

Set up Continuous Learning Model using Watson Studio.

Goals:

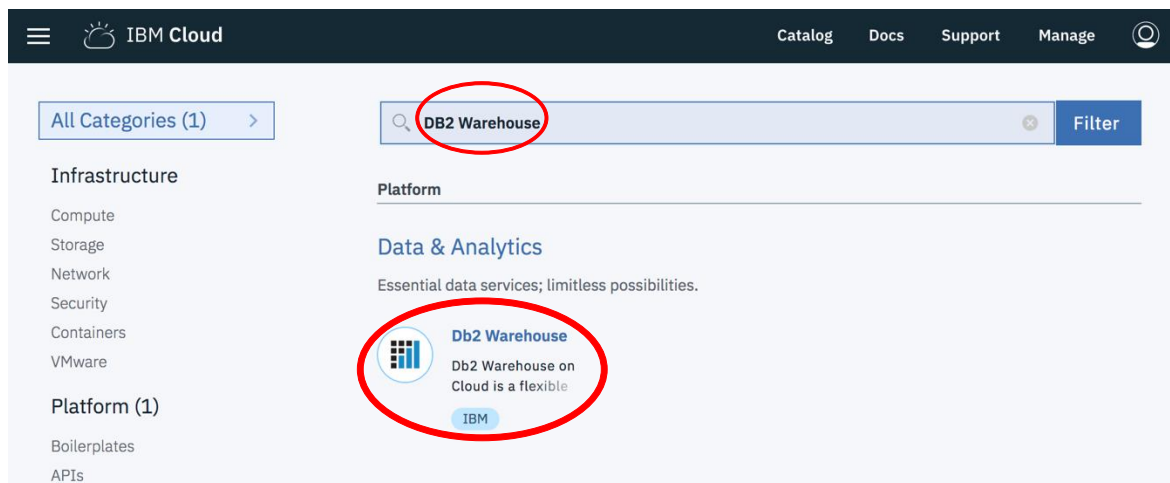
In this lab you will

- Requisition a DB2 Warehouse Service
- Upload data to your Watson Studio project.
- Train, compare, and select a machine learning model.
- Set up continuous learning capabilities.
- Deploy a machine learning model.

Exercise Instructions

Step 1.1 Requisition a DB2 Warehouse Service

1. Open <https://console.bluemix.net/dashboard/apps/>
2. Provide your username and password.
3. Access the catalog page. <https://console.bluemix.net/catalog/>
4. Type DB2 Warehouse into the search bar and click on the DB2 Warehouse icon.



5. Scroll down, ensure that Entry is selected and click Create. Note that you will not be charged for this service for the lab.

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[Catalog](#)
[Docs](#)
[Support](#)
[Manage](#)

Click an image to enlarge and view screen captures, slides, or videos. Screen caps show the user interface for the service after it has been provisioned.

Pricing Plans

Monthly prices shown are for country or region: [United States](#)

PLAN	FEATURES	PRICING
Entry	Free for up to 1GB of data storage One dedicated schema per service instance on a shared server Maximum 20GB of data storage per instance	\$50.00 USD/Monthly

Recommended for up to 100 GB of data, based on typical compression. Estimated compression is based on historical average of observed data compression rates. Actual Client data compression rates and temp space requirements, and resulting data storage availability, are not guaranteed and may vary based on Client's specific usage and data characteristics.

Need Help?
[Contact IBM Cloud Sales](#)

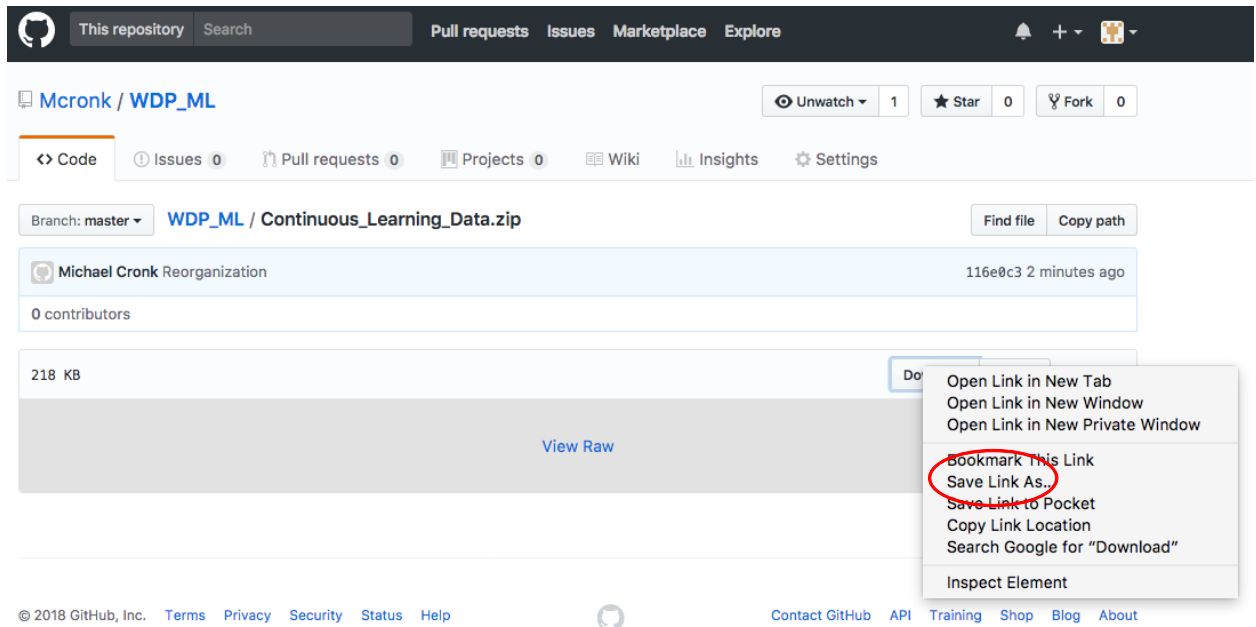
Estimate Monthly Cost
[Cost Calculator](#)

[Create](#)

Step 1.2 Upload a New Data Asset.

Before we build our models, we need to load data into our project.

1. Open https://github.com/bleonardb3/ML-POT/blob/master/Lab-2/data/Continuous_Learning_Data.zip
2. Right click Download and click Save Link As.

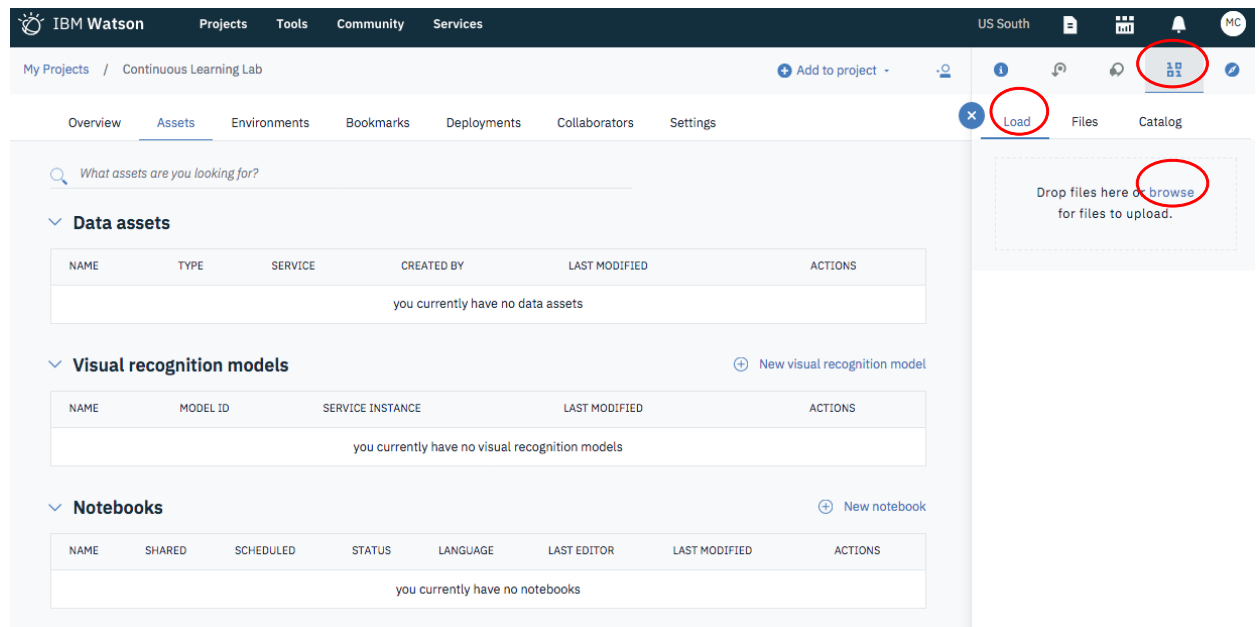


3. Save the zip file to your desktop and decompress the contents. This zip file contains data for building information for each month.

This zip file contains data for building information for each month. We will begin by building our model for the month of September and then add in data for later months to show how we can build our model to continuously adjust over time.

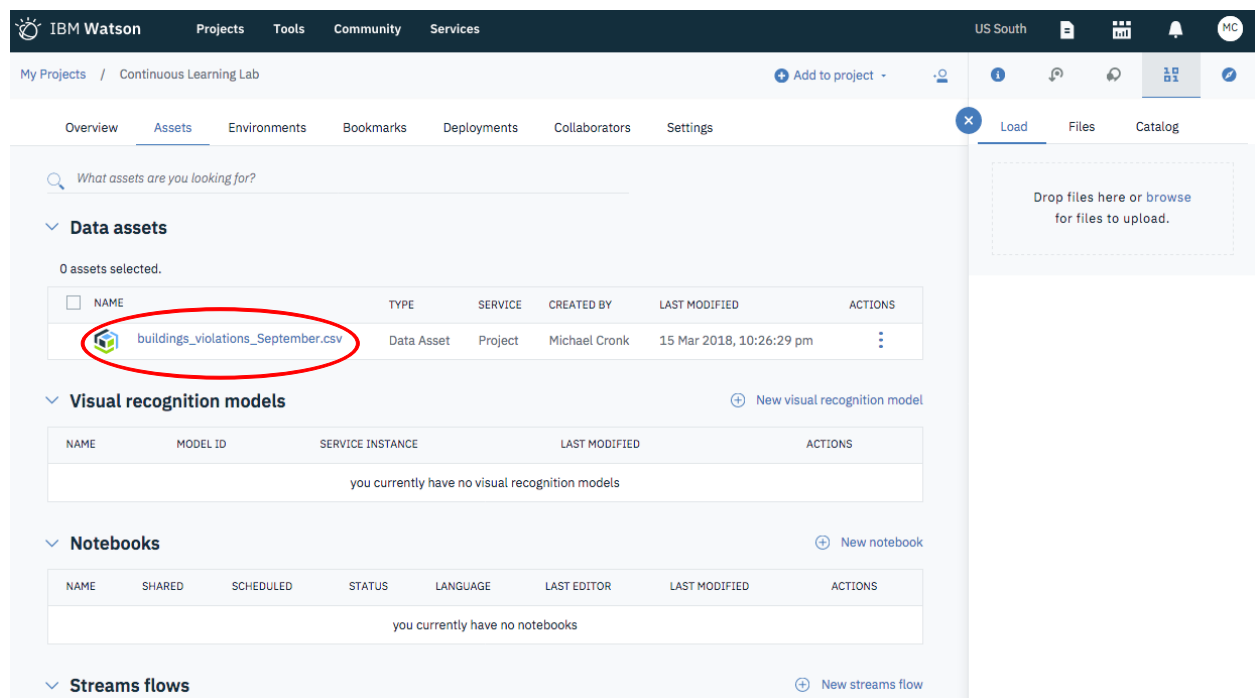
4. Return to your assets page.

5. In the top right of the screen, click the blue icon with 1's and 0's. This will open the data pallet.
6. Click on Load, browse, select the building_violations_September.csv file and click open.



The CSV file should now be listed under “Data assets.” It is now accessible by Watson Data Platform modeling tools and applications.

7. Click on building_violations_September.csv under Data assets.



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After clicking on building_violations_September.csv, you are brought to a data view. Once you are satisfied that this is the data you want, click on your project name to return to your project's assets.

The screenshot shows the IBM Watson Project interface. The top navigation bar includes 'IBM Watson', 'Projects', 'Tools', 'Community', and 'Services'. The 'Projects' tab is active, and the 'Continuous Learning Lab' project is selected. The breadcrumb trail shows 'My Projects' > 'Continuous Learning Lab' > 'buildings_violations_September.csv'. The 'Preview' tab is active, displaying a table with 100 rows of data. The table has 8 columns: INSPECTION_STAT..., VIOLATION_CO..., VIOLATION_STAT..., INSPECTION_CATEGO..., PROPERTY_GRO..., LONGITUDE, and LATITUDE. The data shows various inspection statuses (FAILED, OPEN, COMPLIED, PERMIT) and violation codes (CN063014, EL0086, CN197087, CN190019, NC2022, CN070014, CN073024, NC2022, CN070034, PL157017, PL237020, VT1010). The right sidebar shows the 'Data Asset' details for 'buildings_violations_September.csv', including a description, tags, creator (michael.cronk@ibm.com), added date (02:26 AM UTC, 2018/03/16), and size (106.389 KB).

INSPECTION_STAT...	VIOLATION_CO...	VIOLATION_STAT...	INSPECTION_CATEGO...	PROPERTY_GRO...	LONGITUDE	LATITUDE
Type: String	Type: String	Type: String	Type: String	Type: String	Type: String	Type: String
FAILED	CN063014	OPEN	COMPLAINT	small	-87.691078	42.002457
FAILED	EL0086	OPEN	COMPLAINT	small	-87.714074	41.956543
FAILED	EL0086	OPEN	COMPLAINT	small	-87.633451	41.759317
FAILED	CN197087	OPEN	COMPLAINT	small	-87.795168	41.952655
FAILED	CN190019	OPEN	COMPLAINT	small	-87.769105	41.785145
FAILED	NC2022	OPEN	COMPLAINT	small	-87.712142	41.842044
FAILED	CN070014	OPEN	COMPLAINT	small	-87.713576	41.739676
FAILED	CN073024	COMPLIED	COMPLAINT	small	-87.727869	41.869170
FAILED	NC2022	OPEN	COMPLAINT	small	-87.830633	41.949832
FAILED	CN070034	OPEN	PERIODIC	small	-87.543687	41.730277
FAILED	PL157017	OPEN	COMPLAINT	small	-87.657112	41.792445
FAILED	PL237020	OPEN	COMPLAINT	small	-87.726443	41.902468
FAILED	VT1010	OPEN	PERMIT	small	-87.654530	41.920956

Step 1.3 Train, Compare, and Select a Machine Learning Model

1. Scroll down and click New model.

The screenshot displays the IBM Watson Continuous Learning Lab interface. The top navigation bar includes the IBM Watson logo and links for Projects, Tools, Community, and Services. The right side of the header shows the region (US South) and user profile (MC). Below the header, the breadcrumb trail indicates 'My Projects / Continuous Learning Lab'. A sidebar on the right contains tabs for Load, Files, and Catalog, with a search bar and a list of files including '0 selected' and 'buildings_violations_September.csv'. The main content area is divided into four sections: Notebooks, Streams flows, Dashboard, and Models. Each section has a table header and a message indicating no items are currently present. The 'Models' section is highlighted with a red circle around the 'New model' button.

Notebooks [New notebook](#)

NAME	SHARED	SCHEDULED	STATUS	LANGUAGE	LAST EDITOR	LAST MODIFIED	ACTIONS
you currently have no notebooks							

Streams flows [New streams flow](#)

NAME	MODIFIED BY	LAST MODIFIED	ACTIONS
you currently have no streams flows			

Dashboard [New dashboard](#)

NAME	SHARED	LAST EDITOR	LAST MODIFIED	ACTIONS
you currently have no dashboard				

Models [New model](#)

NAME	STATUS	TYPE	RUNTIME	LAST MODIFIED	ACTIONS
you currently have no models					

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2. After being brought to the New Model page, we need to create a Machine Learning Service to build our models. Click on Associate Machine Learning service instance.

IBM Watson Projects Tools Community Services US South

New model BETA

Define model details

Name

Model name 100

Description

Model description 300

Machine Learning Service

No Machine Learning service instances associated with your project.

Associate a Machine Learning service instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.

Reload

Select model type

☒ Model builder ☐ From file ☐ From sample

Spark Service

No Spark instances associated with your project.

Associate an IBM Analytics for Apache Spark instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.

Reload

Automatic

Prepare my data and create a model automatically

Manual

Let me prepare my data and select which models to train

Need something more flexible? Create a notebook or design an SPSS Modeler flow.

Cancel Create

3. Scroll down, click on Lite and Create. This will allow us to train, evaluate, and deploy up to 5 models.

Pricing Plan: Monthly Process shown above reflect the: [United States](#)

PLAN	FEATURES	PRICING
<input checked="" type="radio"/> Lite	Service instance (5 models per instance) 5,000 predictions 50 capacity unit-hours	Free
<p>The lite plan instance of the IBM Watson Machine Learning service provides you with a maximum of 5 deployed models, 5,000 predictions per month, and 50 capacity unit-hours per month during which model can be trained, evaluated, and deployed to be available to accept prediction events, with a minimum of 1 minute per training job.</p>		
<input type="radio"/> Standard	Predictions Capacity unit-hours	\$0.5 USD/1,000 predictions \$0.5 USD/CAPACITY_HOUR
<input type="radio"/> Professional	Service instance 2,000,000 predictions included and then billed per 1,000 predictions 1,000 capacity unit-hours included and then billed per capacity unit-hours	\$1,000 USD/Instance \$0.4 USD/1,000 predictions \$0.4 USD/CAPACITY_HOUR

[Terms](#)

[Cancel](#) [Create](#)

4. When the Confirm Creation window appears, keep the defaults and click Confirm.
5. Once you have returned to the New model page, click Reload under Machine Learning service.

IBM Watson Projects Tools Community Services US South

New model BETA

Define model details

Name
Model name 100

Description
Model description 300

Machine Learning Service
No Machine Learning service instances associated with your project.
Associate a Machine Learning service instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.
[Reload](#)

Select model type

☒ Model builder ☐ From file ☐ From sample

Spark Service
No Spark instances associated with your project.
Associate an IBM Analytics for Apache Spark instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.
[Reload](#)

Automatic
Prepare my data and create a model automatically

Manual
Let me prepare my data and select which models to train

Need something more flexible? Create a [notebook](#) or design an [SPSS Modeler flow](#).

[Cancel](#) [Create](#)

6. Click on Associate IBM Analytics Apache Spark instance.

IBM Watson Projects Tools Catalog Community Services US South

New model BETA

Define model details

Name
Model name

Description
Model description

Machine Learning Service
predictive-modeling-jg

Select model type

☒ Model builder ☐ From file ☐ From sample

Spark Service
No Spark instances associated with your project.
Associate an IBM Analytics for Apache Spark instance with your project on the project settings page, then click the reload button below to refresh the instances available for association with your new model builder instance.

Reload

Automatic
Prepare my data and create a model automatically

Manual
Let me prepare my data and select which models to train

Need something more flexible? Create a notebook or design an SPSS Modeler flow.

Cancel Create

7. Scroll down, click Lite, and click Create. This will requisition two Spark executors.

IBM Watson Projects Tools Catalog Community Services US South

Apache Spark

Apache Spark is an open source cluster computing framework optimized for extremely fast and large scale data processing, which you can access via the newly integrated notebook interface IBM Analytics for Apache Spark. You can connect to your existing data sources or take advantage of the on-demand big data optimization of Object Storage. Spark plans are based on the maximum number of executors available to process your analytic jobs. Executors exist only as long as they're needed for processing, so you're charged only for processing done.

Features

- Incredibly Fast**
Apache Spark delivers 100x the performance of Apache Hadoop for certain workloads because of its advanced in-memory computing engine.
- Easy to Use and Powerful**
Apache Spark's Streaming and SQL programming models backed by MLlib and GraphX make it incredibly easy for developers and data scientists to build apps that exploit machine learning and graph analytics. Because the service is 100% compatible with Apache Spark, developers can build their apps and run them against the IBM managed service to benefit from operational, maintenance, and hardware excellence.
- Convenient Data Storage**
Object Storage enables a convenient way to upload your data from a file for immediate use by your Spark instance. You can set up Object Storage directly from the Spark service interface.

Pricing Plan: Monthly Process shown above reflect the: [United States](#)

PLAN	FEATURES	PRICING
<input checked="" type="radio"/> Lite	2 Spark Executors	Free

An entry level plan to run programs using up to 2 Spark executors

Terms

Cancel Create

Now that we have the necessary resources, we can define our model.

8. Return to the New model page, enter a Name and a Description, select Manual, and click Create. We are creating a model using “Model builder” but can also create models in notebooks as well as with SPSS or Deep Learning flow modelers.

IBM Watson Projects Tools Catalog Community Services US South

New model BETA

Define model details

Name
Building_Violations_Chicago_2017 68

Description
Building violations continuous machine learning model. 246

Machine Learning Service
predictive-modeling-jg

Select model type

☒ Model builder ☐ From file ☐ From sample

Spark Service
spark-le

Automatic
Prepare my data and create a model automatically

Manual
Let me prepare my data and select which models to train

Need something more flexible? Create a [notebook](#) or design an [SPSS Modeler flow](#).

[Cancel](#) [Create](#)

9. You will be brought to a “Select data asset” page. Select `building_violations_September.csv` as our data asset and click Next.

IBM Watson Projects Tools Catalog Community Services US South

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

Select data asset

The model builder currently supports CSV files and IBM Db2 Warehouse on Cloud data assets.

What asset are you looking for?

NAME	TYPE	SERVICE
<u>buildings_violations_September.csv</u>	Data Asset	Project

[Close](#) [Next](#)

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We will now choose which techniques may work well given our data and given our goal to predict which buildings are most likely to not pass inspection.

10. On the “Select a technique” page, click on the Select Label Col dropdown and select INSPECTION_STATUS(String).

11. Select Binary Classification. Note that this is often automatically suggested by Watson Studio.

12. Click Add Estimators in the upper right corner of the page.

The screenshot displays the IBM Watson Studio interface for selecting a machine learning technique. The top navigation bar includes 'IBM Watson', 'Projects', 'Tools', 'Catalog', 'Community', and 'Services'. The breadcrumb trail shows 'My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017'. On the left, the 'Select Data' sidebar has 'Train' selected. The main area is titled 'Select a technique'. It features a 'Column value to predict (Label Col)' dropdown set to 'INSPECTION_STATUS (String)', a 'Feature columns' dropdown set to 'All (default)', and a 'Suggested technique' section with three options: 'Binary Classification' (selected), 'Multiclass Classification', and 'Regression'. Below these is a 'Validation Split' slider showing 'Train: 60', 'Test: 20', and 'Holdout: 20'. In the top right corner, the 'Add Estimators' button is circled in red. At the bottom right, there are 'Close', 'Previous', and 'Next' buttons, along with a chat icon.

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Watson Data Platform only presents the estimators that would work with our selections on the previous page.


13. Select Logistic Regression and Decision Tree Classifier.


14. Click Add.


Select estimator(s)

 What type of estimator are you looking for?

**Logistic Regression**
Analyzes a data set in which there are one or more independent variables that determine one of two outcomes. Only binary l...

**Decision Tree Classifier**
Makes observations about an item (represented in the branches) to conclusions about the item's target value (represented in...

**Random Forest Classifier**
Constructs multiple decision trees to produce the label that is a mode of each decision tree. It supports both binary and ...

**Gradient Boosted Tree Classifier**
Produces a classification prediction model in the form of an ensemble of decision trees. It only supports binary labels, a...

Cancel

Add

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15. Back on the “Select a technique” page, click Next.

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Select Data
Train
Evaluate

Select a technique

You cannot change label column, feature columns, model type, or validation split after adding an estimator. You must first delete all estimators in order to make changes to these attributes.

Column value to predict (Label Col)
INSPECTION_STATUS (String)

Feature columns
All (default)

☒ Suggested technique.

Binary Classification

Classify new data into defined categories based on existing data. Choose if your label column contains two distinct categories.

Multiclass Classification

Classify new data into defined categories based on existing data. Choose if your label column contains a discrete number of categories.

Regression

Predict values from a continuous set of values. Choose if your label column contains a large number of values.

Validation Split

Train: 60 Test: 20 Holdout: 20

Configured estimators

- Logistic Regression Not Yet Trained
- Decision Tree Classifier Not Yet Trained

Close Previous **Next**

The Select model page will allow us to compare the results of different estimator types (An excellent feature for more technical users). This saves time for data scientists and business analysts by allowing them to focus on the problem at hand rather than dealing with the overhead associated with building out and tuning different models. We can simultaneously train and tune multiple algorithms and immediately compare the results.

16. Both models have performed well. For this tutorial, select Logistic Regression.

17. Click Save.

IBM Watson Projects Tools Catalog Community Services US South

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

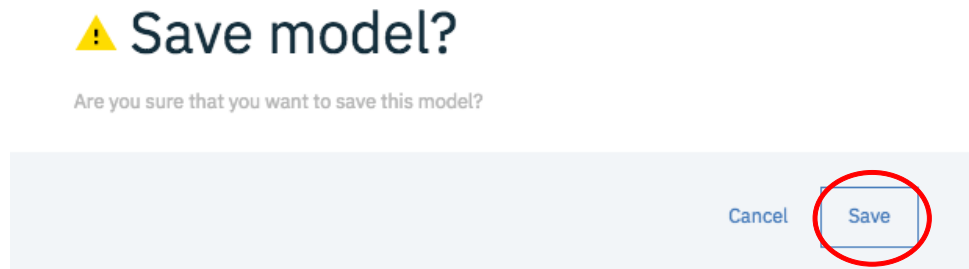
Select Data
Train
Evaluate

Select model

ESTIMATOR TYPE	STATUS	PERFORMANCE	AREA UNDER ROC CURVE	AREA UNDER PR CURVE	LAST EVALUATION	ACTIONS
<input checked="" type="radio"/> LogisticRegression	Trained & Evaluated	Excellent	0.98752	0.90207	15 Mar 2018, 1:38 PM	⋮
<input type="radio"/> DecisionTreeClassifier	Trained & Evaluated	Excellent	0.94157	0.87188	15 Mar 2018, 1:38 PM	⋮

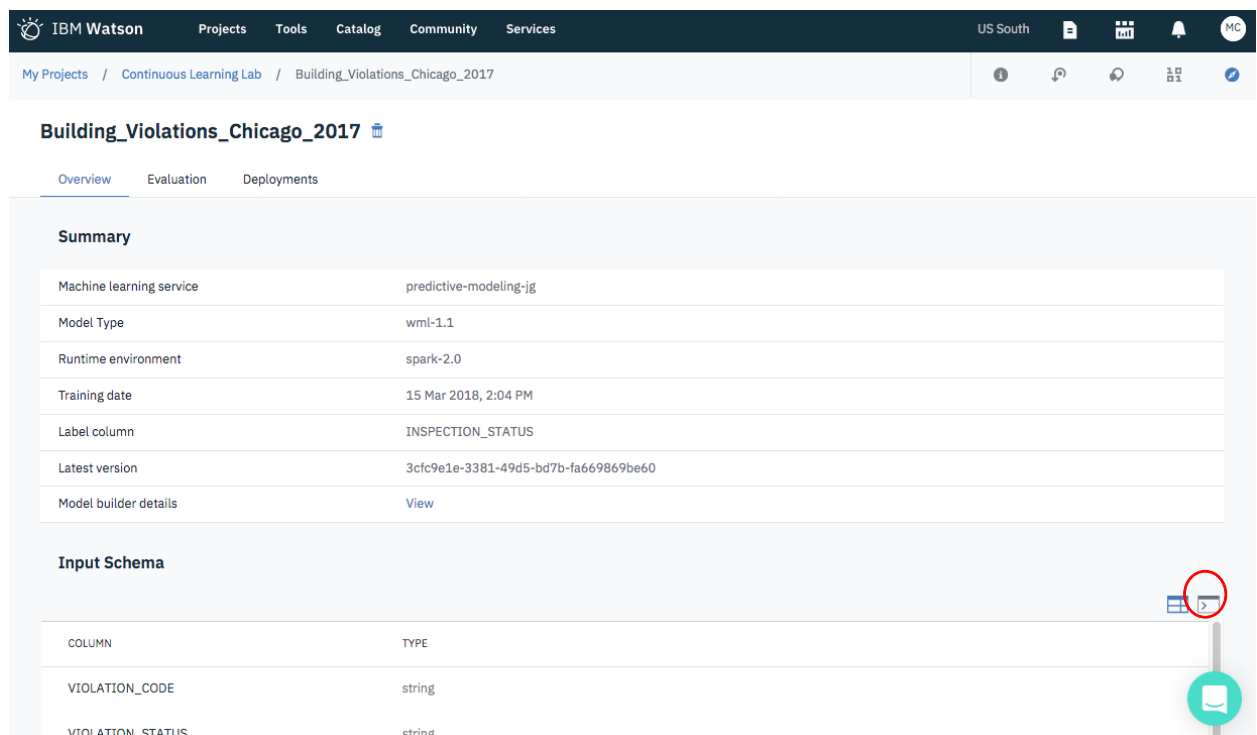
Close Previous **Save**

18. When the “Save model” window appears, click Save.



We have just saved the model in our Watson Machine Learning service and can now view information about the model specifications, details of construction, and input schema. The model can also be exposed as an API and called used by data pipelines, applications, or other external systems.

19. Click on the console button with an “angle bracket” to view the schema in JSON format.



Building_Violations_Chicago_2017

Overview Evaluation Deployments

Summary

Machine learning service	predictive-modeling-jg
Model Type	wml-1.1
Runtime environment	spark-2.0
Training date	15 Mar 2018, 2:04 PM
Label column	INSPECTION_STATUS
Latest version	3cfc9e1e-3381-49d5-bd7b-fa669869be60
Model builder details	View

Input Schema

COLUMN	TYPE
VIOLATION_CODE	string
VIOLATION_STATUS	string

This schema can be copied and used elsewhere to help existing systems easily interact with our model and the Watson Machine Learning service.

Input Schema

```
{
  {
    "name": "VIOLATION_CODE",
    "type": "string",
    "nullable": true,
    "metadata": {
      "columnInfo": {
        "columnPrimaryKey": false,
        "columnTypeName": "varchar",
        "columnSigned": true,
        "columnType": 12,
        "columnLength": 1024,
        "columnNullable": true,
        "columnScale": 0
      }
    }
  }
}
```

20. Scroll up and click on the Evaluation tab.

IBM Watson Projects Tools Catalog Community Services US South

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

Building_Violations_Chicago_2017

Overview **Evaluation** Deployments

Summary

Machine learning service	predictive-modeling-jg
Model Type	wml-1.1
Runtime environment	spark-2.0
Training date	15 Mar 2018, 2:04 PM
Label column	INSPECTION_STATUS
Latest version	3cfc9e1e-3381-49d5-bd7b-fa669869be60
Model builder details	View

Input Schema

```
{
  {
    "name": "VIOLATION_CODE",
    "type": "string",
    "nullable": true,
```


Step 1.4 Set up Continuous Learning Model Capabilities

Model performance is critical for solving data science problems. This page provides information and functionality to aid in continuous training, tuning, and redeployment. We will now set up parameters to automatically retrain our model when performance falls below a certain threshold.

1. Click on Configure Performance Monitoring.

IBM Watson Projects Tools Catalog Community Services US South

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

Overview Evaluation Deployments

Last Evaluation Result

Version	568f25c3-a274-44dd-bcf9-2fe1e2138a3d
Phase	setup
AreaUnderPR	0.902
AreaUnderROC	0.988

Performance Monitoring

Configure performance monitoring to evaluate and retrain the model periodically to ensure the model performance is acceptable. You will need an existing IBM Db2 Warehouse on Cloud connection associated with your project to be used as your feedback data connection.

[Configure Performance Monitoring](#)

Versions

TIME	VERSION	DEPLOYED	ACTIONS
16 Mar 2018 12:39am	568f25c3-a274-44dd-bcf9-2fe1e2138a3d		

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2. Under Metric details, select areaUnderPR and enter 0.8.

This relies on a database table of new data. We will use DB2 Warehouse on Cloud, a data store optimized for analytic data sets.

3. Click on Create a new connection.

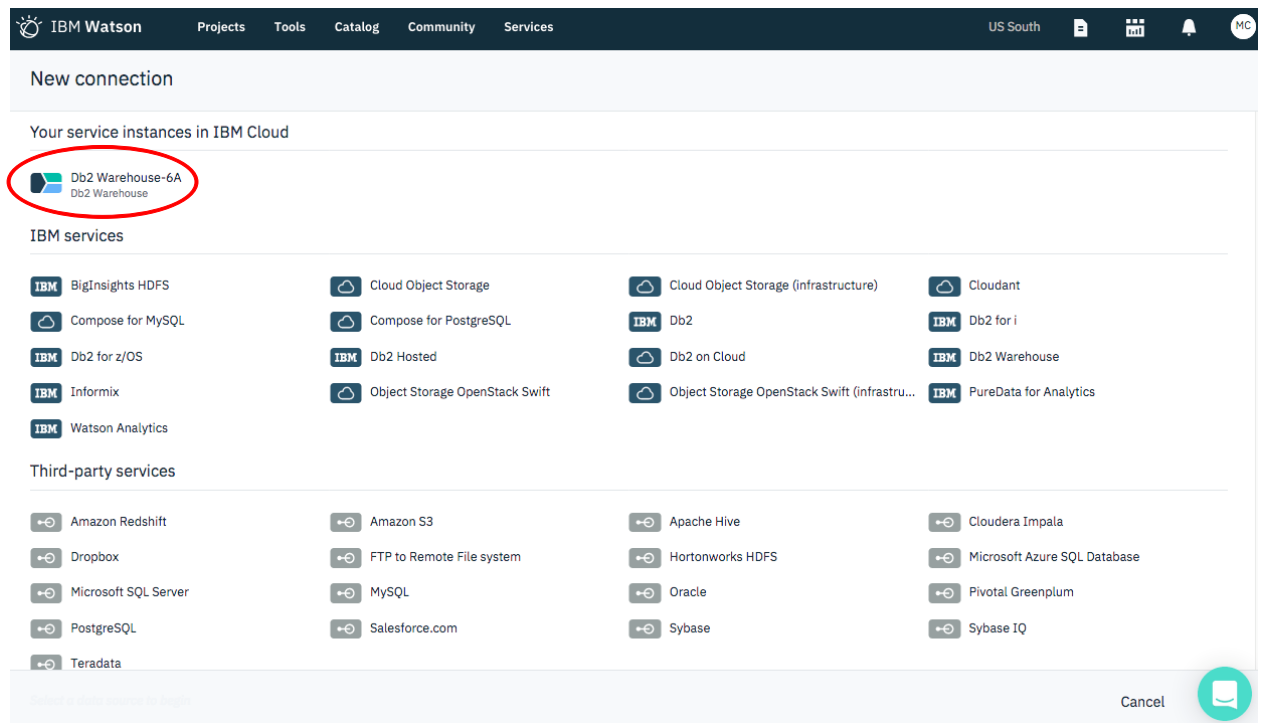
The screenshot shows the 'Configure performance monitoring' page in the IBM Watson interface. The page has a dark blue header with the IBM Watson logo and navigation links: Projects, Tools, Catalog, Community, and Services. On the right side of the header, it shows 'US South' and icons for a document, a list, a bell, and a user profile labeled 'MG'.

The main content area is titled 'Configure performance monitoring'. It contains several sections:

- Spark service:** A dropdown menu with 'spark-le' selected.
- Prediction type:** A dropdown menu with 'binary' selected.
- Metric details (type / optional threshold):** A dropdown menu with 'areaUnderPR' selected and a text input field with '.8' entered. Both the dropdown and the input field are circled in red.
- Feedback data connection (IBM Db2 Warehouse on Cloud connection):** A link that says 'Create new connection' with a plus icon, which is also circled in red. Below it is a 'Select source' link.
- Record count required for re-evaluation:** A text input field with '1000' entered.
- Auto retrain:** A dropdown menu with 'when model performance is below threshold' selected.
- Auto deploy:** A dropdown menu with 'when model performance is better than previous version' selected.

At the bottom right of the page, there are 'Cancel' and 'Save' buttons, and a green circular icon with a white speech bubble.

4. On the “New connection” page, click the DB2 Warehouse instance created during the lab prerequisites.



Notice the connection details have already been filled in.

5. Click Create.

The screenshot shows the IBM Watson Cloud console interface for creating a new connection. The top navigation bar includes the IBM Watson logo and links to Projects, Tools, Catalog, Community, and Services. The user is logged in as 'US South'.

The main heading is 'New connection (Db2 Warehouse-6A - Db2 Warehouse)'. The form is divided into two main sections: 'Connection overview' and 'Connection details'.

Connection overview:

- Name:** Db2 Warehouse-6A
- Description:** IBM Db2 warehouse database on Cloud

Connection details:

- Hostname or IP Address ***: dashdb-entry-yp-dal10-01.services.dal.bl
- Username ***: dash7669
- Secure Gateway**: ☐ Use a secure gateway
- Database ***: BLUDB
- Password ***:
- Connection discovery**: ☐ Discover data assets

At the bottom right, there are two buttons: 'Cancel' and 'Create'. The 'Create' button is circled in red, indicating it should be clicked. A small green chat icon is also visible next to the 'Create' button.

6. Return to the “Configure performance monitoring page” and click Select source.

IBM Watson Projects Tools Catalog Community Services US South

Configure performance monitoring

Spark service
spark-le

Prediction type
binary

Metric details (type / optional threshold)
areaUnderPR .8

Feedback data connection (IBM Db2 Warehouse on Cloud connection - Create new connection)
Select source






Record count required for re-evaluation
1000

Auto retrain
when model performance is below threshold

Auto deploy
when model performance is better than previous version


Cancel Save


7. Click on your DB2 Warehouse-xx name.
8. Select the schema that matches DASH####.
9. Click select.

 Projects Tools Catalog Community Services US South    

Select feedback data source

Continuous Learning Lab	Db2 Warehouse-6A	DASH7669
Connections (1)	Schemas (11)	
Db2 Warehouse-6A	DASH7669	No drilldowns currently exist.
	ERRORSCHEMA	
	GOSALES	
	GOSALESDW	
	GOSALESHR	
	GOSALESMR	
	GOSALESRT	
	NULLIDR1	
	NULLIDRA	
	SAMPLES	
	ST_INFORMTN_SCHEMA	


Select the data sources you want to work with.

Cancel 

10. After returning to the “Configure performance monitoring” page, enter “New2017Table” as the table name.
11. Enter 500 as the Record count.
12. Under Auto deploy, select never.
13. Click Save.

Configure performance monitoring

Spark service

spark-nn

Prediction type

binary

Metric details (type / optional threshold)

areaUnderPR

.8

+

Feedback data connection (IBM Db2 Warehouse on Cloud connection - [Create new connection](#))

dashdb: BLUDB [Change source](#)

New2017Table

Record count required for re-evaluation

500

Auto retrain

when model performance is below threshold

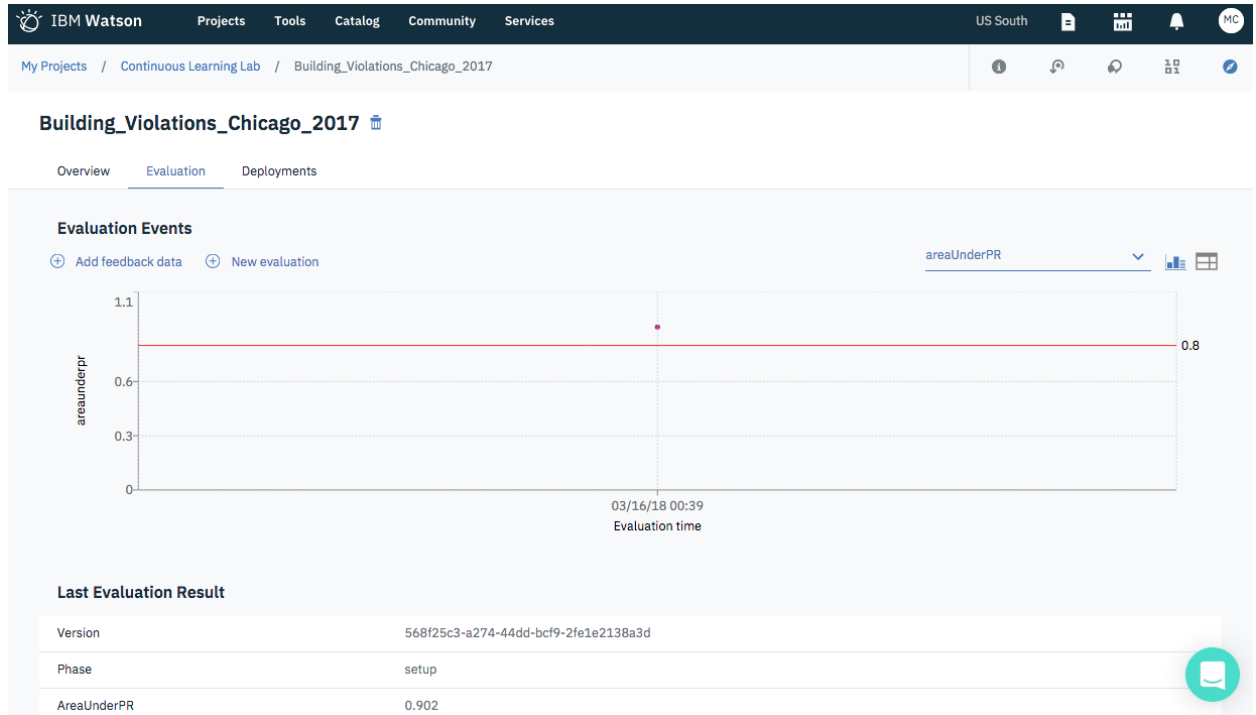
Auto deploy

never

Cancel

Save

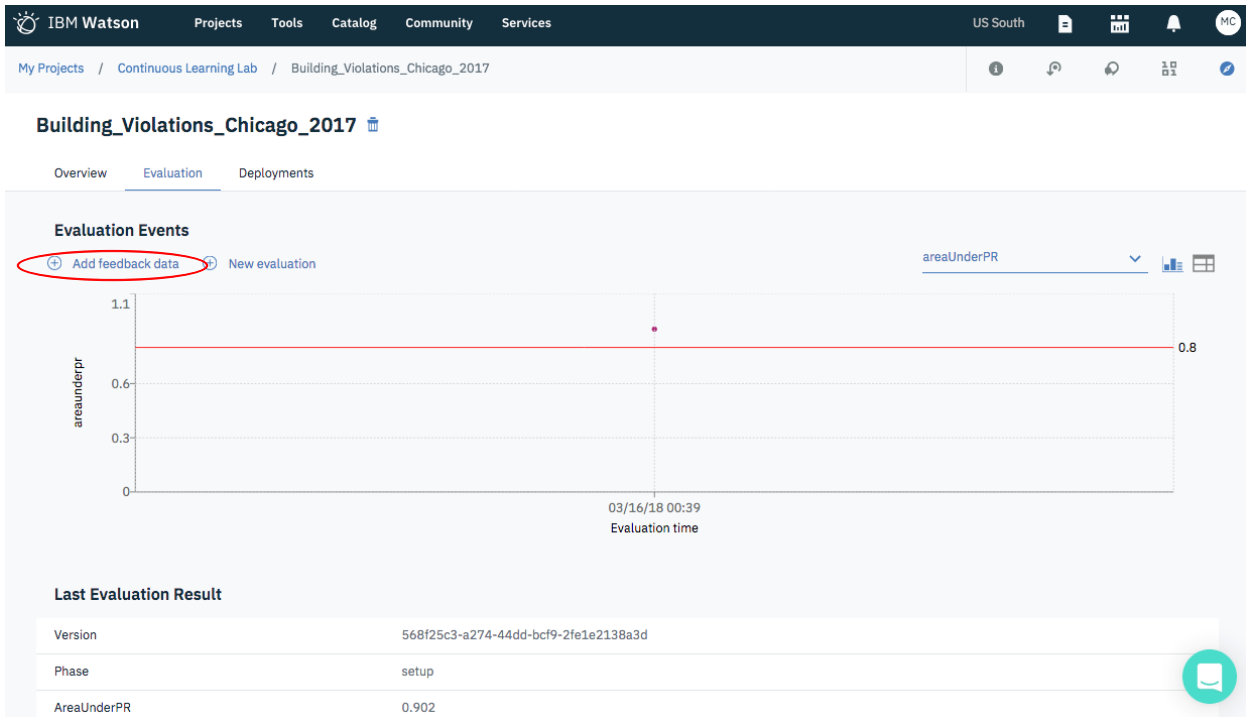
We have just set our model to retrain whenever its performance falls below 0.8. The evaluation screen has changed to reflect the decisions we have just made. Notice the graph lists our current areaunderPR and the threshold we have set. Clicking on Add feedback data will upload a new dataset. Clicking on new evaluation will then retrain the model and check to see how the model compares to our 0.8 threshold.



Suppose September has passed and we now have October data. We can trigger a new evaluation by adding more feedback data.

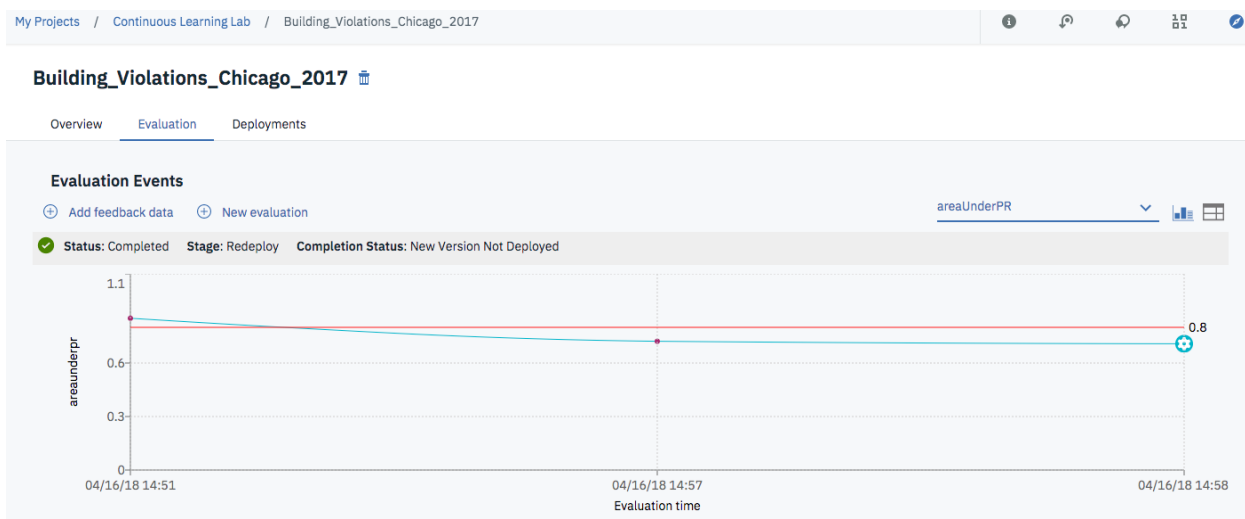
14. Click Add feedback data.

15. Select building_violations_October.csv.



16. When the “New evaluation” window appears, click New Evaluation. Re-evaluating the model may take a few minutes. This is a great time to grab coffee.

Notice that the October data has caused our model to fall below the 0.8 threshold and a new version has been trained. Although we run through these steps graphically, you can also configure a Watson Machine Learning continuous learning model entirely through APIs.



You can continue by adding the November data by the same process of hitting **Add feedback data** and adding more files. If you scroll down you will be able to see all model versions listed. We have three versions, but no deployments.

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

Last Evaluation Result

Version	e2a674a9-e916-4eb0-81d3-702ce33fa9ba
Phase	training
AreaUnderPR	0.738

Performance Monitoring [Edit configuration](#)

Performance Metrics (Threshold)	areaUnderPR (0.8)
Feedback Data Source	dashdb: BLUDB / New2017Table
Record Count Required For Re-Evaluation	500
Auto Re-Train	conditionally
Auto Re-Deploy	never

Versions

TIME	VERSION	DEPLOYED	AREAUNDERPR	ACTIONS
16 Apr 2018 03:03pm	e2a674a9-e916-4eb0-81d3-702ce33fa9ba		0.738	⋮
16 Apr 2018 02:57pm	4cc6abb1-f3be-4e3b-b26d-b9c2dc67abec		0.708	⋮
16 Apr 2018 02:51pm	66245399-4be3-470d-b190-c849a076947a		0.851	⋮

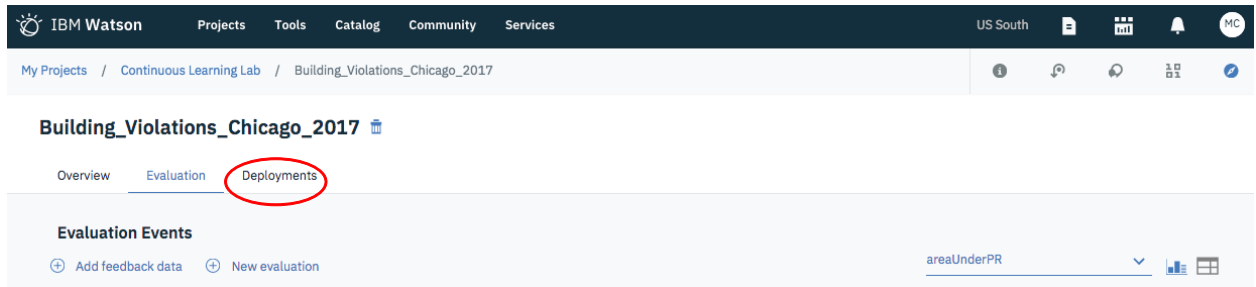
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Lesson 1.5 Deploy a Machine Learning Model.

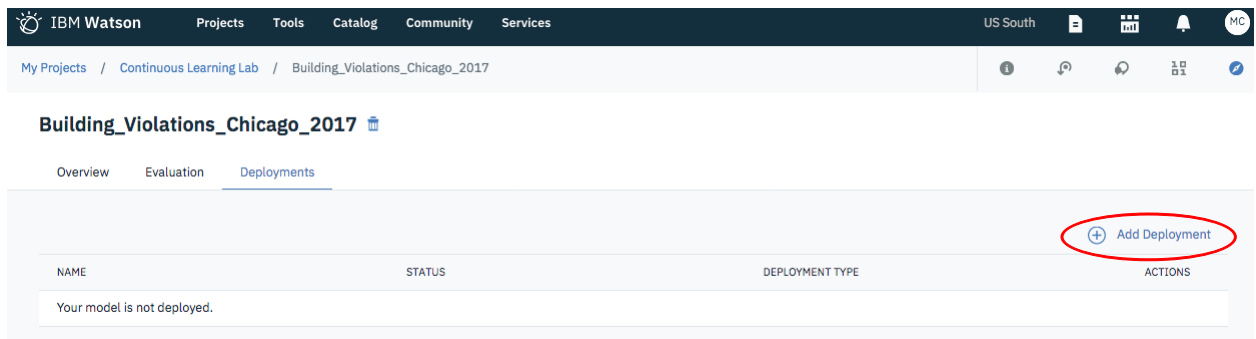
Now we will focus on deployment.

1. Click the Deployment tab.



The screenshot shows the IBM Watson interface for a project named 'Building_Violations_Chicago_2017'. The top navigation bar includes 'IBM Watson', 'Projects', 'Tools', 'Catalog', 'Community', and 'Services'. The breadcrumb trail is 'My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017'. Below the project name, there are three tabs: 'Overview', 'Evaluation', and 'Deployments'. The 'Deployments' tab is selected and circled in red. Under the 'Deployments' tab, there is a section titled 'Evaluation Events' with two buttons: 'Add feedback data' and 'New evaluation'. On the right side, there is a dropdown menu set to 'areaUnderPR' and a chart icon.

2. Add Deployment.



The screenshot shows the same IBM Watson interface, but now the 'Deployments' tab is active. The 'Add Deployment' button in the top right corner is circled in red. Below the button, there is a table with the following structure:

NAME	STATUS	DEPLOYMENT TYPE	ACTIONS
Your model is not deployed.			

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3. Enter a Name (e.g. ChicagoOnline).
4. Enter a Description.
5. Click Save.

IBM Watson Projects Tools Community Services Docs Support Manage

Create Deployment

Web Service Batch Prediction Real-time Streaming Predictions

Name
ChicagoOnline

Description
Building violations 2017 model deployment.

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Cancel Save

The model is now accessible by external systems.

6. Click on your deployment (e.g. ChicagoOnline).

IBM Watson Projects Tools Catalog Community Services US South

My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017

Building_Violations_Chicago_2017

Overview Evaluation Deployments

+ Add Deployment

NAME	STATUS	DEPLOYMENT TYPE	ACTIONS
ChicagoOnline	DEPLOY_SUCCESS	Web Service	

You are automatically brought to the Overview tab lists information related to the model deployment including services used and version number.

7. Click the Implementation tab.

The screenshot shows the IBM Watson interface. At the top, there is a dark blue navigation bar with the IBM Watson logo and links for Projects, Tools, Catalog, Community, and Services. On the right side of this bar, it says 'US South' and has icons for a document, a grid, a bell, and a user profile. Below the navigation bar is a breadcrumb trail: 'My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017 / ChicagoOnline'. The main content area is titled 'ChicagoOnline' and has three tabs: 'Overview', 'Implementation' (which is circled in red), and 'Test'. Under the 'Implementation' tab, there are two sections: 'Deployment' and 'Model'. The 'Deployment' section contains a table with the following data:

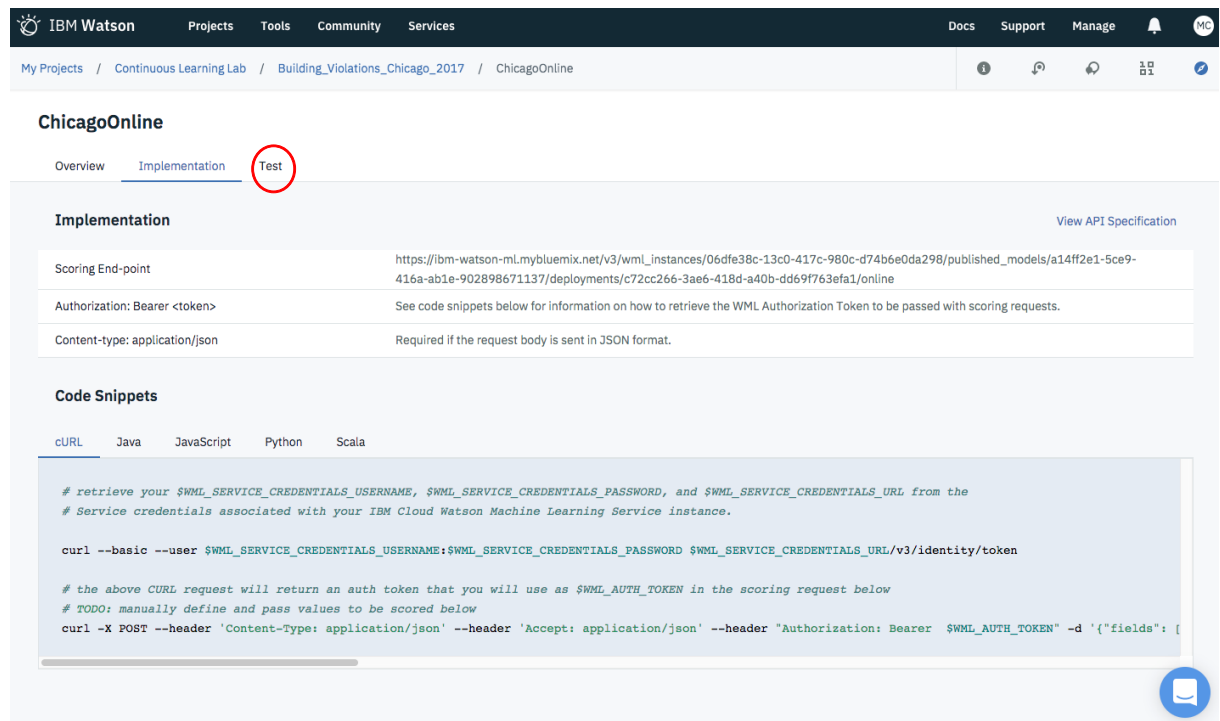
Name	ChicagoOnline
Type	Web Service
Deployment ID	0bfd9e9c-6a0e-4577-b5ee-9420dfb4955e
Status	DEPLOY_SUCCESS
Machine learning service	predictive-modeling-jg
Created	15 Mar 2018 03:35pm
Last modified	15 Mar 2018 03:35pm

The 'Model' section contains a single row with the following data:

Name	Building_Violations_Chicago_2017
------	----------------------------------

The implementation tab provides developers information to help minimize the time it takes to develop models and place them in a production environment.

8. Click on the Test tab.



The screenshot shows the IBM Watson ChicagoOnline API page. The top navigation bar includes 'IBM Watson', 'Projects', 'Tools', 'Community', 'Services', 'Docs', 'Support', 'Manage', and a user profile icon. The breadcrumb trail is 'My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017 / ChicagoOnline'. The main content area has tabs for 'Overview', 'Implementation', and 'Test'. The 'Test' tab is circled in red. Below the tabs, the 'Implementation' section displays a table with API details:

Implementation		View API Specification
Scoring End-point	https://ibm-watson-ml.mybluemix.net/v3/wml_instances/06dfe38c-13c0-417c-980c-d74b6e0da298/published_models/a14ff2e1-5ce9-416a-ab1e-902898671137/deployments/c72cc266-3ae6-418d-a40b-dd69f763efa1/online	
Authorization: Bearer <token>	See code snippets below for information on how to retrieve the WML Authorization Token to be passed with scoring requests.	
Content-type: application/json	Required if the request body is sent in JSON format.	

Below the table is the 'Code Snippets' section with tabs for 'cURL', 'Java', 'JavaScript', 'Python', and 'Scala'. The 'cURL' tab is selected, showing a code block with the following content:

```
# retrieve your $WML_SERVICE_CREDENTIALS_USERNAME, $WML_SERVICE_CREDENTIALS_PASSWORD, and $WML_SERVICE_CREDENTIALS_URL from the
# Service credentials associated with your IBM Cloud Watson Machine Learning Service instance.

curl --basic --user $WML_SERVICE_CREDENTIALS_USERNAME:$WML_SERVICE_CREDENTIALS_PASSWORD $WML_SERVICE_CREDENTIALS_URL/v3/identity/token

# the above CURL request will return an auth token that you will use as $WML_AUTH_TOKEN in the scoring request below
# TODO: manually define and pass values to be scored below
curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/json' --header 'Authorization: Bearer $WML_AUTH_TOKEN' -d '{"fields": [
```

The Test tab allows manual testing of the deployed model and viewing of results.

9. Enter:

VIOLATION_CODE: CN063014

VIOLATION_STATUS: OPEN

INSPECTION_CATEGORY: COMPLAINT

PROPERTY_GROUP: small

LONGITUDE: -87.691078

LATITUDE: 42.002457

DEPARTMENT_BUREAU: CONSERVATION

10. Click Predict.

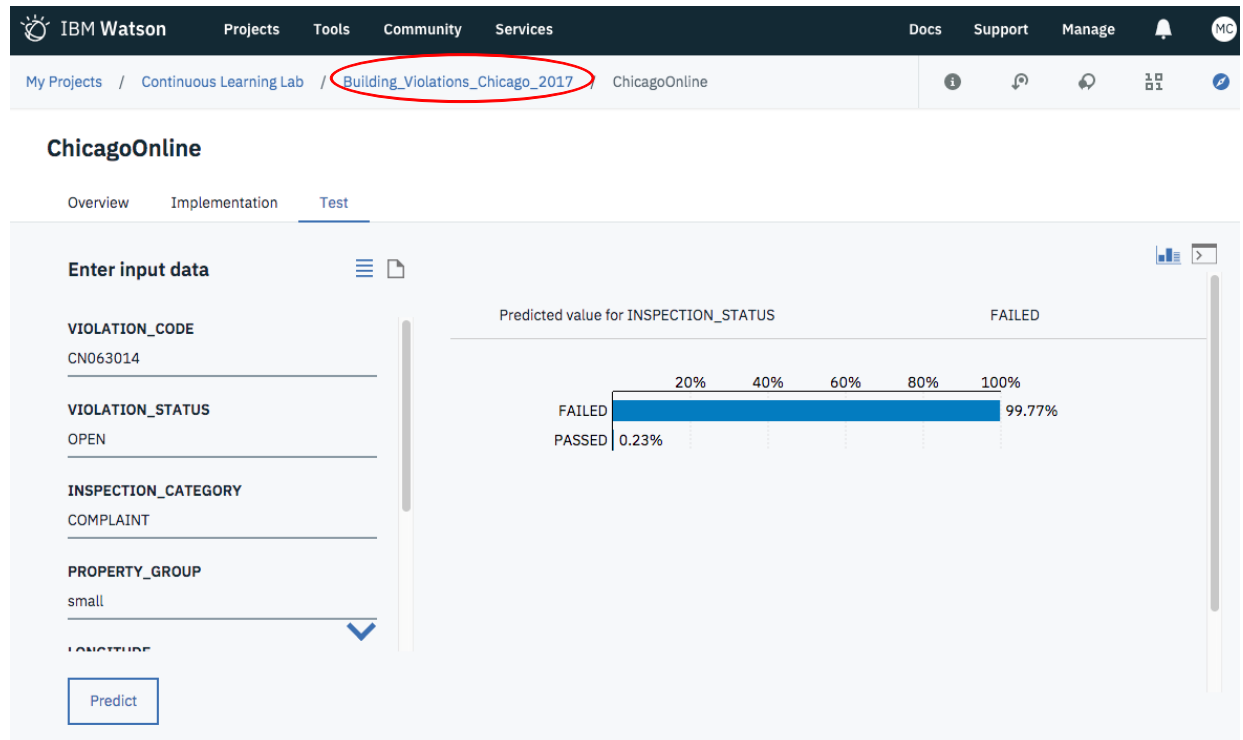
The screenshot shows the IBM Watson ChicagoOnline interface. The top navigation bar includes the IBM Watson logo and links for Projects, Tools, Catalog, Community, and Services. The user is logged in as 'US South'. The breadcrumb trail indicates the path: My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017 / ChicagoOnline. The main heading is 'ChicagoOnline'. Below it, there are three tabs: Overview, Implementation, and Test. The 'Test' tab is selected. The 'Enter input data' section contains several input fields with the following values: VIOLATION_CODE (CN063014), VIOLATION_STATUS (OPEN), INSPECTION_CATEGORY (COMPLAINT), PROPERTY_GROUP (small), and LONGITUDE (-87.691078). A blue checkmark is visible next to the LONGITUDE field. At the bottom of this section, there is a 'Predict' button, which is circled in red.

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According to our model, a building with our input data has a 0.23% chance of passing inspection.

11. Feel free to change the input data and run new predictions. When ready, click on your model name (e.g. Building_Violations_Chicago_2017)



12. Click on the Evaluation tab.

The screenshot shows the IBM Watson Machine Learning interface. At the top, there's a navigation bar with 'IBM Watson' and links for 'Projects', 'Tools', 'Community', and 'Services'. Below this, a breadcrumb trail shows 'My Projects / Continuous Learning Lab / Building_Violations_Chicago_2017'. The main header for the project is 'Building_Violations_Chicago_2017'. Below the header, there are three tabs: 'Overview', 'Evaluation' (which is circled in red), and 'Deployments'. The 'Evaluation' tab is active, showing a 'Summary' section with a table of model details and an 'Input Schema' section with a table of input features.

Machine learning service	predictive-modeling-xd
Model Type	wml-1.1
Runtime environment	spark-2.1
Training date	16 Apr 2018, 2:51 PM
Label column	INSPECTION_STATUS
Latest version	e2a674a9-e916-4eb0-81d3-702ce33fa9ba
Model builder details	View

COLUMN	TYPE
VIOLATION_CODE	string
VIOLATION_STATUS	string

If you scroll to the bottom you will be able to see the different model versions that have been created and which model is currently deployed.

Versions				
TIME	VERSION	DEPLOYED	AREAUNDERPR	ACTIONS
16 Apr 2018 03:03pm	e2a674a9-e916-4eb0-81d3-702ce33fa9ba		0.738	⋮
16 Apr 2018 02:57pm	4cc6abb1-f3be-4e3b-b26d-b9c2dc67abec		0.708	⋮
16 Apr 2018 02:51pm	66245399-4be3-470d-b190-c849a076947a	✓	0.851	⋮

During this lab we have very quickly compared various machine learning models and chosen the best one tuned to our dataset and objectives. We then created a continuous machine learning model that automatically monitors and retrains the most up-to-date machine learning model allowing Watson Machine Learning to keep applications, data pipelines, or external systems relying on the machine learning model as up to date as possible.

You have completed Lab 2

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