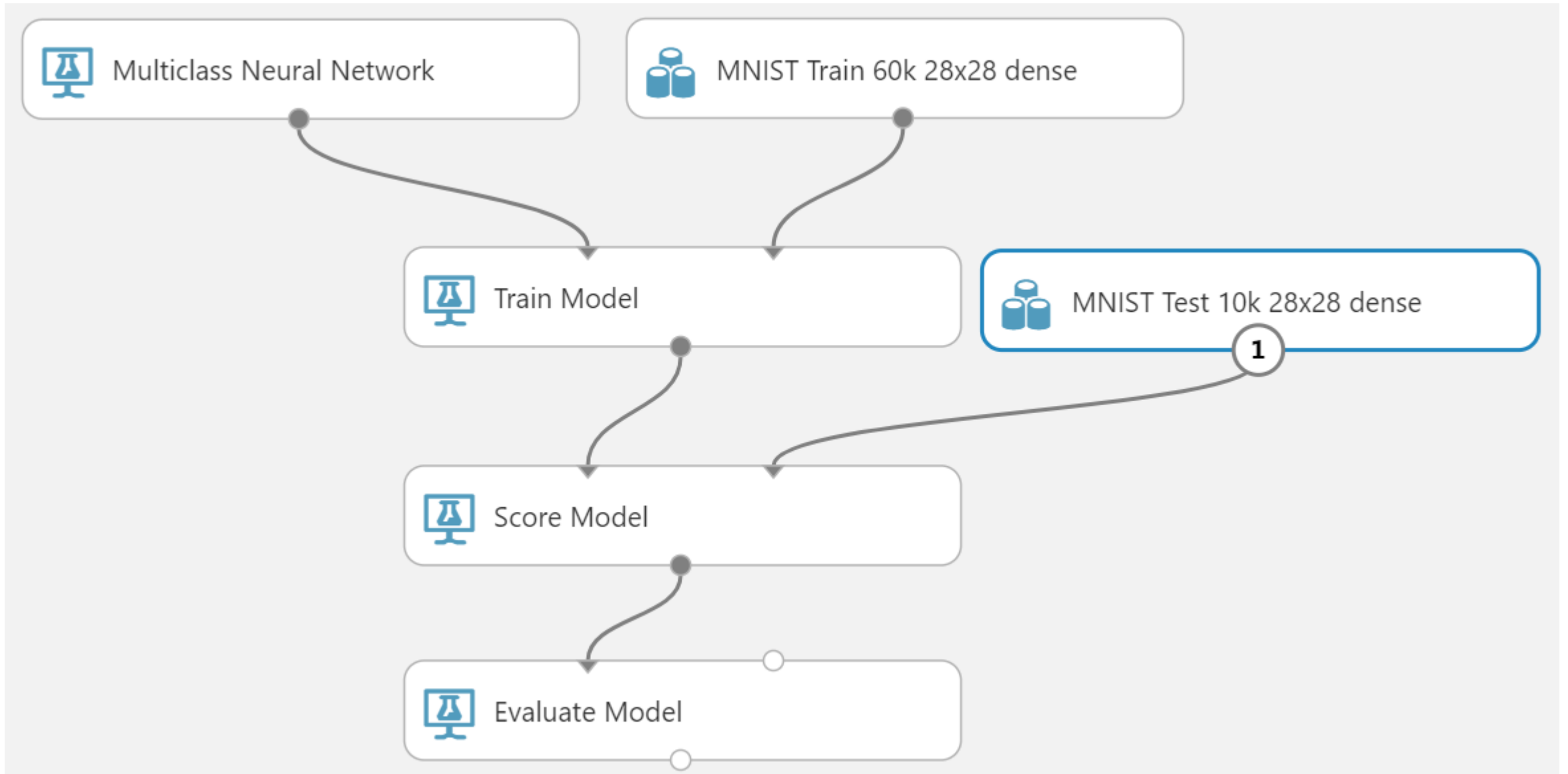
오른쪽 버튼 클릭>Scored dataset>Visualize

Logistic regression

결과 확인

		Predicted Class									
		0	1	2	3	4	5	6	7	8	9
Actual Class	0	97.8%		0.2%	0.3%			0.7%	0.4%	0.5%	0.1%
	1		98.0%	0.3%	0.2%			0.2%	0.3%	0.2%	1.0%
	2	0.6%	0.8%	90.2%	1.4%	1.0%	0.3%	1.3%	1.0%	3.3%	0.3%
	3	0.4%	0.1%	1.6%	91.3%		2.5%	0.3%	1.1%	2.2%	0.6%
	4	0.1%	0.1%	0.5%	0.3%	93.7%		0.9%	0.3%	0.8%	3.3%
	5	1.1%	0.2%	0.3%	4.0%	1.0%	87.0%	1.6%	0.9%	3.5%	0.3%
	6	0.9%	0.3%	0.5%	0.2%	0.8%	1.6%	95.2%	0.2%	0.2%	

Neural Network(1 hidden layer)



Neural Network(1 hidden layer)

Neural Network 설정

Draft saved at 오전 10:26:41

1

Multiclass Neural Network

MNIST Train 60k 28x28 dense

Train Model

Score Model

Multiclass Neural Network

Create trainer mode

Single Parameter

2

Hidden layer specification

Custom definition script

Neural network def...

1

Quick Help

Creates a multiclass classification model using a neural network algorithm
([more help...](#))

Neural Network(1 hidden layer)

Neural Network 설정

Properties Project

▴ Multiclass Neural Network

Create trainer mode

Single Parameter ▼

Hidden layer specification

Custom definition script ▼

Neural network definition

```
1 input picture[28, 28];  
2 hidden H [100] from picture all;  
3 output result[10] sigmoid from H all;
```

Number of learning iterations

30

Neural Network(1 hidden layer)

Train Model

Select a single column

BY NAME

WITH RULES

AVAILABLE COLUMNS

All Types

search columns

Label

f0

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

...

785 columns available

SELECTED COLUMNS

All Types

search columns

>

<

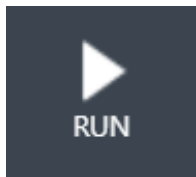
0 columns selected

3

✓

Neural Network(1 hidden layer)

결과 확인

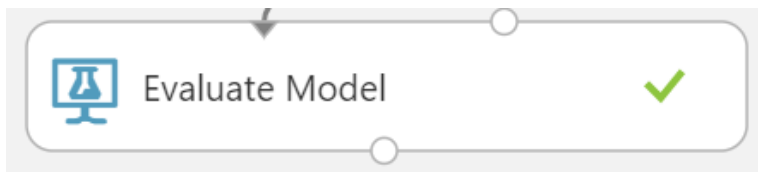


버튼을 누른 후

Finished running ✓

이 뜰 때까지 대기

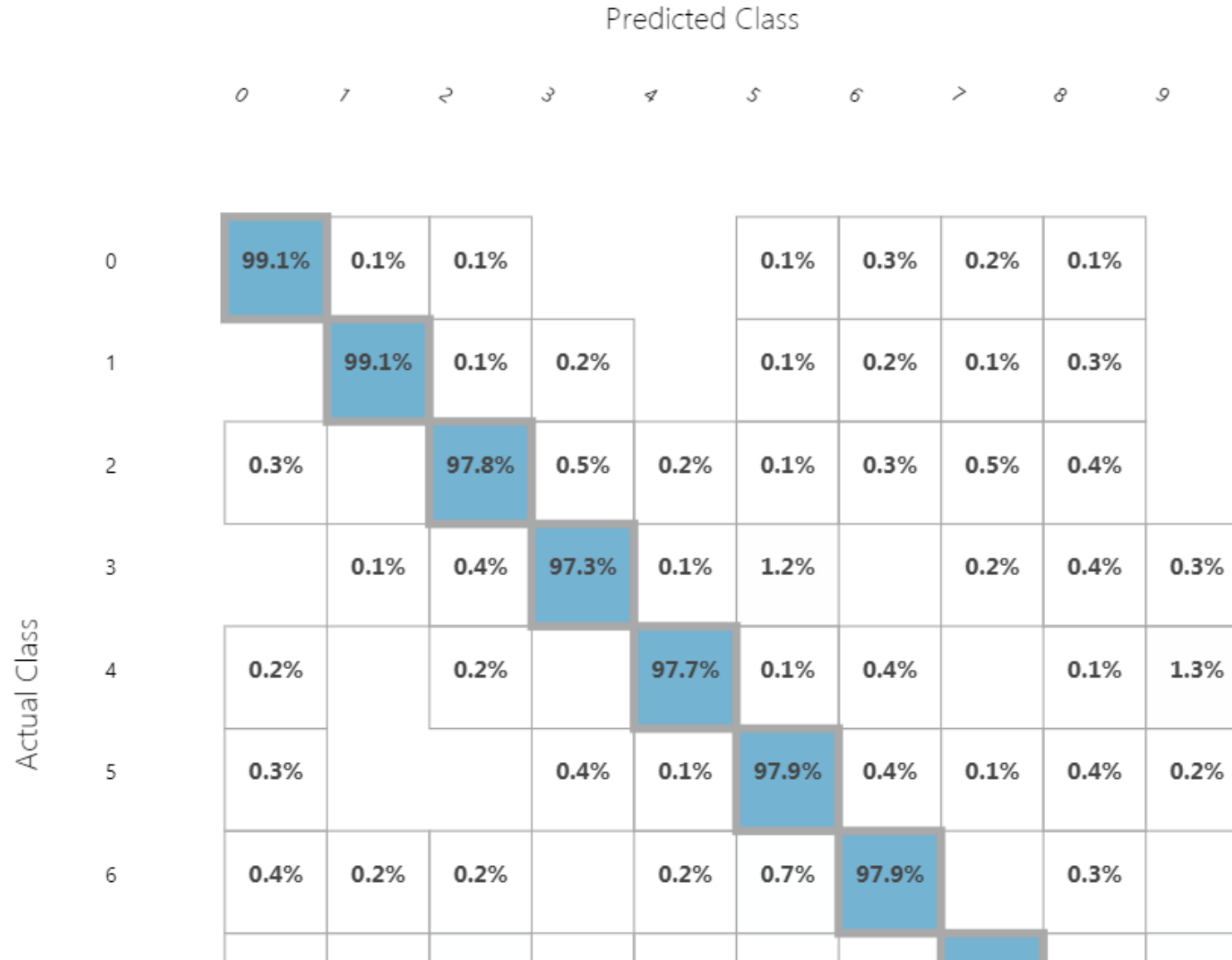
결과 확인



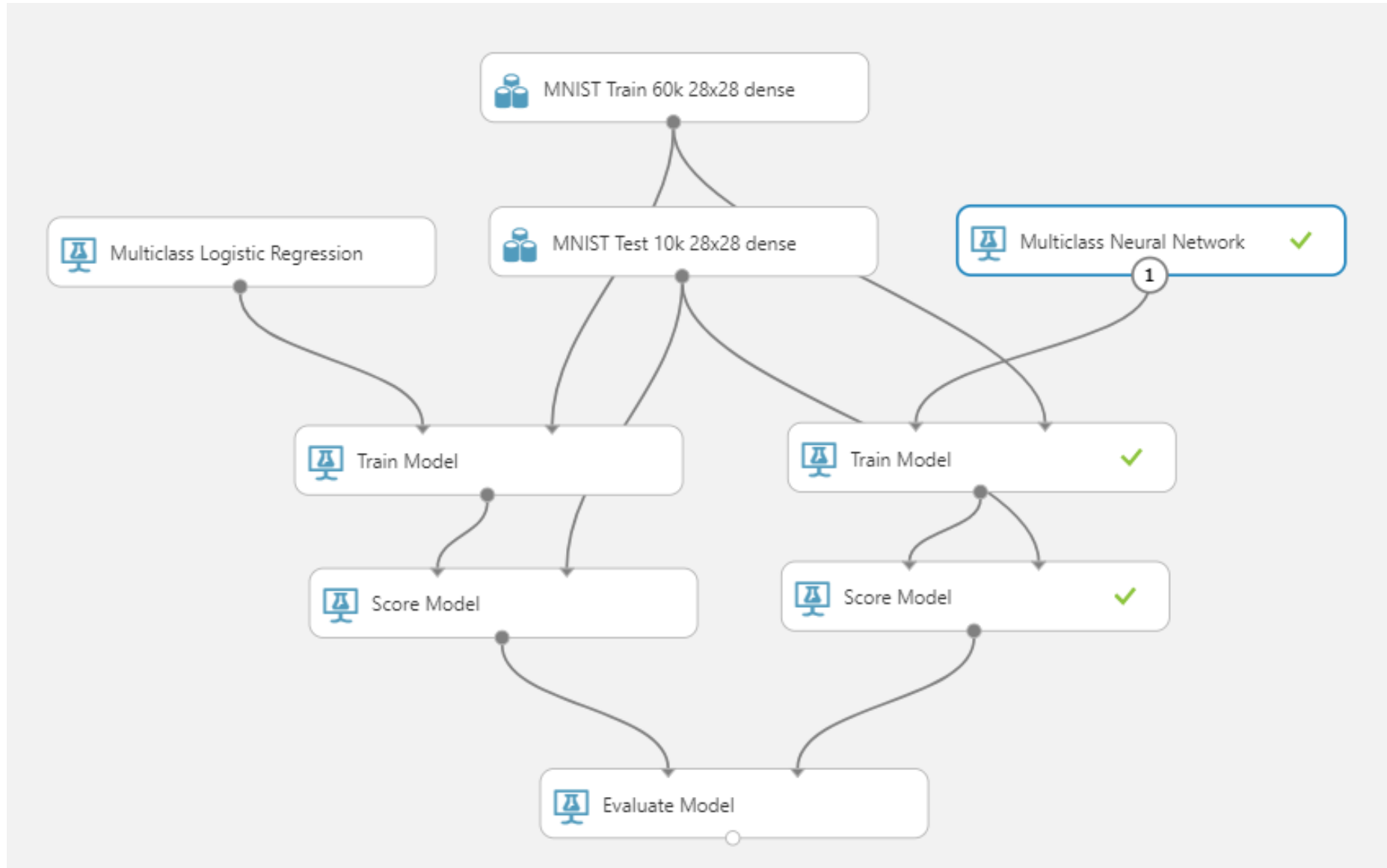
오른쪽 버튼 클릭>Evaluation results>Visualize

Neural Network(1 hidden layer)

결과 확인



Logistic Regression vs Neural Network(1 hidden layer)

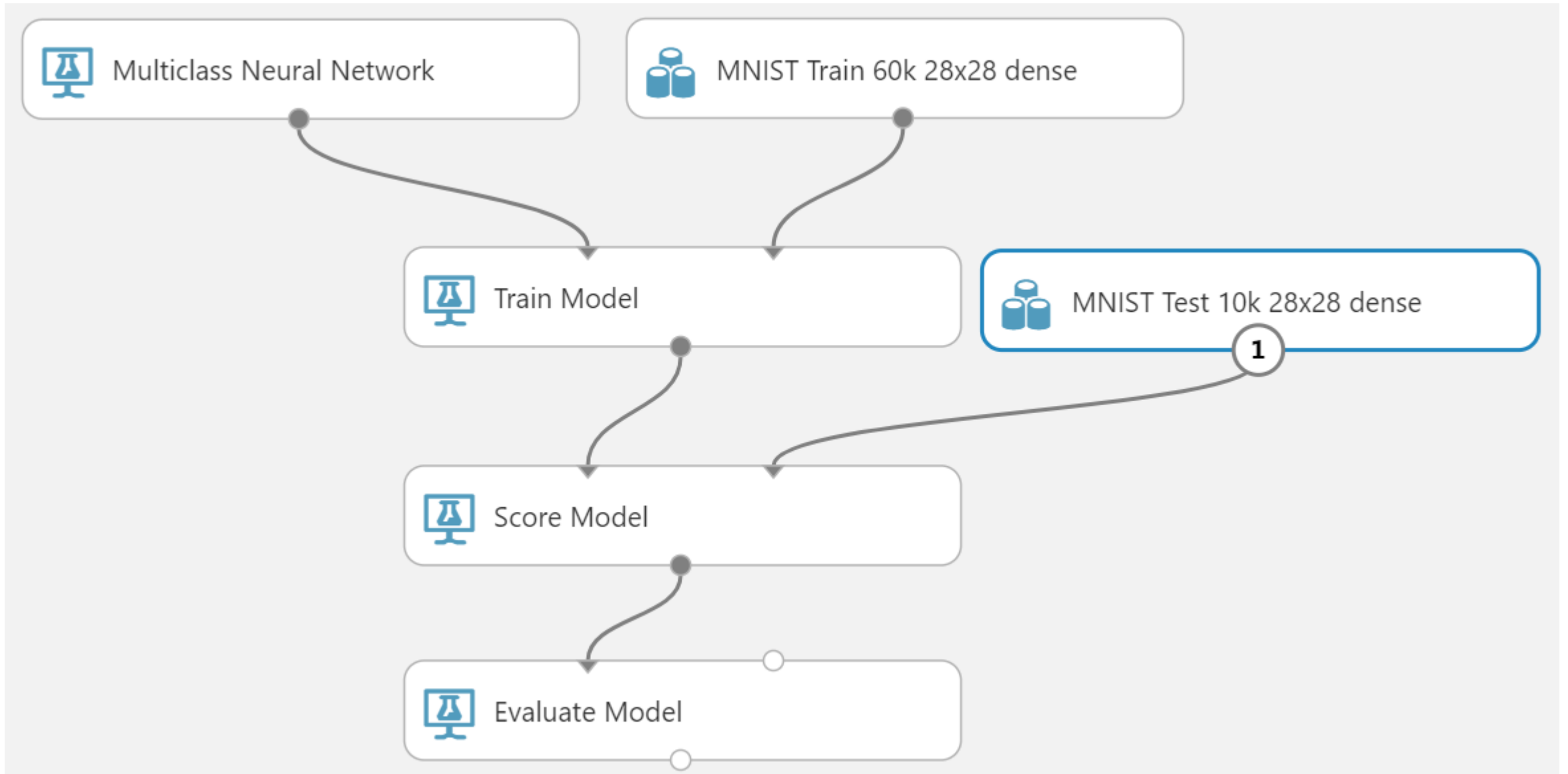


Logistic Regresion vs Neural Network(1 hidden layer)

		Predicted Class									
		0	1	2	3	4	5	6	7	8	9
Actual Class	0	97.8%					0.7%	0.4%	0.5%	0.1%	
	1		98.0%	0.3%	0.2%		0.2%	0.3%	0.2%	1.0%	
	2	0.6%	0.8%	90.2%	1.4%	1.0%	0.3%	1.3%	1.0%	3.3%	0.3%
	3	0.4%	0.1%	1.6%	91.3%		2.5%	0.3%	1.1%	2.2%	0.6%
	4	0.1%	0.1%	0.5%	0.3%	93.7%		0.9%	0.3%	0.8%	3.3%
	5	1.1%	0.2%	0.3%	4.0%	1.0%	87.0%	1.6%	0.9%	3.5%	0.3%
	6	0.9%	0.3%	0.5%	0.2%	0.8%	1.6%	95.2%	0.2%	0.2%	
	7	0.1%	0.9%	2.1%	0.6%	0.6%	0.1%		92.5%	0.1%	3.0%
	8	0.7%	1.0%	0.5%	2.2%	0.9%	2.7%	1.0%	0.8%	89.0%	1.1%
	9	1.1%	0.8%	0.1%	0.9%	2.6%	0.6%		1.9%	0.7%	91.4%

		Predicted Class									
		0	1	2	3	4	5	6	7	8	9
Actual Class	0	98.9%			0.2%	0.1%	0.3%	0.2%	0.1%	0.1%	0.1%
	1		99.1%	0.3%	0.1%		0.1%	0.2%	0.2%	0.1%	
	2	0.6%	0.2%	97.5%	0.3%	0.2%		0.3%	0.6%	0.4%	
	3			0.6%	97.9%	0.1%	0.5%	0.1%	0.1%	0.1%	0.6%
	4	0.2%		0.2%		98.0%		0.3%	0.1%	0.1%	1.1%
	5	0.3%			0.6%	0.1%	97.5%	0.9%	0.1%	0.2%	0.2%
	6	0.3%	0.3%		0.1%	0.2%	0.1%	98.7%		0.2%	
	7	0.2%	0.2%	1.1%		0.6%			97.3%	0.1%	0.6%
	8	0.5%	0.1%	0.1%	0.3%	0.7%	0.2%	0.4%	0.4%	97.0%	0.2%
	9	0.5%	0.3%		0.4%	1.0%	0.3%	0.1%	0.3%	0.2%	96.9%

Neural Network(2 hidden layers)



Neural Network(2 hidden layers)

Neural Network 설정

Draft saved at 오전 10:26:41

1 Multiclass Neural Network

MNIST Train 60k 28x28 dense

Train Model

Score Model

2 Multiclass Neural Network

Create trainer mode

Single Parameter

Hidden layer specification

Custom definition script

Neural network def...

1

Quick Help

Creates a multiclass classification model using a neural network algorithm
([more help...](#))

Neural Network(2 hidden layers)

Neural Network 설정

Properties Project

▴ Multiclass Neural Network

Create trainer mode

Single Parameter ▼

Hidden layer specification

Custom definition script ▼

Neural network definition

```
1 input picture[28,28];  
2 hidden H1 [100] from picture all;  
3 hidden H2 [100] from H1 all;  
4 output result[10] sigmoid from H2 all;
```

Number of learning iterations

30

Neural Network(1 hidden layer)

Train Model

Select a single column

BY NAME

WITH RULES

AVAILABLE COLUMNS

All Types ▼ search columns

1

Label

f0

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

...

785 columns available

SELECTED COLUMNS

All Types ▼ search columns

2

>

<

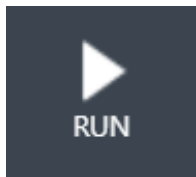
0 columns selected

3

✓

Neural Network(1 hidden layer)

결과 확인

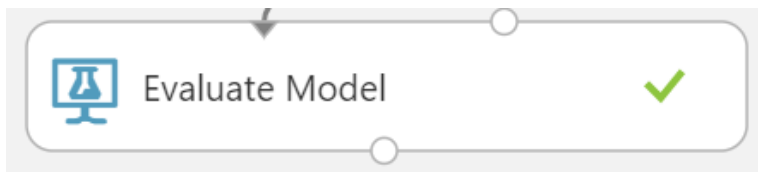


버튼을 누른 후

Finished running ✓

이 뜰 때까지 대기

결과 확인



오른쪽 버튼 클릭>Evaluation results>Visualize

Neural Network(1 hidden layer)

결과 확인

		Predicted Class									
		0	1	2	3	4	5	6	7	8	9
Actual Class	0	98.8%		0.1%		0.2%	0.4%	0.1%	0.2%	0.2%	
	1		99.6%	0.1%	0.1%				0.1%	0.1%	
	2	0.4%	0.2%	97.0%	0.7%	0.5%	0.2%	0.1%	0.7%	0.3%	
	3	0.1%		0.2%	97.2%		1.0%		0.4%	0.6%	0.5%
	4	0.2%	0.2%	0.1%		97.4%		0.5%	0.2%		1.4%
	5	0.6%		0.1%	1.2%	0.2%	96.3%	0.6%	0.2%	0.2%	0.6%
	6	1.3%	0.3%	0.2%		0.7%	0.8%	96.5%		0.2%	
	7	0.1%	0.3%	0.9%	0.6%	0.3%			96.8%	0.1%	1.0%

감사합니다😊