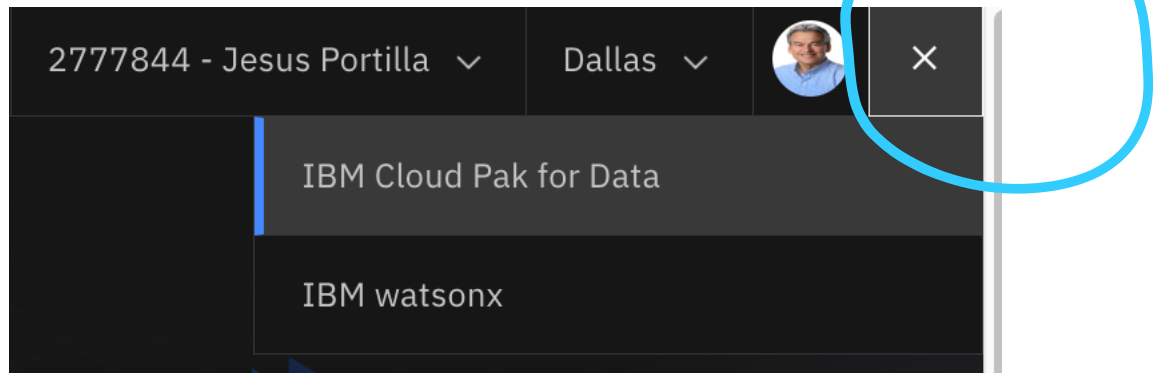


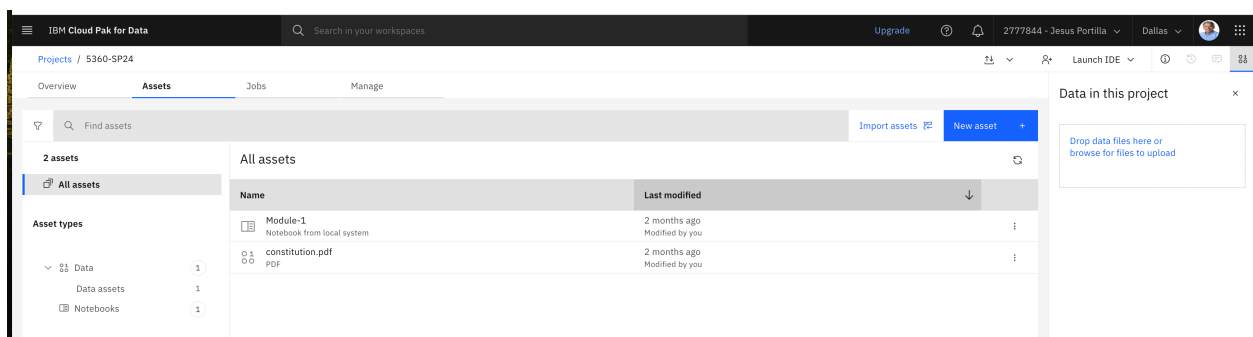
1. Login to IBM Watson Studio – Cloud Pak for Data

<https://dataplatform.cloud.ibm.com/>

1.1 Make sure you are in Cloud Pak for Data Mode



2. Navigate to Course project: 5360-SP24



3. Import Data

Select Drop Data here in Data in this Project Section, add energy-5360.csv, inspect the data

Preview asset	Profile	Data quality	Visualization	Feature group β	
Columns: 6 Sample rows: 96					Last refresh: 13 seconds ago
Electricity_Usage	Year_Built	Floors	Area_SQFT	PLEI_1_Quantity	PLEI_3_Quantity
117870	1955	4	14600	1	2
16207	1940	1	600	1	
15564	1920	2	6	2	1
25851	1965	1	5	6	1
32343	1930	3	4196	1	1
106938	1910	1	2200	2	1
228985	1964	2	26318	18	7
228985	1964	2	26318	18	7
380400	1931	4	650	2	27
4510	1910	3	324	2	1
10722	1897	2	3800	4	1
6365	1931	1	3128	4	1
15130	1931	1	5700	1	2
51172	1960	2	150	2	1

4. Create new AutoAI asset.

New asset


Select a tool based on what type of asset you want and how you want to work.

Tool type

- All types
- Data access tools
- Automated builders**
- Graphical builders
- Code editors
- Component editors

Find tools by name or description

Automated builders



AutoAI

Automatically analyze your tabular data and generate candidate model pipelines customized for your predictive modeling problem.

5. Complete configuration details:

New asset

Create an AutoAI experiment

+ New

Sample

Define details

Name

Energy-Prediction

Description (optional)

Energy consumption demo 5360

Tags (optional)

Add tags to make assets easier to find.

Start typing to add tags

Define configuration

Watson Machine Learning Service Instance

WML-Leeds

Environment definition

Large: 8 CPU and 32 GB RAM

This environment definition consumes 20 capacity units per hour for training. For details, see [Watson Machine Learning plans](#).

Cancel

Create

6. Select Data asset energy-5360.csv loaded earlier:

Select data from project

Select a tabular data file. [Learn more.](#)

Find

Categories 3

Data asset

Connection

Feature Group

Find

Data assets 2

constitution.pdf

☒ energy.csv

Selected assets 1 / 1

All assets details must load before final selection.

energy.csv

Type
Data asset

Size
2 KB

Owner
Jesus Portilla
jesus.portilla@colorado.edu

Mime type
text/csv

Create at
2024/03/29 20:13:50

Last update at
2024/03/29 20:13:50

Cancel

Select asset

7. Answer configuration questions

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Projects / 5360-SP24 / Energy-Prediction

Configure AutoAI experiment

Energy-Prediction

Autosaved: 8:18:42 PM

Add data source

Add files such as tabular data (CSV).

Browse

Select data from project

energy.csv
Size: 2.2 KB Columns: 6

Configure details

Create a time series analysis?
Enable this option to predict future activity over a specified date/time range. Data must be structured and sequential. [Learn more](#)

What do you want to predict?
Prediction column: Electricity_Usage

Prediction column: Electricity_Usage CUH remaining: 20 CUH

PREDICTION TYPE
Regression OPTIMIZED FOR
RMSE & run time

Experiment settings

8. Monitor AutoAI Experiment

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Projects / 5360-SP24 / Energy-Prediction

Experiment summary Pipeline comparison

★ Rank by: Root mean squared error (RMSE) ... Cross validation score

Progress map
Prediction column: Electricity_Usage

Read dataset Split holdout data Read training data Preprocessing Model selection

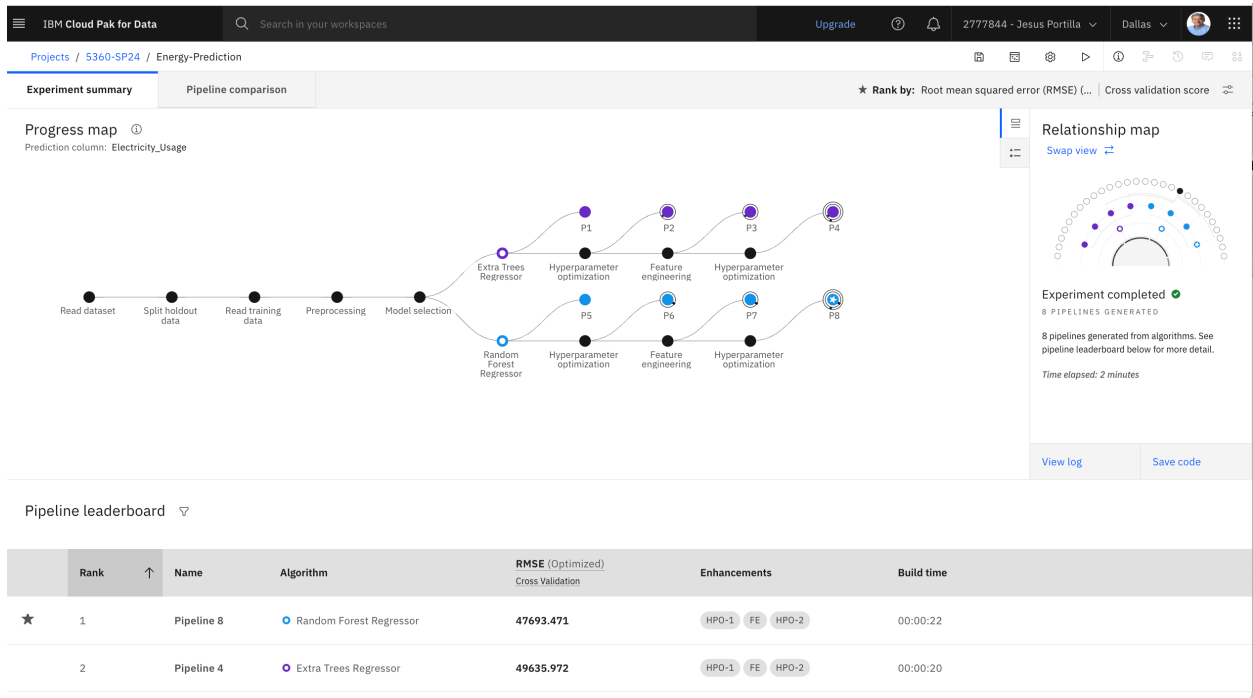
Relationship map
[Swap view](#)

Running
ENERGY.CSV
Starting the AutoAI experiment
Time elapsed: 63 seconds
[View log](#) [Save code](#)

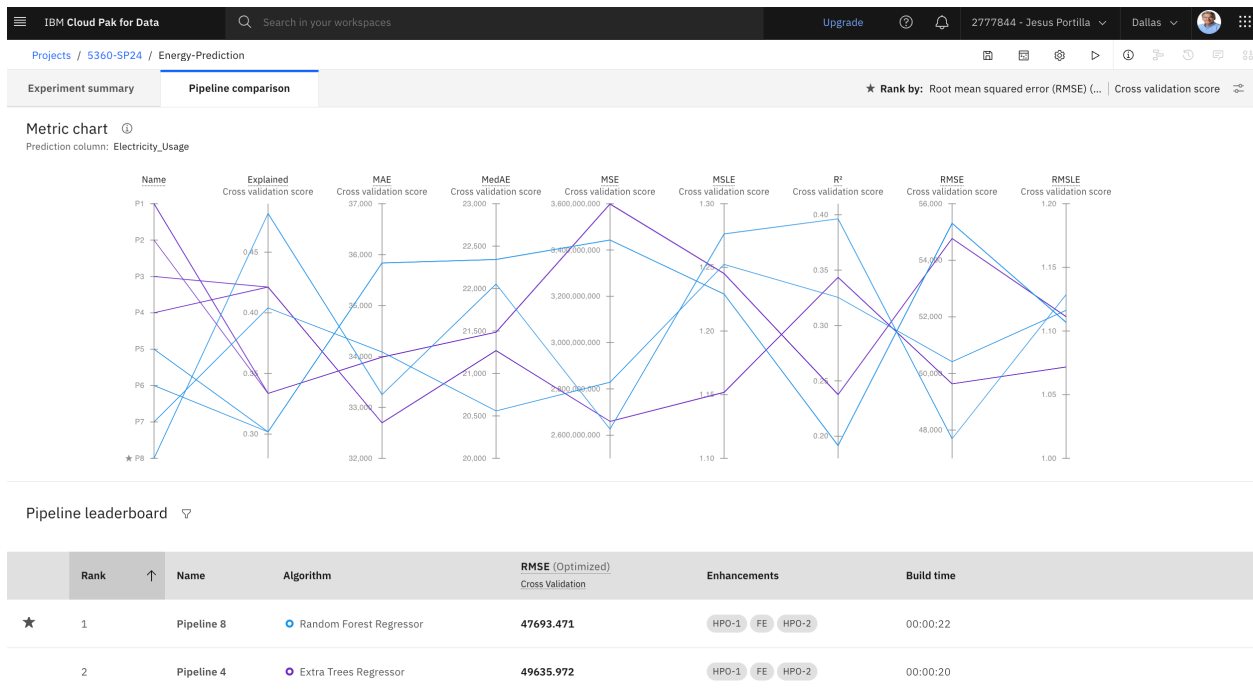
Pipeline leaderboard

Rank	Name	Algorithm	RMSE (Optimized) Cross Validation	Enhancements	Build time
------	------	-----------	--------------------------------------	--------------	------------

9. Select the best pipeline from AutoAI Experiment run:



10. Compare pipelines metrics:



11. Select the best pipeline (Pipeline 8) and save it as a ML model:

Pipeline details

Pipeline 8

Rank

1

RMSE (Optimized)

44422.508 (Holdout)

Algorithm

Random Forest Regressor

Enhancements

HPO-1 +2

Save as

Model viewer

Model information

Feature summary

Evaluation

Model evaluation

Model evaluation ⓘ

Model evaluation measure

Measures	Holdout score	Cross validation score
Root mean squared error	44422.508	47693.471
R squared	0.372	0.396
Explained variance	0.401	0.482
Mean squared error	1973359178.988	2626201299.691
Mean squared log error	1.906	1.276
Mean absolute error	35637.907	33251.808
Median absolute error	25603.505	22053.097
Root mean squared log error	1.381	1.129

12. Complete the Save as details:

Save as

Select asset type

Model

Create a Watson Machine Learning model asset that you can test with new data, deploy to generate predictions, and trace lineage activity.

Notebook

Create a notebook if you want to view the code that created this model pipeline or interact with with the model programatically.

Define details

Name

Energy-Prediction - P8 Random Forest Regressor - Model

Description (optional)

5360 Demo

Tags

Add tags to make assets easier to find.

Add a tag

Cancel

Create

13. If Model is saved successfully, you will see the following message:

✓

Saved model successfully.

Energy-Prediction - P8 Random Forest Regressor - Model was successfully saved to 5360-SP24.

[View in project](#)

×

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Projects / 5360-SP24 / Energy-Prediction - P8 Random For

Governance

Model

Evaluation

Develop

5360-SP24

Training evaluation

Attachments

Other attachments

Export report

Governance

This asset is not tracked.

To track an asset, add it to an AI use case. Tracking captures details about the asset for governance purposes.

Track in AI use case ⓘ

Model

Energy-Prediction - P8 Random Forest Regressor - Model

ceadb856-45e7-4291-91ee-c8f68228ecaa

Description

5360 Demo

Created by

Jesus Portilla

Created

March 31, 2024 at 04:48:52 AM

Modified

March 31, 2024 at 04:49:04 AM

Algorithm

RandomForestRegressor

Model type

wml-hybrid_0.1

Software specification

hybrid_0.1

Prediction type

regression

Training: General

Project

5360-SP24

Hybrid pipeline

autoai-kb_rt23.1-py3.10

Number of features

5

Input schema

Feature	Type
Area_SQFT	double
Floors	double
PLEI_1_Quantity	double
PLEI_3_Quantity	double
Year_Built	double

Energy-Prediction - P8 Random Forest Regressor - Model

Last modified at Mar 31, 2024, 4:51 AM

Description

5360 Demo

Created

Mar 31, 2024, 4:48 AM

Type

wml-hybrid_0.1

Model ID

ceadb856-45e7-4291-91ee-c8f...

Software specification

hybrid_0.1

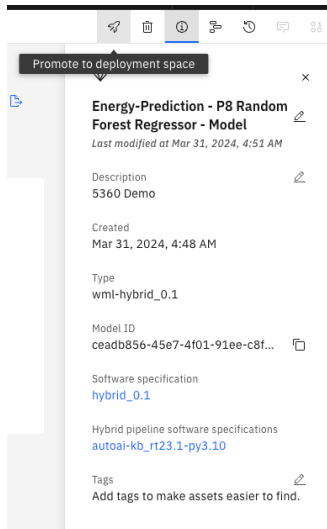
Hybrid pipeline software specifications

autoai-kb_rt23.1-py3.10

Tags

Add tags to make assets easier to find.

14. Next promote Model to a Deployment space



15. Complete the Deployment Space details as follows:

Create a deployment space
Use a space to collect assets in one place to create, run, and manage deployments

Define details

Name
5360-Deployment-Space

Description (Optional)
Demo

Deployment stage
Development

Deployment space tags (optional)
Find or create tags

Select services

Select storage service
Cloud Object Storage-Leads

Select machine learning service (optional)
WML-Leads

Cancel Create

The space is ready

Close this notification to resume your work. Click **Deployments** in the navigation pane to view and access the new space.

✔ Step 1 of 1. Creating deployment space.

Close

16. Deploy model to the newly created deployment space:

Promote to space

Use a deployment space to organize supporting resources such as input data and environments; deploy models or functions to generate predictions or solutions; and view or edit deployment details.

Target space

5360-Deployment-Space

Go to the model in the space after promoting it

Selected assets (1)

Name	Format
Energy-Prediction - P8 Random Forest Regressor - Model	Model

Select version

Promoting a version of an asset to a space creates a new asset in the space, with a new asset ID.

Current

Description (Optional)

Demo

CancelPromote

17. Create a Model deployment

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Deployments / 5360-Deployment-Space / Energy-Prediction - P8 Random Forest Regressor - Model

Deployments

AI Factsheet

Search

New deployment

Name	Type	Status	Tags	Last modified
------	------	--------	------	---------------

This asset doesn't have any deployments yet
Use the New Deployment button to create a deployment for this asset.

Energy-Prediction - P8 Random Forest Regressor - Model

Created

Mar 31, 2024, 4:53 AM

Type

wml-hybrid_0.1

Model ID

5229fea7-a410-48ed-8220-4c732...

Software specification

hybrid_0.1

Hybrid pipeline software specifications

autoai-kb_rt23.1-py3.10

Description

Demo

Tags

Add tags to make assets easier to find.

Source asset details

18. Complete deployment details

Create a deployment

Associated asset

Energy-Prediction - P8 Random Forest Regressor - Model

Deployment type

Online

Run the model on data in real-time, as data is received by a web service.

Batch

Run the model against data as a batch process.

Name

Energy-Prediction

Serving name ⓘ

energy_demo

Description

Energy Demo

Tags

Add tags to make assets easier to find.

Add a tag

Cancel

Create

19. Once deployment is created, proceed to testing the model

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🔔 1

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👤

⋮

Deployments / ... / Energy-Prediction - P8 Random Forest Regressor - Model

🔗 🗑️ ⓘ 📄 ⌛ 💬 ☰

Deployments

AI Factsheet

🔍 Search

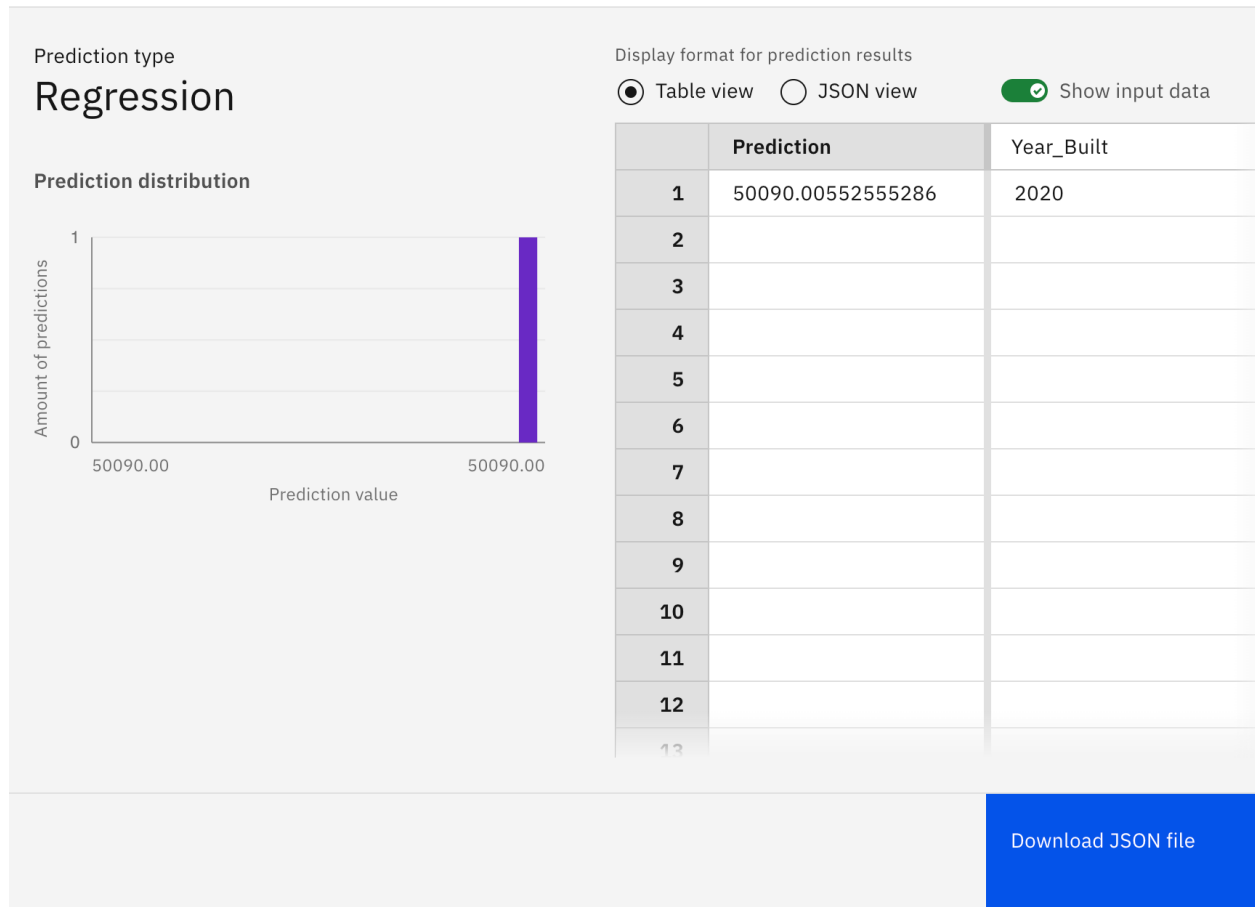
🔄

New deployment 🔗

Name	Type	Status	Tags	Last modified	⌵
🔗 Energy-Prediction	Online	✅ Deployed		2 minutes ago Jesus Portilla (You)	⋮

20. Enter test data in the new deployment

Prediction results



```
{
  "fields": [
    "prediction"
  ],
  "values": [
    [
      50090.00552555286
    ]
  ]
}
```

Configuration:

Make sure to associate a Watson Machine Learning instance to your Watson Studio instance

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Projects / 5360-SP24

OverviewAssetsJobsManage

Project

General

Access control

Environments

Resource usage

Services & integrations

Tools

Metadata enrichment

Services & integrations

IBM services

Third-party integrations

Find services

Associate service +

Name

Service type

No services

Click **Associate service** or ask a project Admin to associate one

Associate service

Choose an existing or add a new service to associate with your project.

1 x Default

2 x Locations

Find services

New service +

Name	Type	Plan	Location	Status	Group
<input type="checkbox"/> Watson Assistant-CU-class	watsonx Assistant	Trial	Dallas	Not associated	Default
<input type="checkbox"/> Watson Assistant-k-12-ai	watsonx Assistant	Lite	Dallas	Not associated	Default
<input type="checkbox"/> IBM Cognos Dashboard Embedded-im	IBM Cognos Dashboard Embedded	Lite	Dallas	Not associated	Default
<input type="checkbox"/> Language Translator-5360	Language Translator	Lite	Dallas	Not associated	Default
<input type="checkbox"/> Natural Language Understanding-Fall21	Natural Language Understanding	Lite	Dallas	Not associated	Default
<input checked="" type="checkbox"/> WML-Leeds ⓘ	Watson Machine Learning	Lite	Dallas	Not associated	Default
<input type="checkbox"/> Speech to Text-Pay-5360	Speech to Text	Plus - NEW!	Dallas	Not associated	Default
<input type="checkbox"/> Speech to Text-vf	Speech to Text	Lite	Dallas	Not associated	Default
<input type="checkbox"/>					

Cancel

Associate