# Machine Learning, Auto AI and IBM Watson Studio

Flow of building and deploying Machine Learning Model with Watson Studio

1. Create Watson Studio Service
2. Create a Project
3. Add Auto AI experiment
4. Create a Machine Learning service instance
5. Associate ML Service
6. Load the dataset to Cloud object storage
7. Select the prediction parameter in the dataset
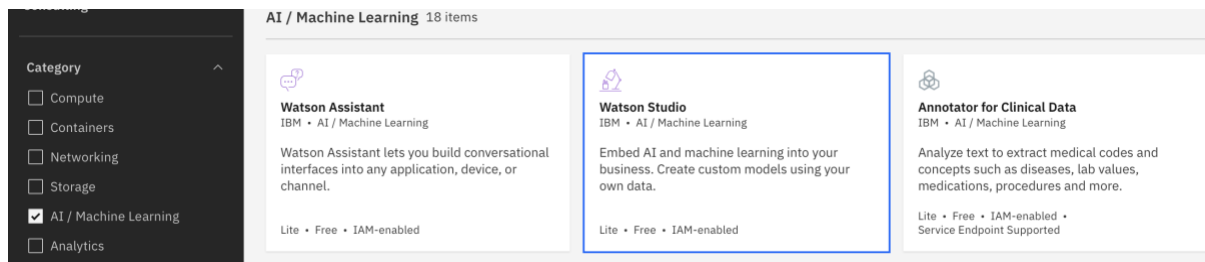8. Train the model
9. Deploy the model

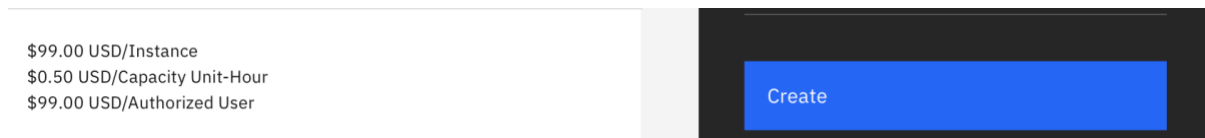Step1: Click on **Catalog** from the dashboard
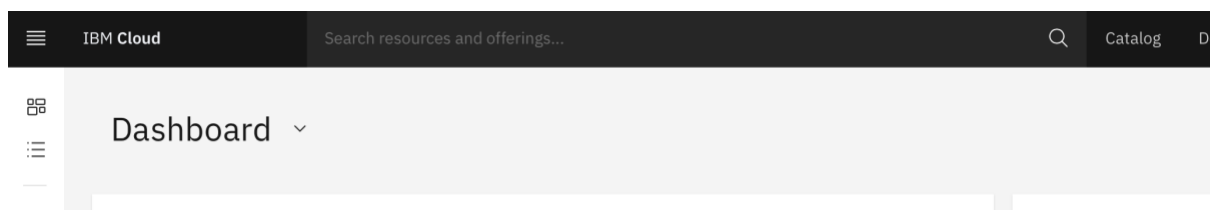
Step 2: Select **Services** under **IBM Cloud catalog**
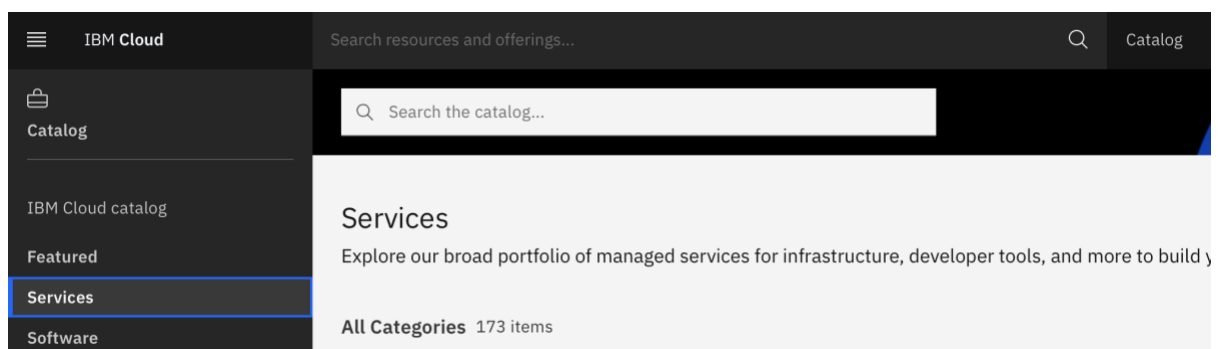
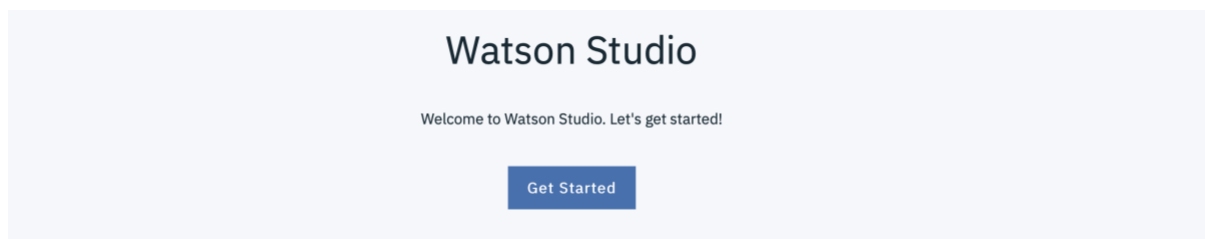
Step 3: Select AI/Machine Learning under **Category** and select **Watson Studio** service
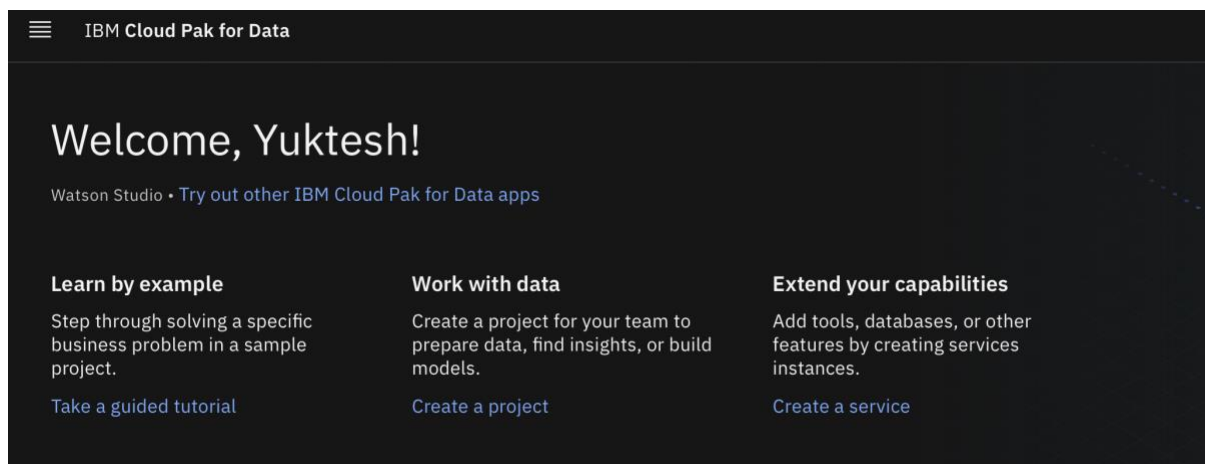
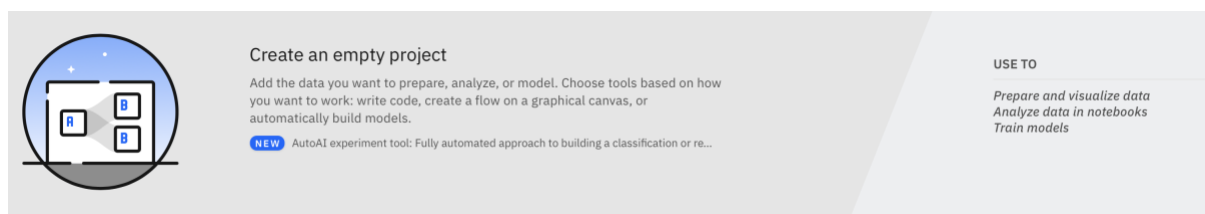Step 4: Click on right bottom *create* blue button to create Watson Studio service

Step 5: Click on *Get Started*

Step 6: Click on *Create a project*

Step 7: Click on *Create an empty project*

Step 8: Give project name and click on *Add* (blue colored) Hypertext

Note: I gave my project name as **ToIDemoProject**

New project

Define project details

Name

ToIDemoProject

Description

Define storage

① Select storage service

Add

Add an object storage instance, and then return to this page and click Refresh.

Step 9: Right bottom click on Create (blue colored) button
Note: This creates object storage service this serves as database to our Watson Studio service

See pricing details

Create

Step 10: Click on *refresh* (blue colored) Hypertext

Define storage

① Select storage service

Add

Add an object storage instance, and then return to this page and click Refresh.

② **Refresh**

Step 11: Click on Create (blue colored) button which helps in creating ToIDemoProject.
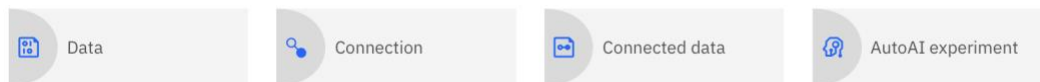
Cancel

Create

Step 12: Click on **Add to project** button

ToIDemoProject
Last Updated: Oct 15, 2020

Step 13: Click on *AutoAI experiment*

Choose asset type

Available asset types

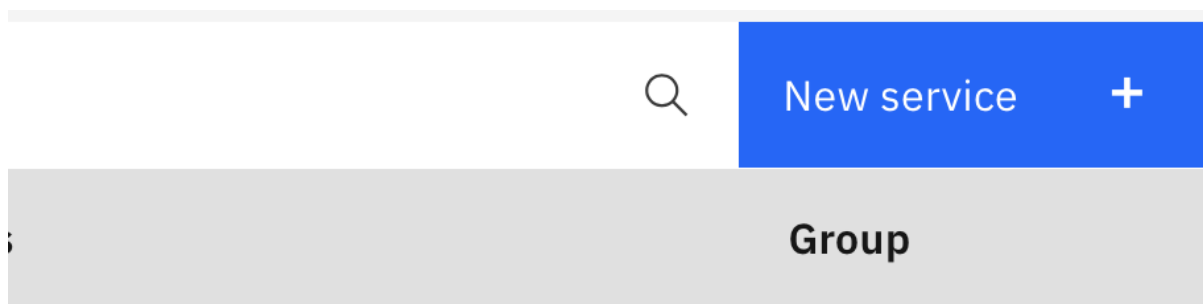| | Data | | Connection | | Connected data | | AutoAI experiment |

Step 14: Give any Name and click on Associate a *Machine Learning service instance* hypertext
Note: I gave Name as *ML Model*
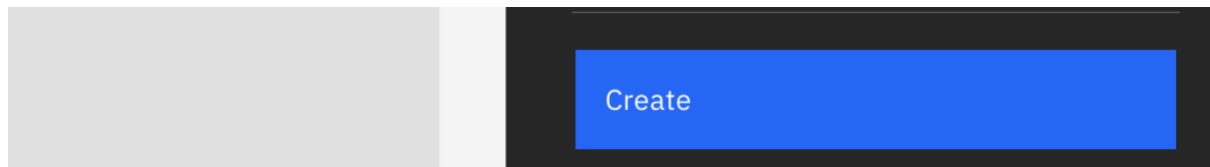
New AutoAI experiment

+ New	**Define details**	**Associate services**
▯□ Gallery sample	Name *	**Watson Machine Learning Service Instance ***
	[ML Model]	No Machine Learning service instances associated with your project.
	Description	Associate a Machine Learning service instance with your
	Description of AutoAI experiment	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.

Step 15: Click on *New Service*

🔍 **New service   +**

Group

Step 16: Select *Machine Learning* service

Personality Insights
AI / Machine Learning

The Watson Personality Insights derives insights from transactional and social media data to identify psychological

Machine Learning
AI / Machine Learning

IBM Watson Machine Learning - make smarter decisions, solve tough problems, and improve user outcomes.

Speech to Text
AI / Machine Learning

Low-latency, streaming transcription

Step 17: Click on *Create* on right bottom in next page

Step 18: Select the just created *Machine Learning – sg* and click on *Associate service*

Step 19: Click on *Reload*

Step 20: Click on *Create*

Step 21: Select *Browse* and select *50_startup.csv* file from the system directory

Add data source

Drop or browse for a csv file.

Browse   or   Select from project

Step 22: You can see uploaded csv file at left and select *Profit* as prediction column

Drop or browse for a csv file.

Browse   or   Select from project

50_Startups.csv
Size: 0.00 MB   Columns: 5

What do you want to predict?
Prediction column ⓘ

Select prediction column

DEC	R&D Spend
DEC	Administration
DEC	Marketing Spend
STR	State
DEC	Profit

Step 23: Now select *Run Experiment*

PREDICTION TYPE	OPTIMIZED METRIC
Regression ⓘ	**RMSE** ⓘ

| Experiment settings ⚙ | Run experiment ▷ |

Step 24: Ensure of *Experiment completed* (It may take 3 to 4mins) and click on *Save as Model* as shown below

PIPELINES

TOP ALGORITHMS

50_Startups.csv

Experiment completed ✓
8 PIPELINES GENERATED

8 pipelines generated from algorithms. See pipeline leaderboard below for more detail.

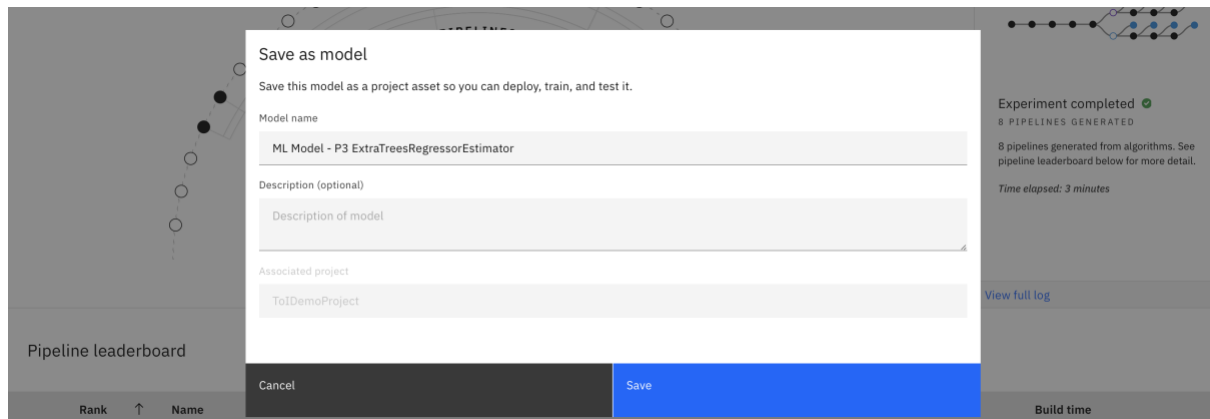*Time elapsed: 3 minutes*

View full log

Pipeline leaderboard

	Rank ↑	Name	Algorithm	RMSE (Optimized)	Enhancements	Build time	
>	★ 1	Pipeline 3	Extra Trees Regressor	8003.243	HPO-1 FE	00:00:33	Save as ⌄
>	2	Pipeline 4	Extra Trees Regressor	8003.243	HPO-1 FE HPO-2	00:00:33	Model
							Notebook

Step 25: Click on **Save**

Step 26: Click on **View in Project**
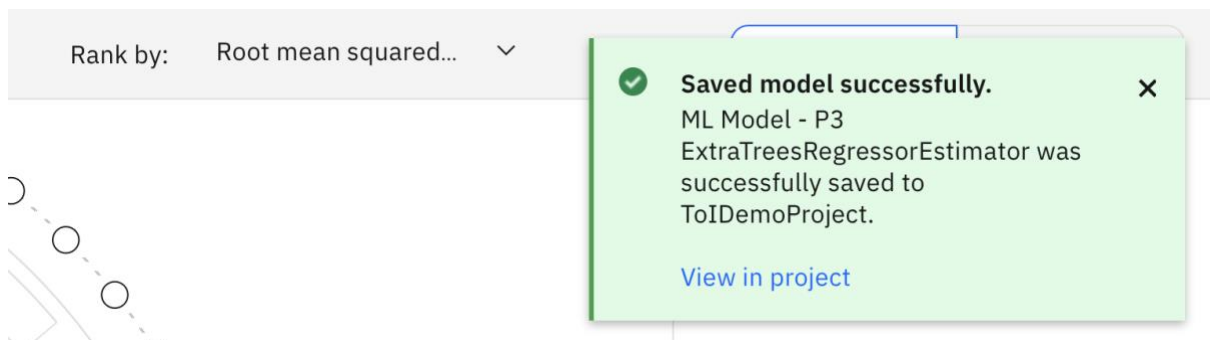
Step 27: Click on **Promote to deployment space**

Step 28: Click on **New space**

Step 29: Give a **Name** to your space, select machine learning service from drop down and click on **Create**
Note: I gave Name as ML Model Space1

Create a deployment space
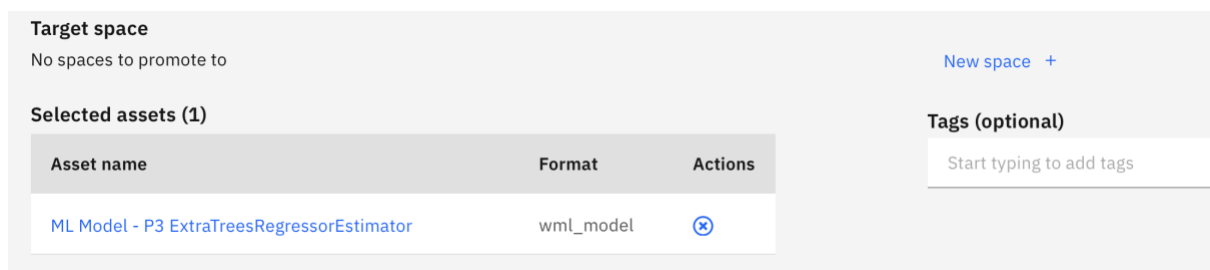
Define space details

Name

ML Model Space1

Description (Optional)

Deployment space description

Select storage service ⓘ

Cloud Object Storage-ma   ⌄

Select machine learning service (Optional) ⓘ

Machine Learning-sg   ⌄

Cancel   Create

Step 30: Click on *close*

ML Model Space1
is ready

✅ Step 1 of 1. Creating deployment space.

Close
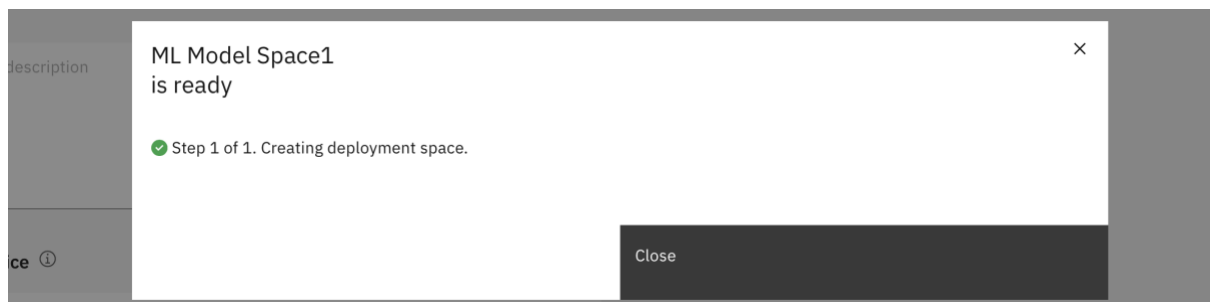
Step 31: Click on *Promote*

Cancel   Promote

Step 32: Click on ☰
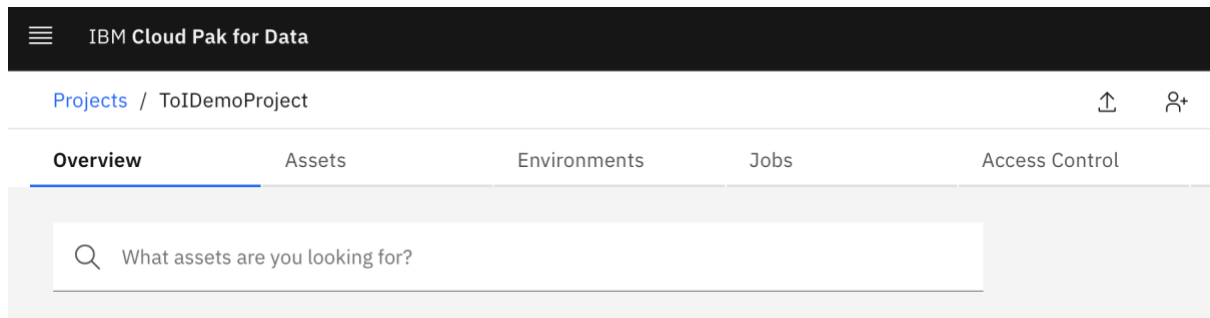
Step 33: Click on *View all spaces*

Step 34: Click on your Machine Learning Space Model *ML Model Space1*

Deployments
1 space

Step 35: Click on your Machine Learning Model *ML Model – P3 Extra TreesRegressorEs..*

ML Model Space1

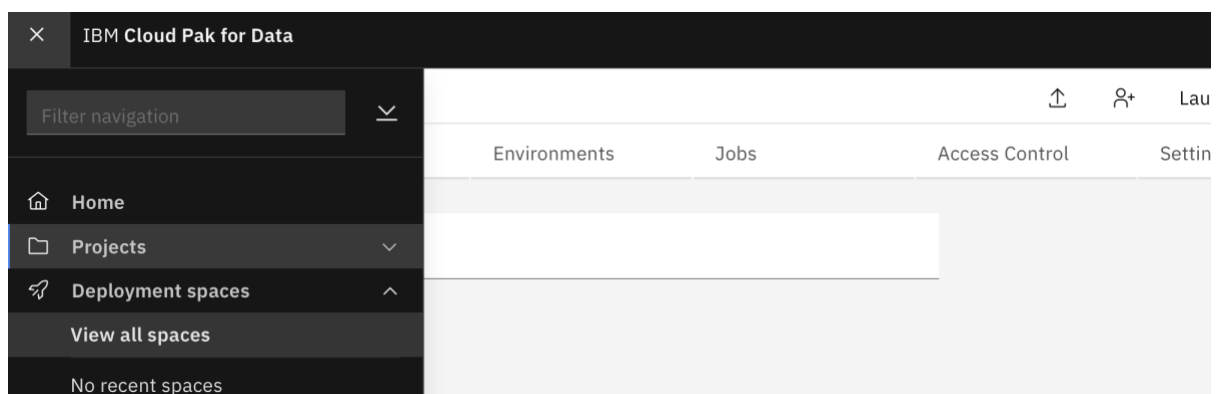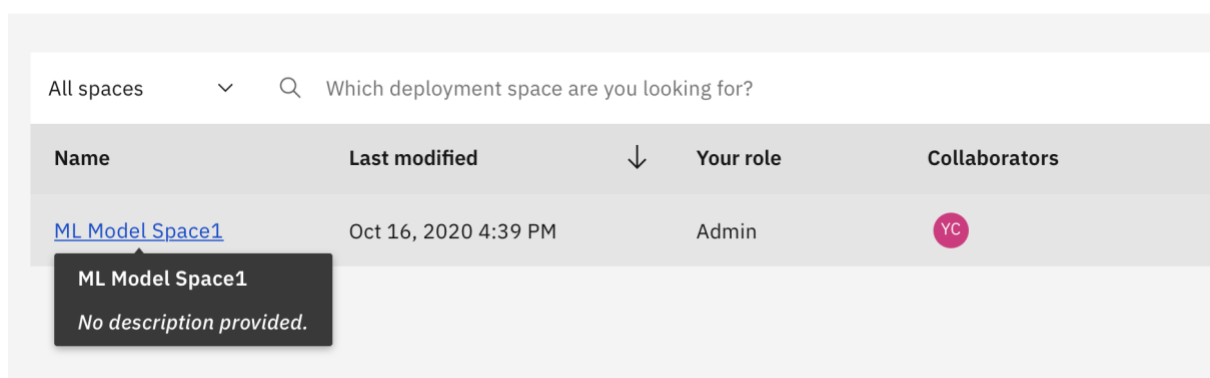| Assets	Deployments	Jobs	Access control	Settings

🔍 What assets are you looking for?

⌄ Models (1)   Import model +

Name	Type	Software specification	Last modified	↓		
⊕ ML Model - P3 ExtraTreesRegressorEs...	wml-hybrid_0.1	hybrid_0.1	Oct 16, 2020 4:42 PM		⬈	🗑

ML Model - P3 ExtraTreesRegressorEstimator

ML Model - P3 ExtraTreesRegressorEstimator
No description provided.

Step 36: Click on *Create deployment*

Deployments / ML Model Space1 / ML Model - P3 ExtraTreesRegres...   🗑

ML Model - P3 ExtraTreesRegressorEstimator   Create deployment ⬈

Deployments   Schema

Step 37: Select. Deployment Type as *Online* and Name as *Project1* and click on *Create*

Create a deployment

⊕ Associated asset
ML Model - P3 ExtraTreesRegressorEstimator

Deployment type

Online ✓	Batch
Run the model on data in real-time, as data is received by a web service.	Run the model against data as a batch process.

Name

Project1

Description

Deployment description

Software specification

hybrid_0.1

The software specification is predefined for the asset type. You can update or customize the software specification programmatically. Learn more

Cancel   Create

Step 38: Click on your *Project1*

ML Model - P3 ExtraTreesRegressorEstimator

Create deployment

Deployments   Schema

DEPLOYMENT TYPES	1 Online Deployment(s)			
	Name	Status	Last modified	↓
Online (1)	Project1	✓ Deployed	Oct 17, 2020 2:46 PM	⋮
Batch (0)				

Step 39: Click on *Test*

Deployments / machine learning model / machine learning model - P8 Rid... / project1

project1 ✓ Deployed Online

API reference   Test

Direct link

Endpoint   Bearer <token> ⓘ

/us-south.ml.cloud.ibm.com/ml/v4/deployments/38895dbb-a13c-4985-bab1-27b86697c8c3/predictions   IAM

Code snippets

cURL	Java	JavaScript	**Python**	Scala

Step 40: Enter input data like below and click *Predict.* Can see *Result* at right side

Deployments / ML Model Space1 / ML Model - P3 ExtraTreesRegres... / Project1

Project1 ✓ Deployed Online

API reference   **Test**

Enter input data   ### Result

R&D Spend
```
131561
```

Administration
```
54515
```

Marketing Spend
```
65464
```

State
```
New York
```

```
 0  {
 1      "predictions": [
 2          {
 3              "fields": [
 4                  "prediction"
 5              ],
 6              "values": [
 7                  [
 8                      156057.29375
 9                  ]
10              ]
11          }
12      ]
13  }
```

Predict

Project1 ✓ Deployed Online

API reference   Test

Direct link

Endpoint   Bearer <token> ⓘ

https://eu-gb.ml.cloud.ibm.com/ml/v4/deployments/fc5f4cb7-5ec1-4b50-8781-3a224888eb78/pred   📋   IAM