

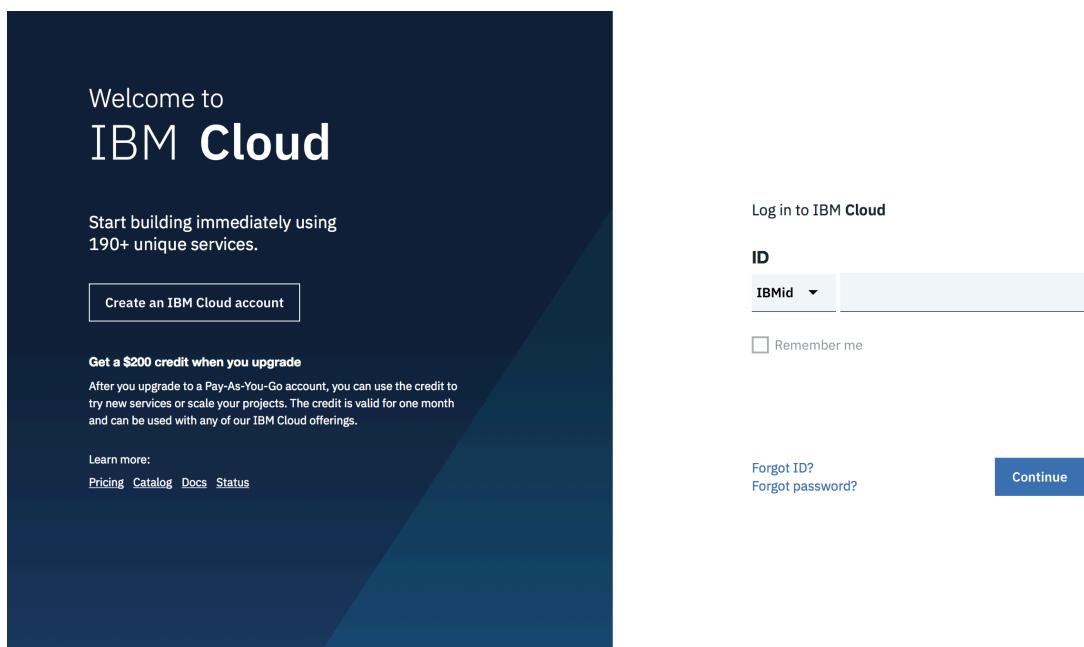
# Lab to explore the IBM Watson Studio, Machine learning and Auto AI with Sample data

In this lab, we will understand the concepts of Watson studio, machine learning and Auto AI services on the IBM Cloud platform. Please follow the below mentioned steps to see how quickly we can enable/Create the projects on Watson studio and Apply Auto AI service on top of it.

[Visit cloud.ibm.com](#)

[Login to IBM Cloud](#)

Sign up/Login to IBM Cloud Platform with your credentials and click on continue.



From the landing page/Dashboard Select “Catalog”

The image shows the IBM Cloud Dashboard. At the top, there's a navigation bar with links for 'IBM Cloud', 'Search resources and offerings...', 'Catalog', 'Docs', 'Support', 'Manage', 'Karan Chaturvedi's Account', and a user icon. Below the navigation bar, the dashboard has three main sections: 'Resource summary' (listing Cloud Foundry apps, services, storage, and developer tools), 'Planned maintenance' (showing a next event on Nov 26, 2019, at 11:30 PM), and 'Location status' (listing regions like Asia Pacific, Europe, North America, and South America with green checkmarks). A 'Dashboard' link and a 'Customize' link are also present at the top of the dashboard area.

In the Catalog , Search for “Watson Studio” service and Select:

Catalog  x

**Services (2)** Software (0)

All Categories (2) >

VPC Infrastructure  
Compute  
Containers  
Networking  
Storage  
AI (1)  
Analytics (1)  
Databases  
Developer Tools  
Integration  
Internet of Things  
Security and Identity

**Services**  
Explore our broad portfolio of managed services for infrastructure, developer tools, and more.

**All Categories**

 <b>Analytics Engine</b> IBM • Analytics  Flexible framework to deploy Hadoop and Spark analytics applications.  Lite • Free • IAM-enabled • Service Endpoint Supported	 <b>Watson Studio</b> IBM • AI  Embed AI and machine learning into your business. Create custom models using your own data.  Lite • Free • IAM-enabled
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**Choose the Lite plan and click on Create:**

 Watson Studio

Author: IBM • Date of last update: 20/02/2020 • [Docs](#)

**Create** **About**

Select a region

Dallas

Select a pricing plan  
Displayed prices do not include tax. Monthly prices shown are for country or region: [United States](#)

Plan	Features	Pricing
Lite	<b>1 authorized user</b> 50 capacity unit-hours monthly limit 1 free small compute environment with 1 vCPU and 4 GB RAM (does not require capacity unit-hours)	Free <input checked="" type="checkbox"/>

The Lite plan for Watson Studio offers everything you need to become a better data scientist or domain expert in a collaborative environment.

**Summary**

**Watson Studio** **Free**  
 Region: Dallas  
 Plan: Lite  
 Service name: Watson Studio-qp  
 Resource group: default

**Create**

Allow few minutes for the Watson Studio development environment to be provisioned.

## Go back to Catalog, Search for Machine learning service and Select

The screenshot shows the IBM Cloud Catalog interface. The search bar at the top contains the text "machine learning". Below the search bar, the results are categorized under "Services (7)" and "Software (1)". The "Services" category is currently selected. The results are displayed in a grid format:

- Compare and Comply**: Process governing documents to convert, identify, classify, and compare important elements.
- Db2 Warehouse**: Db2 Warehouse on Cloud is a flexible and powerful data warehouse for enterprise-level analytics.
- Knowledge Studio**: Teach Watson the language of your domain.
- Machine Learning**: IBM Watson Machine Learning - make smarter decisions, solve tough problems, and improve user outcomes.
- Natural Language Classifier**: Natural Language Classifier uses advanced natural language processing and machine learning techniques to create custom...
- PowerAI**: The accelerated deep learning platform for enterprise. Built on the IBM PowerAI platform, powered by Nimbix.
- Watson Studio**: Embed AI and machine learning into your business. Create custom models using your own data.

On the left sidebar, there are filters for "All Categories (7)", "Provider (1)", and "Pricing plan". The "Provider" filter shows options for IBM (123), Community (1), and Third party (65). The "Pricing plan" filter shows options for Lite (46) and Free (124). A note at the bottom right of the catalog page says "Looking for more? Check out the [IBM Cloud experimental services](#)."

Choose the Lite plan, and click on create

The screenshot shows the "Machine Learning" service creation page. At the top, there are tabs for "Lite", "IBM", "Service", and "IAM-enabled". The "Lite" tab is selected. To the right, there are links for "Need Help?", "Contact Support", and "View docs".

The main section has tabs for "Create" and "About". The "Create" tab is selected. It asks to "Select a region" and shows "London" as the current selection. Below this, it asks to "Select a pricing plan" and shows "India" as the current selection. A note says "Displayed prices do not include tax. Monthly prices shown are for country or region: India".

A table compares different plans:

PLAN	FEATURES	PRICING
Lite	Service Instance 5 model deployments 5,000 predictions 50 capacity unit-hours (CUH) included: Capacity Type: - 1 (one) NVIDIA K80 GPU = 2 capacity units required per hour - 1 (one) NVIDIA V100 GPU = 8 capacity units required per hour - 1 vCPU and 4 GB RAM = 0.5 capacity units required per hour - 2 vCPU and 8 GB RAM = 1 capacity units required per hour - 4 vCPU and 16 GB RAM = 2 capacity units required per hour - 8 vCPU and 32 GB RAM = 4 capacity units required per hour - 16 vCPU and 64 GB RAM = 8 capacity units required per hour Auto AI - 8 vCPU and 32 GB RAM = 20 capacity units required per hour Decision Optimization: - 2 vCPU and 8 GB RAM = 30 capacity units required per hour - 4 vCPU and 16 GB RAM = 40 capacity units required per hour - 16 vCPU and 64 GB RAM = 60 capacity units required per hour	Free

To the right, there is a "Summary" section with details about the service:

- Machine Learning**
- Region:** London
- Plan:** Lite
- Service name:** Machine Learning-es
- Resource group:** default

At the bottom, there are buttons for "Create", "Add to estimate", and "View terms".

Click on “Access in Watson Studio” to create a machine learning service through Watson studio

The screenshot shows the Watson Machine Learning resource page. On the left, there's a sidebar with options: Manage, Service credentials, Plan, and Connections. The main area displays the resource name "Machine Learning-hp", its location "London", and a "Watson Machine Learning" icon. Below the icon, the text "Watson Machine Learning" is displayed. A button labeled "Access in Watson Studio" is visible at the bottom.

Select “Create a project”

The screenshot shows the Watson Knowledge Catalog welcome screen. It features a large "Welcome Karan!" message and two main buttons: "Create a project" and "Search a catalog". The "Create a project" button has a sub-description: "Create a project, then add the tools and assets you need." To the right, there's a circular icon containing a computer monitor with a magnifying glass over it, representing data analysis or search.

## Select “Create an empty project”

The screenshot shows the 'Create a project' page. At the top, there's a back button labeled 'Back'. Below it, there are two main options:

- Create an empty project**: This option features a circular icon with a wrench and a screwdriver. The text describes creating an empty project or preloading it with data and assets. It mentions the AutoAI experiment tool. To the right, under 'USE TO', are three items: 'Prepare and visualize data', 'Analyze data in notebooks', and 'Train models'.
- Create a project from a sample or file**: This option features a circular icon with a plus sign and a document. The text describes starting fast by loading existing assets. It also mentions the AutoAI experiment tool. To the right, under 'USE TO', are three items: 'Learn by example', 'Build on existing work', and 'Run tutorials'.

In the new project section, Please furnish the unique name of the project, its description and proceed to add storage ...

**Please note, we will have to attach an object storage here itself.**

The screenshot shows the 'New project' creation form. It has two main sections:

- Define project details**:
  - Name**: CIO MasterClass Project
  - Description**: Project created to demo Watson studio, ML and Auto AI
  - Choose project options**: A checkbox for 'Restrict who can be a collaborator' is checked.
- Storage**: A dropdown menu shows 'Cloud Object Storage-3f'.

At the bottom, there are 'Cancel' and 'Create' buttons.

Follow the steps below to add Storage:

- Add storage:



IBM Watson Studio

## New project

Project will include integration with [Cloud Object Storage](#) for storing project assets.

### Define storage

- ① Select storage service

**Add**

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

- ② [Refresh](#)

(ii)     Select New

## Cloud Object Storage

Existing

New

### Cloud Object Storage

IBM Cloud Object Storage is a highly scalable cloud storage service, designed for high durability, resiliency and security. Store, manage and access your data via our self-service portal and RESTful APIs. Connect applications directly to Cloud Object Storage use other IBM Cloud Services with your data.

Features

Storage

IBM Cloud Object Storage provides durable, unstructured data storage for applications and common scenarios. New applications can integrate with IBM Cloud Object Storage services. It is available with Regional and Cross-Regional resiliency.

### (iii) Create Storage

The screenshot shows the IBM Watson Studio interface with the title "Cloud Object Storage" at the top. Below it, there are two tabs: "Existing" and "New", with "New" being the active tab. The main content area is titled "Cloud Object Storage" and describes the service as highly scalable, durable, and secure. It mentions the ability to store, manage, and access data via a self-service portal and RESTful APIs, and to connect directly to other IBM Cloud Services. To the right of the main text, there is a vertical sidebar with the heading "Features" followed by "Storage". The sidebar lists several features: IBM Cloud Object Storage, unstructured data storage, applications, common scenarios, new applications, integration, IBM Cloud Object Storage services, and regional and cross-regional resiliency. At the bottom of the sidebar, there is a note: "The Lite service plan for Cloud Object Storage includes Regional and Cross Regional resiliency, flexible data classes, and built in security."

PLAN	FEATURES	PRICING
<input checked="" type="radio"/> Lite	<p>1 COS Service Instance </p> <p>Storage up to 25 GB/mo.</p> <p>Up to 20,000 GET requests/mo.</p> <p>Up to 2,000 PUT requests/mo.</p> <p>Up to Data Retrieval 10 GB/mo.</p> <p>Up to 5GB Public Outbound</p> <p>Applies to aggregate total across all storage bucket classes</p>	Free
<input type="radio"/> Standard	<p>There is no minimum fee, so you pay only for what you use.</p>	Expand each section to view details

At the bottom right, there are buttons for "Cancel" and "Create".

Complete the project creation, by selecting create: (If storage is not reflecting, try reload)

### New project

Define project details

**Name**  
CIO MasterClass Project

**Description**  
Project created to demo Watson studio, ML and Auto AI

**Choose project options**  
 Restrict who can be a collaborator (i)

Project will include integration with Cloud Object Storage for storing project assets.

**Storage**

Cloud Object Storage-3f

Cancel **Create**

Below screenshot shows the dashboard.

My Projects / CIO MasterClass Project

Launch IDE v Add to project

**Overview** Assets Environments Jobs Deployments Access Control Settings

**CIO MasterClass Project**  
Last Updated: 19 Dec, 2019

[Readme](#)

**0** Assets **1** Collaborators

**Date created**  
19 Dec, 2019

**Description**  
Project created to demo Watson studio, ML and Auto AI

**Storage**  
Cloud Object Storage  
0 Byte used

**Collaborators**  
 Karan Chaturvedi Admin

[View all \(1\)](#)

**Recent activity**

Alerts related to this project will show here when the project is active.

Select “+Add to project” to add AutoAI experiment .

My Projects / CIO MasterClass Project

Overview Assets Environments Jobs Deployments Access Control Settings

CIO MasterClass Project  
Last Updated: 19 Dec, 2019

0 Assets 1 Collaborators

Date created 19 Dec, 2019

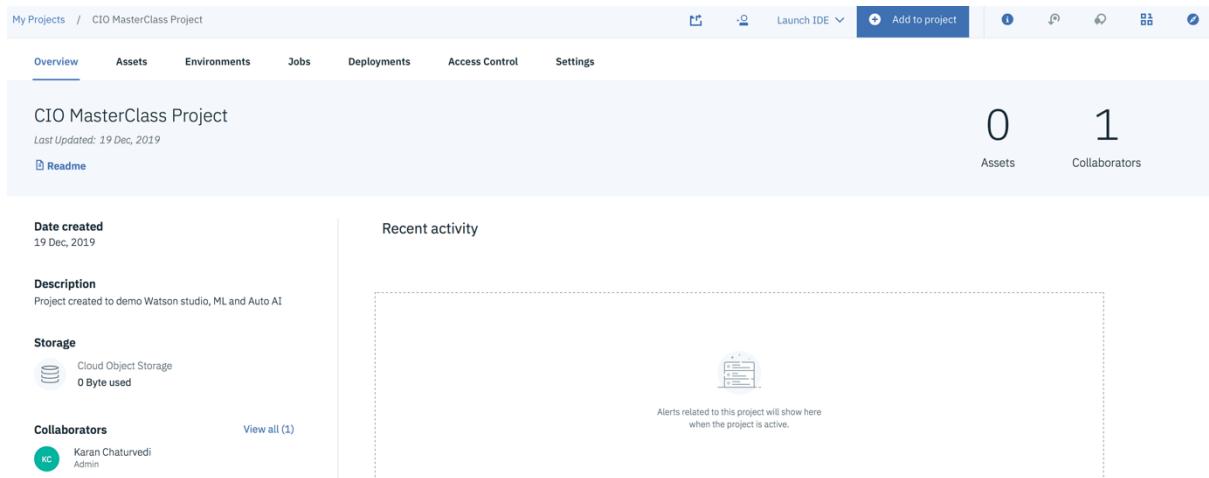
Description Project created to demo Watson studio, ML and Auto AI

Storage Cloud Object Storage 0 Byte used

Collaborators View all (1)  
KC Karan Chaturvedi Admin

Recent activity

Alerts related to this project will show here when the project is active.



## Select AutoAI Experiment.

eu-gb.dataplatform.cloud.ibm.com

IBM Watson Studio

My Projects / CIO MasterClass Project

Overview Assets Environments Jobs Deployments Access Control Settings

CIO MasterClass Project  
Last Updated: 19 Dec, 2019

Choose asset type

AVAILABLE ASSET TYPES

AutoAI experiment Fully automated approach to building a classification or regression model.

Data Connection Connected data AutoAI experiment

Notebook Dashboard Visual Recognition ... Natural Language CL...

Watson Machine Lea... Deep learning experi... Modeler flow Data Refinery flow

Streams flow Decision Optimizatio...

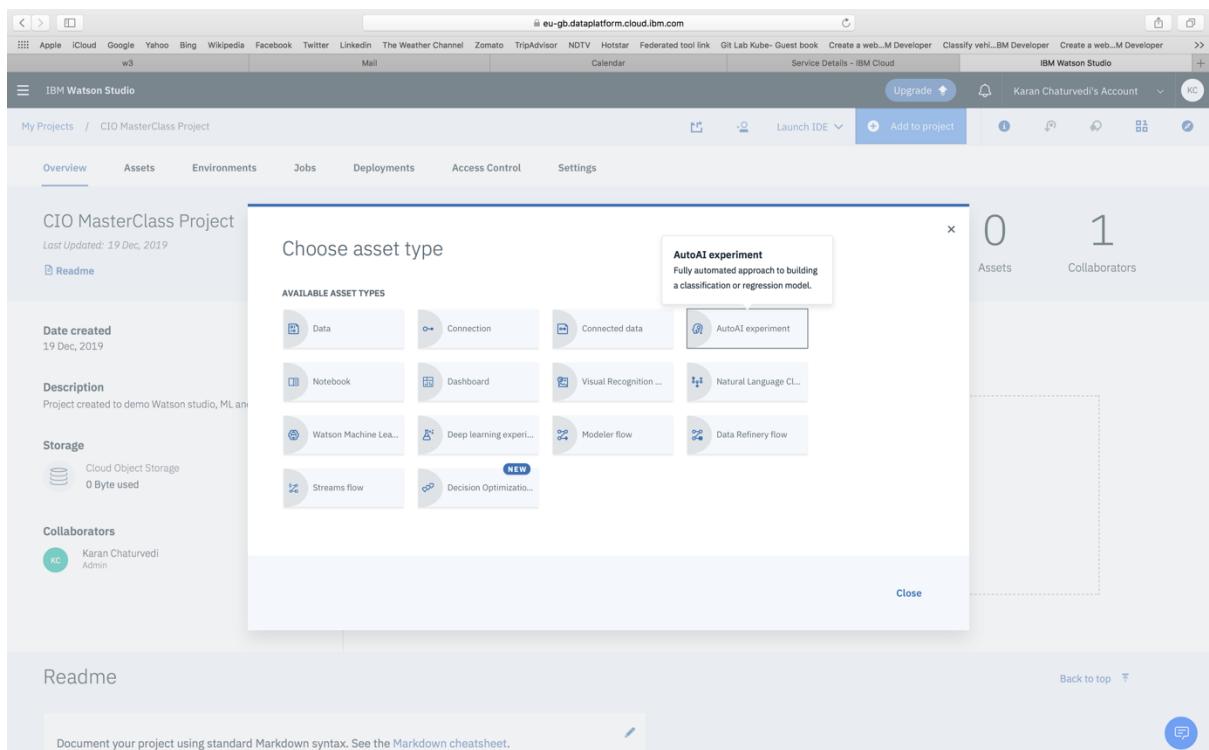
Close

0 Assets 1 Collaborators

Readme

Back to top

Document your project using standard Markdown syntax. See the [Markdown cheatsheet](#).



Under the Associated services tab, Select the ML service created earlier . If it is not visible, try “Associate a Machine Learning Service Instance” and then “reload” option again.

## AutoAI experiment

The screenshot shows a user interface for configuring an AutoAI experiment. On the left, there's a sidebar with sections like 'Details', 'Type' (set to 'Blank'), and 'Dataset' (with a 'From sample' option selected). The main area has a title 'Configure configuration \*'. On the right, under 'Associate services', it says 'Watson Machine Learning Service Instance \*' and 'No Machine Learning service instances associated with your project.' It includes a link to 'Associate a Machine Learning service instance' and a 'Reload' button. At the bottom, there's a 'Compute configuration \*' section with a 'Save' button.

Below is the screen shot of “Associate a Machine Learning Service Instance”

# Machine Learning

**Existing**

**New**

**RESOURCE GROUP**

All Resources ▾

**LOCATION**

All Locations ▾

**CLOUD FO**

jrkumar@ir

## Existing Service Instance

**Machine Learning-IRL2020**

**Select**

**Cancel**

Select the provisioned Machine Learning Instance from the list and proceed further. If the Machine Learning Instance is not visible, try “Reload” option again.

## New AutoAI experiment

The screenshot shows the 'Define details' section of the AutoAI experiment creation interface. Under 'Experiment type', the 'From blank' option is selected. The 'Name \*' field contains 'Predictive\_dataset'. The 'Description' field contains 'Description of AutoAI experiment'. On the right side, under 'Associate services', 'Machine Learning' is selected. Below it, 'Compute configuration' is set to '8 vCPU and 32 GiB'. A note indicates this is a standard configuration for a 1-hour experiment.

**Define details**

Experiment type  
 From blank  From sample

Name \*

Predictive\_dataset

Description

Description of AutoAI experiment

**Associate services**

Watson Machine Learn

Machine Learning

Compute configuration

8 vCPU and 32 GiB

This compute config  
hour. [Learn more](#) ab  
Machine Learning pr

Now , Select the Blank Experiment type (“From Blank”) , Provide a name and proceed to create “AutoAI” experiment, as shown above:

Next step is to “Add the data source” . <Check with the instructors for the dataset download link> . Click on the “Browse” option to upload the provided dataset.

Data: <https://github.com/IBMDevConnect/DBS2020/AI4Enterprise>

File Name - Homeloan\_autoAI.csv

figure AutoAI experiment

dictive\_dataset | 

Add data source



### Add data source

Drop a .csv file here or [browse](#) for a file upload. Maximum file size is 1 GB.

— OR —

[Select from project](#)

It may take couple of minutes to upload the data file.

wse for a file to  
is 1 GB.

—

Columns

3 MB      45       

### Configure details

What do you want to predict?

Prediction column 

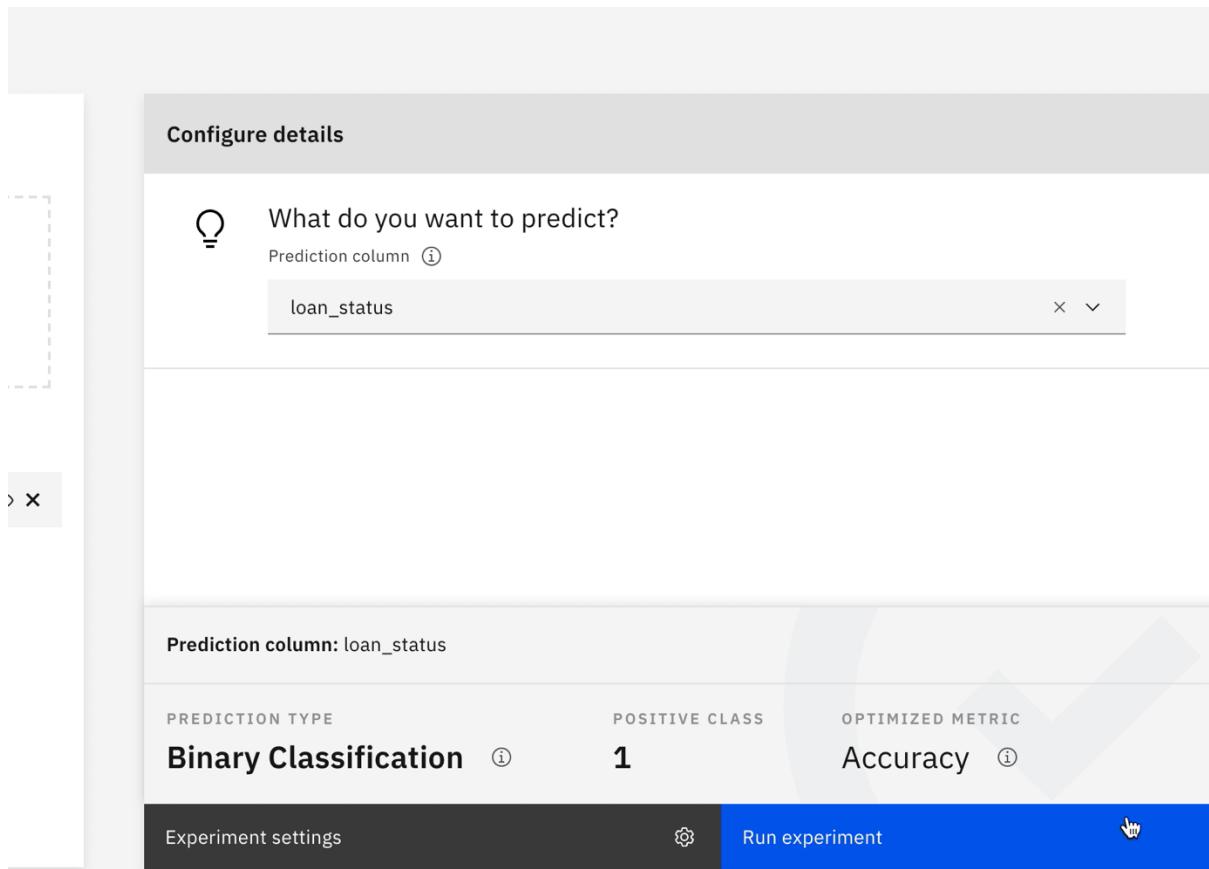
INT loan\_amnt

INT loan\_status 

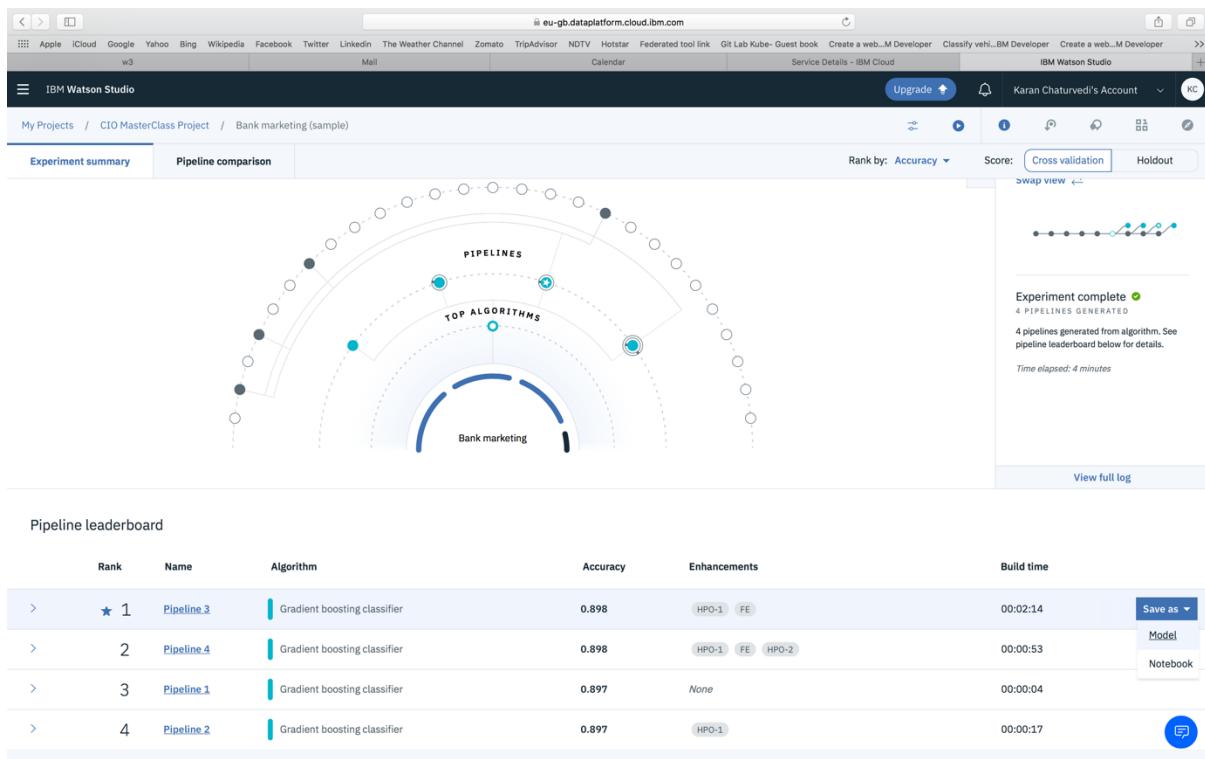
Select the column by name “loan\_status” , as shown above, as the target (Prediction) column.

Next step is to Run the AutoAI experiment to train and create the ML Model.

Click on “Run experiment”



At this stage, the ML Model pipeline gets started. It takes around 2 minutes to get the first pipeline completed. Scan through the process to understand how AutoAI functions.



**Note: Once any one of the pipeline is created, proceed to save the Model. If you would like to select the most accurate pipeline, then wait for few more minutes for other pipeline to get completed.**

Select the most accurate pipeline and save this as a model as shown below:

Pipeline leaderboard

Rank	Name	Algorithm	Accuracy (Optimized)	Enhancements	Build time	
> ★ 1	Pipeline 4	LGBM Classifier	0.872	HPO-1 FE HPO-2	00:07:21	<button>Save as</button>
> 2	Pipeline 3	LGBM Classifier	0.870	HPO-1 FE	00:23:36	<button>Model</button> <button>Notebook</button>

Save as model

Save this model as a project asset so you can deploy, train, and test it.

**Model name**  
Bank marketing (sample) - P3 GradientBoostingClassifierEstimator

**Description (optional)**  
Description of model

**Associated project**

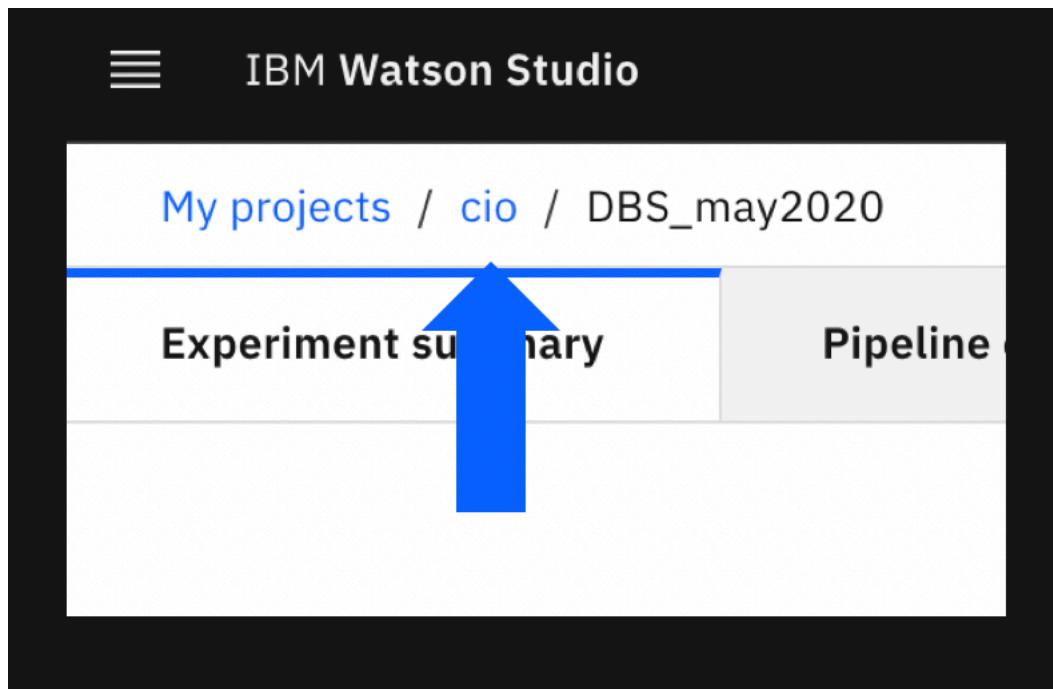
**Cancel** **Save**

Experiment complete 4 PIPELINES GENERATED  
4 pipelines generated from algorithm. See pipeline leaderboard below for details.  
Time elapsed: 4 minutes  
View full log

Rank	Name	Algorithm	Build time
> ★ 1	Pipeline 3	Gradient boosting classifier	00:02:14
> 2	Pipeline 4	Gradient boosting classifier	00:00:53
> 3	Pipeline_1	Gradient boosting classifier	00:00:04
> 4	Pipeline_2	Gradient boosting classifier	00:00:17

Go back to the Watson studio project and Select the saved model to **deploy**

Select your project name in the top left as shown below:



Go Under “Watson Machine Learning Models” dropdown :

A screenshot of the Watson Machine Learning Models section. The top header says "Watson Machine Learning models" and includes an "Import model +". Below is a table with columns: Name, Type, Runtime, Last modified, and a downward arrow. A single row is shown: "DBS\_may2020 - P1 LGBMClassifierEstimator" with type "wml-hybrid\_0.1", runtime "hybrid\_0.1", and last modified "May 19, 2020". To the right of the table is a dropdown menu with two options: "Deploy" and "Delete", both highlighted with a blue border.

Click on add deployment and select Deployment type as web service.

A screenshot of the deployment management interface. At the top, there are two tabs: "Deployments" (which is selected and highlighted with a blue border) and "Lineage". Below the tabs is a button "Add Deployment +". The main area is a table with columns: STATUS, TYPE, and ACTIONS. There are no rows currently listed in the table.

The screenshot shows the IBM Watson Studio interface with the URL `eu-gb.dataplatform.cloud.ibm.com` in the address bar. The top navigation bar includes links for Apple, iCloud, Google, Yahoo, Bing, Wikipedia, Facebook, Twitter, LinkedIn, The Weather Channel, Zomato, TripAdvisor, NDTV, Hotstar, Federated tool link, GitLab, Kube, Guest book, Create a web..., M Developer, Classify veh..., IBM Developer, Create a web..., M Developer, IBM Watson Studio, and IBM Watson Studio. A sidebar on the left shows 'IBM Watson Studio' and 'Create Deployment'. The main content area is titled 'Define deployment details' and contains fields for 'Name' (CIO MasterClass Deployment), 'Description' (Deployment description), and 'Deployment type' (Web service selected). At the bottom right are 'Cancel' and 'Save' buttons.

Note: Wait for couple of minutes for the status to become "Ready"

## STATUS

Initializing

Once the Model is deployed, next step is to provide test data to validate the ML Model .  
Click on "View"

The screenshot shows the 'Add Deployment' screen with a 'TYPE' column listing 'Web Service' and an 'ACTIONS' column with a context menu. The context menu is open over the 'Web Service' entry, showing options 'View' and 'Delete'. A blue box highlights the 'View' option, and a hand cursor is positioned over the 'View' button.

To test the Model, select the test tab and select the json input option (red arrow ) as shown below:

Input test data using the provided data in json format:<Check with Instructor for the json file,if the below data is not working due to syntax issue, if any>

<https://github.com/IBMDevConnect/DBS2020/AI4Enterprise>

File Name - validate\_data.json

Go to git and copy the json data in raw format:

## data.json

format

Raw Blame

```
;": ["member_id", "loan_amnt", "funded_amnt", "func
```

Copy the content – ctrl-A

```
ot_coll_amt", "tot_cur_bal", "total_rev_hi_lim"], "values": [
  "Information Security Engineer", "5 years", "MORTGAGE", 1030
  23.91, 0, 3, 0, 67, 28, 1, 8711, 23.6
  week", 0, 0, 271985, 36900]
]} ] }
```

Go back to Watson Studio and paste the content . Proceed to ‘Predict’... see the response in json on the right side:

Overview

Implementation

Test

## Enter input data

```
Security Engineer", "5 years","MORTGAGE", 103000,  
"Verified", "n","desc",      "debt_consolidation",  
"Debt consolidation",     "840xx",    "UT",    23.91,  
0, 3,0,       67, 28, 1, 8711,  23.6,   51, "f",  
1208.71,   0, 0, 0,0,   0,  
"INDIVIDUAL","yes",      "56th week",   0 ,0,  
271985, 36900] ] }]
```

Predict



```
{
  "predictions": [
    {
      "fields": [
        "prediction",
        "probability"
      ],
      "values": [
        [
          [
            0,
            [
              [
                0.670110
              ],
              [
                0.329889
              ]
            ]
          ]
        ]
      ]
    }
  ]
}
```

Congratulations..!!

Thank You !!

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