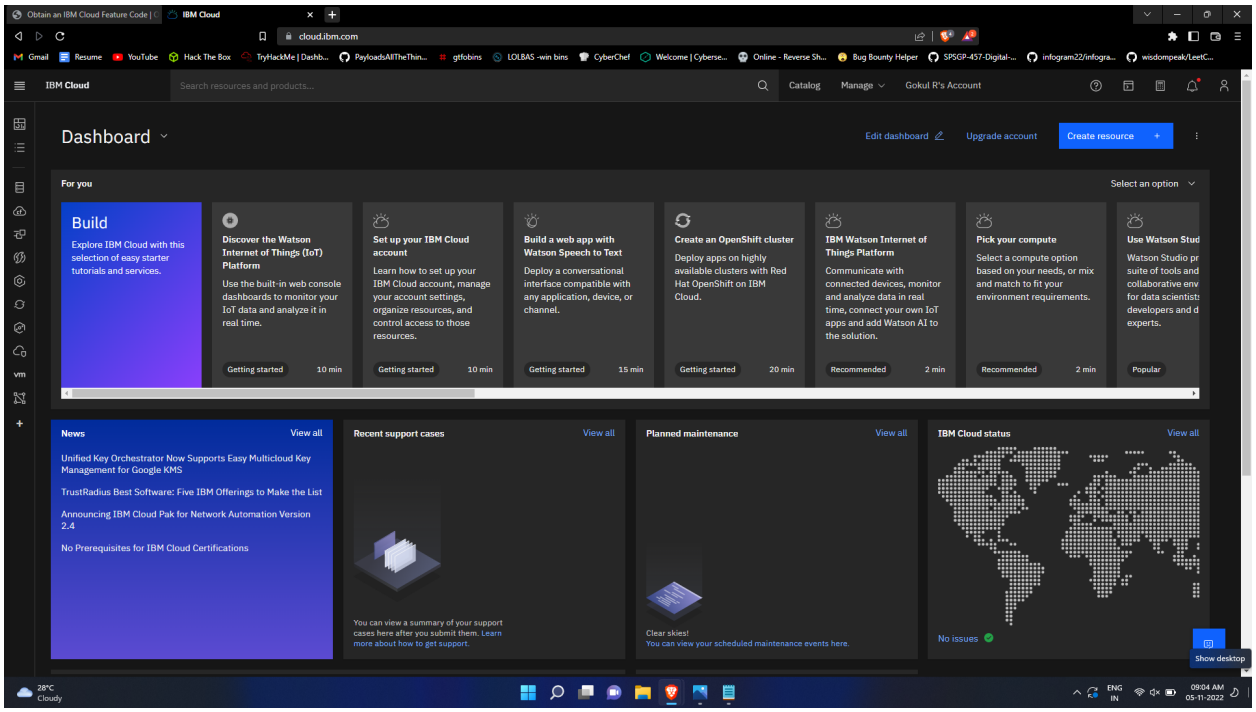
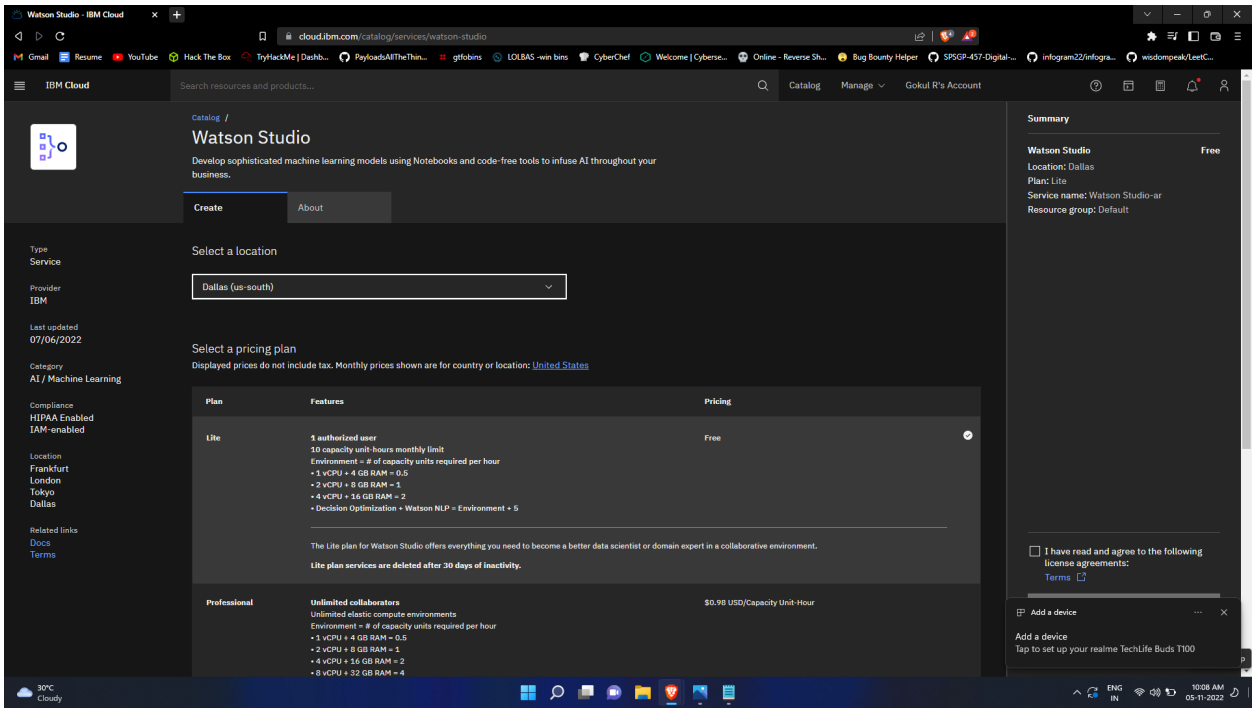
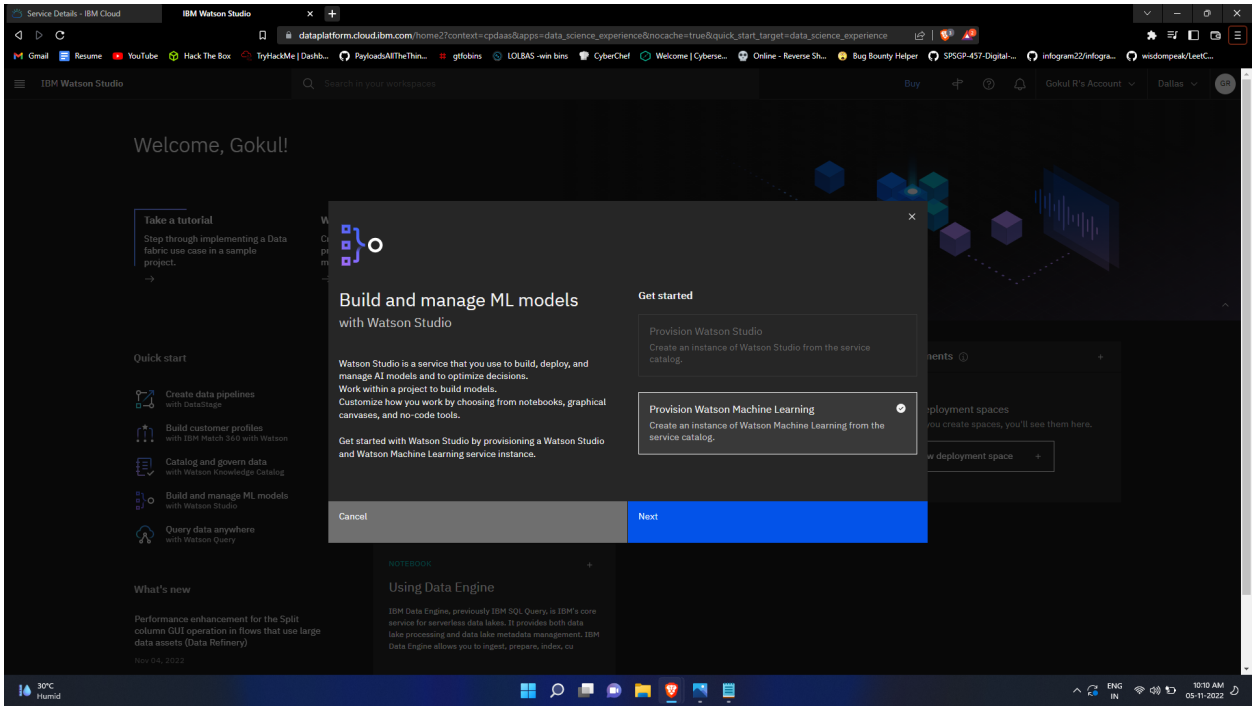
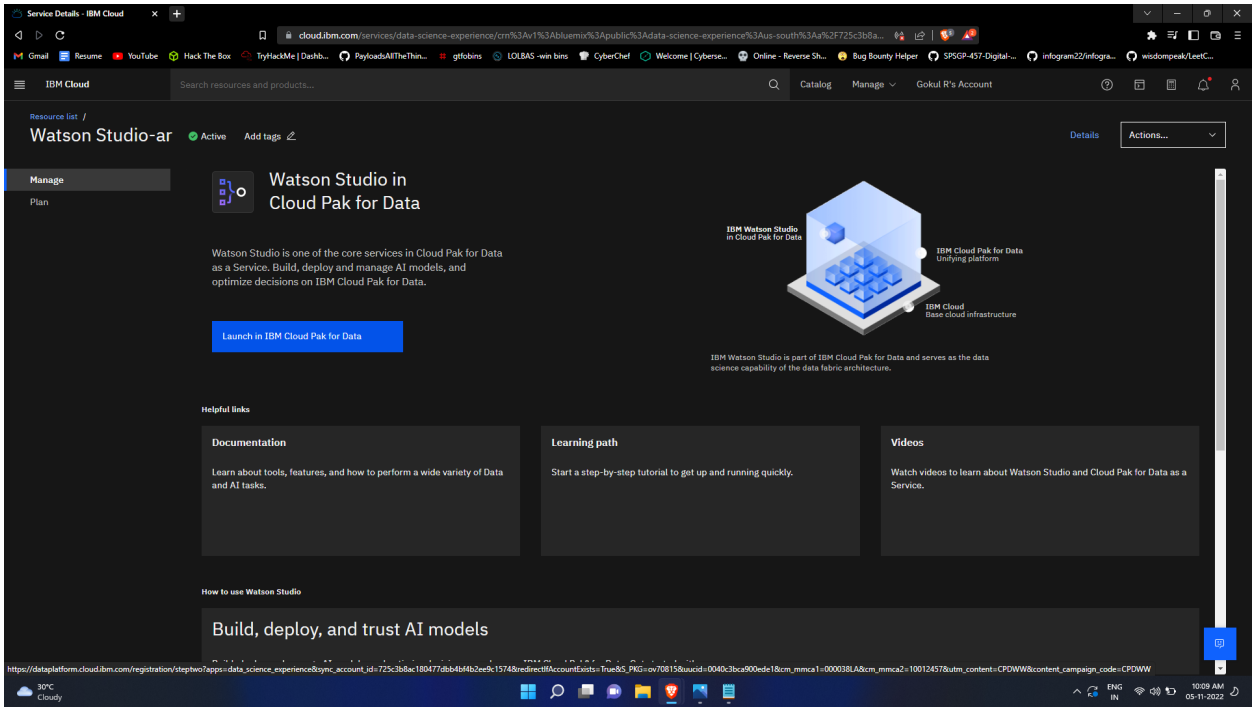
IBM CLOUD DEPLOYMENT

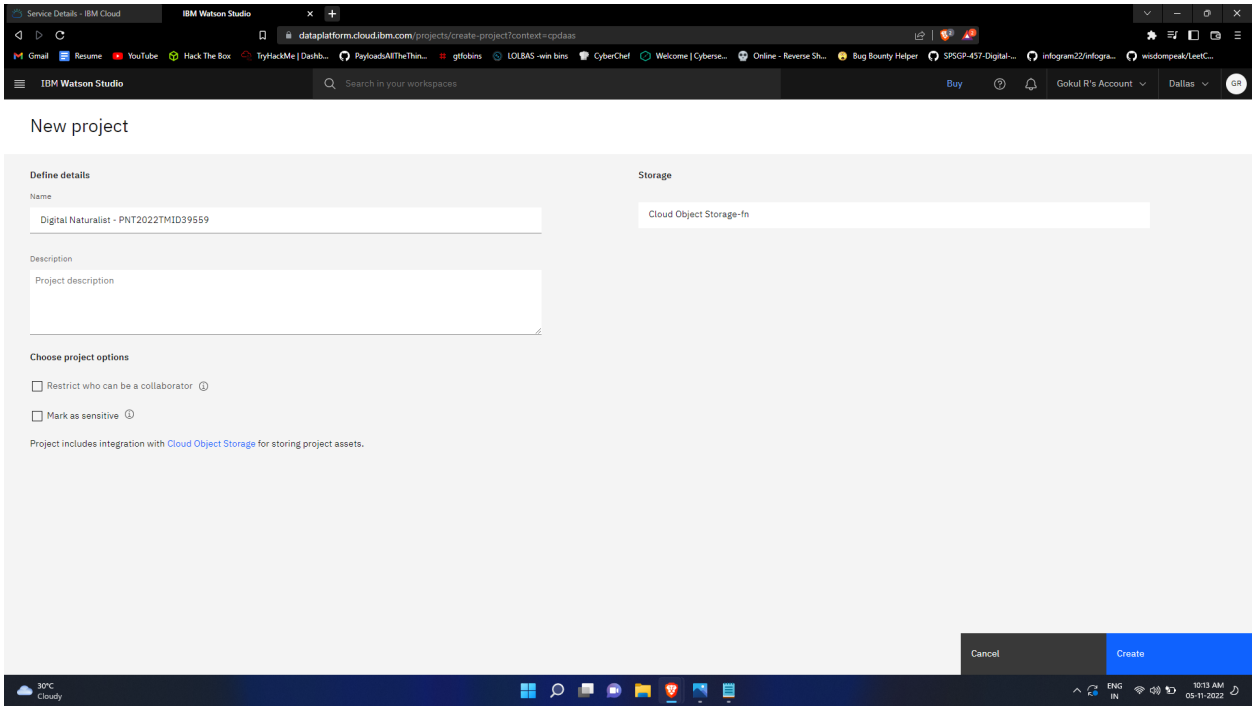
Date	17 November 2022
Team ID	PNT2022TMID39559
Project Name	Project - Digital Naturalist - AI Enabled tool for Biodiversity Researchers

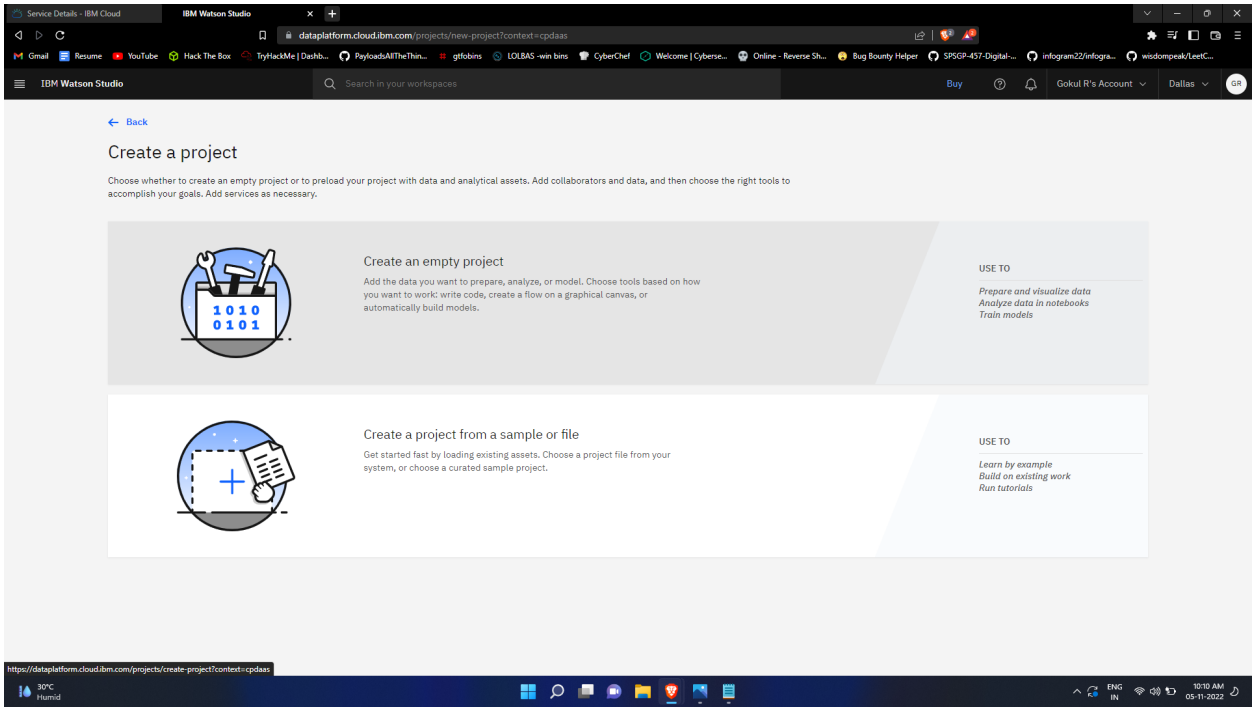





Welcome, Gokul!
Take a tutorial
Step through implementing a Data fabric use case in a sample project.
Quick start
Create data pipelines
Build customer profiles
Catalog and govern data
Build and manage ML models
Query data anywhere
What's new
Performance enhancement for the Split column GUI operation in flows that use large data assets (Data Refinery)
Build and manage ML models
with Watson Studio
Watson Studio is a service that you use to build, deploy, and manage AI models and to optimize decisions.
Work within a project to build models.
Customize how you work by choosing from notebooks, graphical canvases, and no-code tools.
Get started with Watson Studio by provisioning a Watson Studio and Watson Machine Learning service instance.
Get started
Provision Watson Studio
Create an instance of Watson Studio from the service catalog.
Provision Watson Machine Learning
Create an instance of Watson Machine Learning from the service catalog.
Cancel
Next
Using Data Engine


Watson Studio-ar
Active
Add tags
Details
Actions...
Manage
Plan
Watson Studio in Cloud Pak for Data
Watson Studio is one of the core services in Cloud Pak for Data as a Service. Build, deploy and manage AI models, and optimize decisions on IBM Cloud Pak for Data.
Launch in IBM Cloud Pak for Data
IBM Watson Studio in Cloud Pak for Data
IBM Cloud Pak for Data Unifying platform
IBM Cloud Base cloud infrastructure
IBM Watson Studio is part of IBM Cloud Pak for Data and serves as the data science capability of the data fabric architecture.
Helpful links
Documentation
Learn about tools, features, and how to perform a wide variety of Data and AI tasks.
Learning path
Start a step-by-step tutorial to get up and running quickly.
Videos
Watch videos to learn about Watson Studio and Cloud Pak for Data as a Service.
How to use Watson Studio
Build, deploy, and trust AI models


Service Details - IBM Cloud
IBM Watson Studio
dataplatform.cloud.ibm.com/projects/create-project?context=cpdaas
IBM Watson Studio
Search in your workspaces
Buy
Gokul R's Account
Dallas
New project
Define details
Name
Digital Naturalist - PNT2022TMID39559
Description
Project description
Choose project options
Restrict who can be a collaborator
Mark as sensitive
Project includes integration with Cloud Object Storage for storing project assets.
Storage
Cloud Object Storage-fn
Cancel
Create


Service Details - IBM Cloud
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IBM Watson Studio
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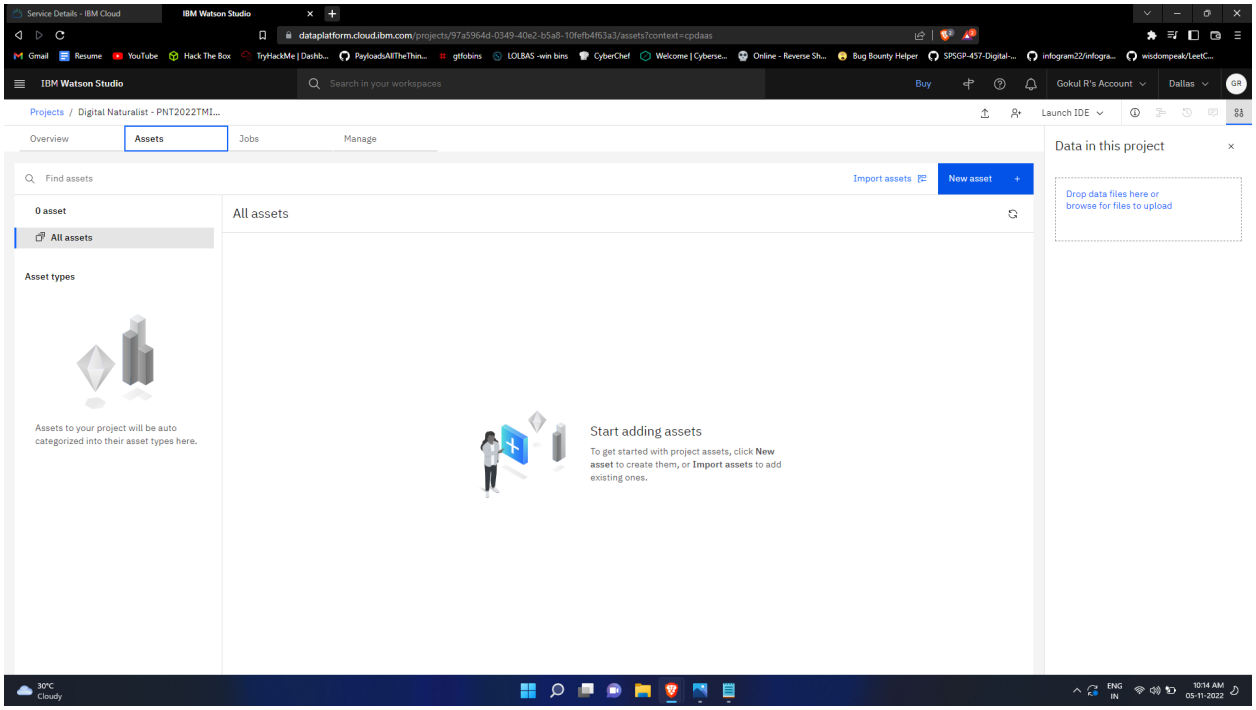
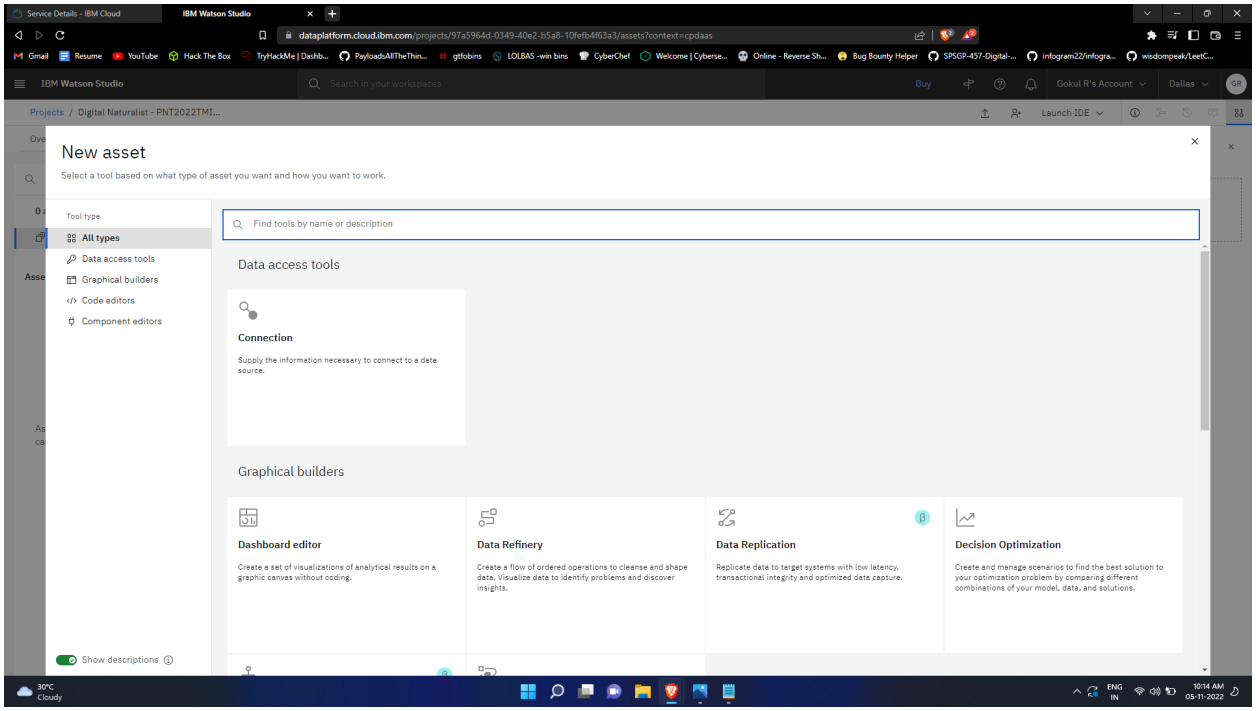
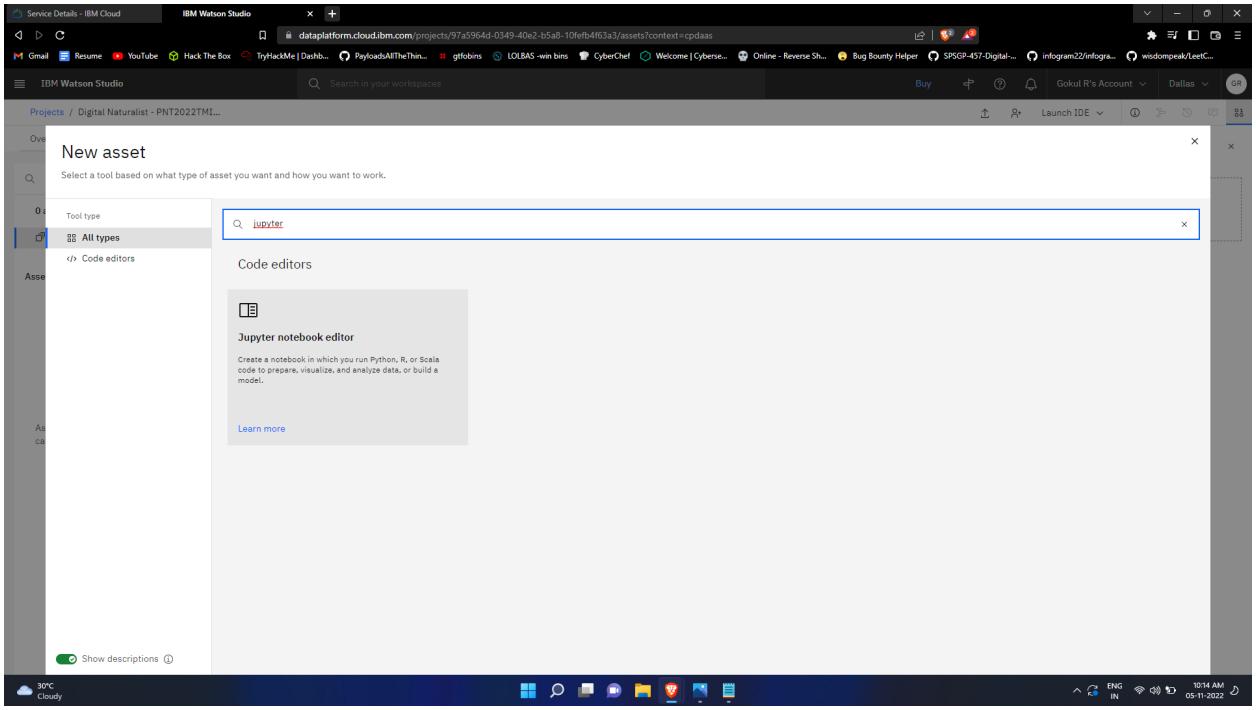
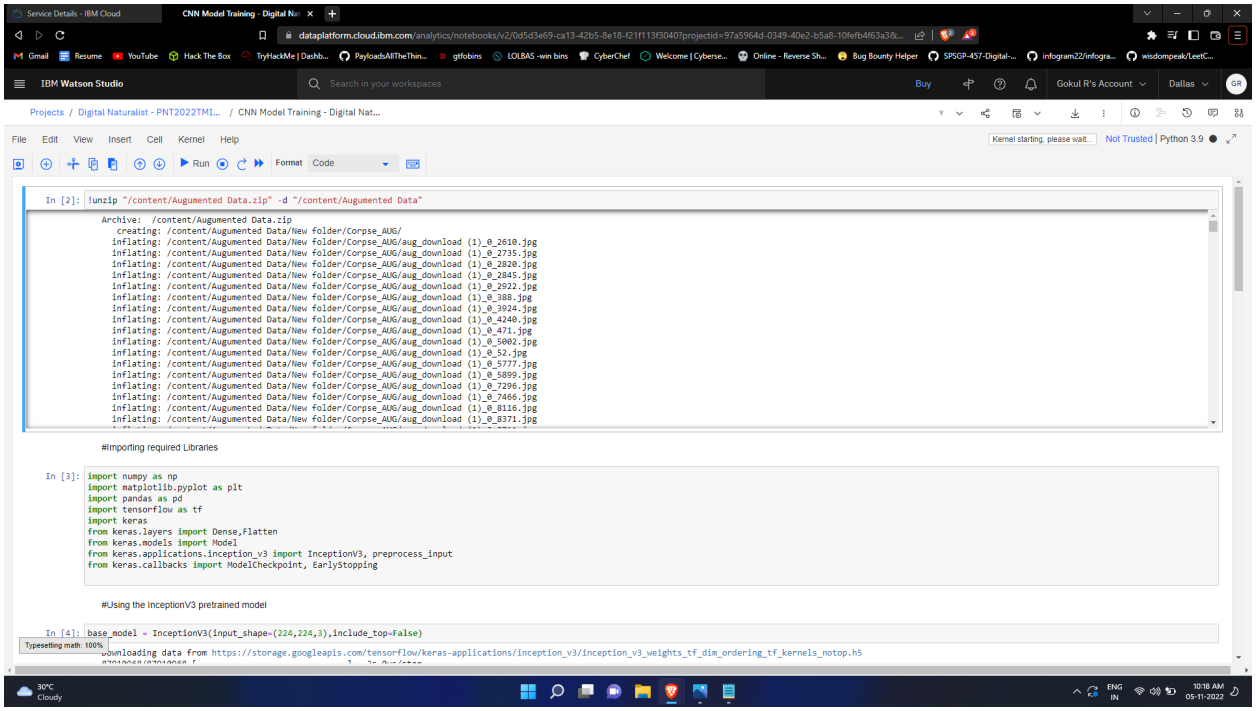
Dallas
Back
Create a project
Choose whether to create an empty project or to preload your project with data and analytical assets. Add collaborators and data, and then choose the right tools to accomplish your goals. Add services as necessary.
1010
0101
Create an empty project
Add the data you want to prepare, analyze, or model. Choose tools based on how you want to work: write code, create a flow on a graphical canvas, or automatically build models.
USE TO
Prepare and visualize data
Analyze data in notebooks
Train models
Create a project from a sample or file
Get started fast by loading existing assets. Choose a project file from your system, or choose a curated sample project.
USE TO
Learn by example
Build on existing work
Run tutorials
https://dataplatform.cloud.ibm.com/projects/create-project?context=cpdaas


IBM Watson Studio
Search in your workspaces
Projects / Digital Naturalist - PNT2022TMI...
Launch IDE
Overview
Assets
Jobs
Manage
Find assets
Import assets
New asset
0 asset
All assets
Asset types
Assets to your project will be auto categorized into their asset types here.
All assets
Start adding assets
To get started with project assets, click New asset to create them, or Import assets to add existing ones.
Data in this project
Drop data files here or browse for files to upload


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
Graphical builders
Code editors
Component editors
Find tools by name or description
Data access tools
Connection
Supply the information necessary to connect to a data source.
Graphical builders
Dashboard editor
Create a set of visualizations of analytical results on a graphic canvas without coding.
Data Refinery
Create a flow of ordered operations to cleanse and shape data. Visualize data to identify problems and discover insights.
Data Replication
Replicate data to target systems with low latency, transactional integrity and optimized data capture.
Decision Optimization
Create and manage scenarios to find the best solution to your optimization problem by comparing different combinations of your model, data, and solutions.
Show descriptions


New asset
Select a tool based on what type of asset you want and how you want to work.
Tool type
All types
Code editors
jupyter
Code editors
Jupyter notebook editor
Create a notebook in which you run Python, R, or Scala code to prepare, visualize, and analyze data, or build a model.
Learn more
Show descriptions


In [2]: !unzip "/content/Augumented Data.zip" -d "/content/Augumented Data"
Archive: /content/Augumented Data.zip
creating: /content/Augumented Data/New folder/Corpse_AUG/
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_2610.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_2735.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_2820.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_2845.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_2922.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_388.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_3924.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_4240.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_471.jpg
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inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_52.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_5777.jpg
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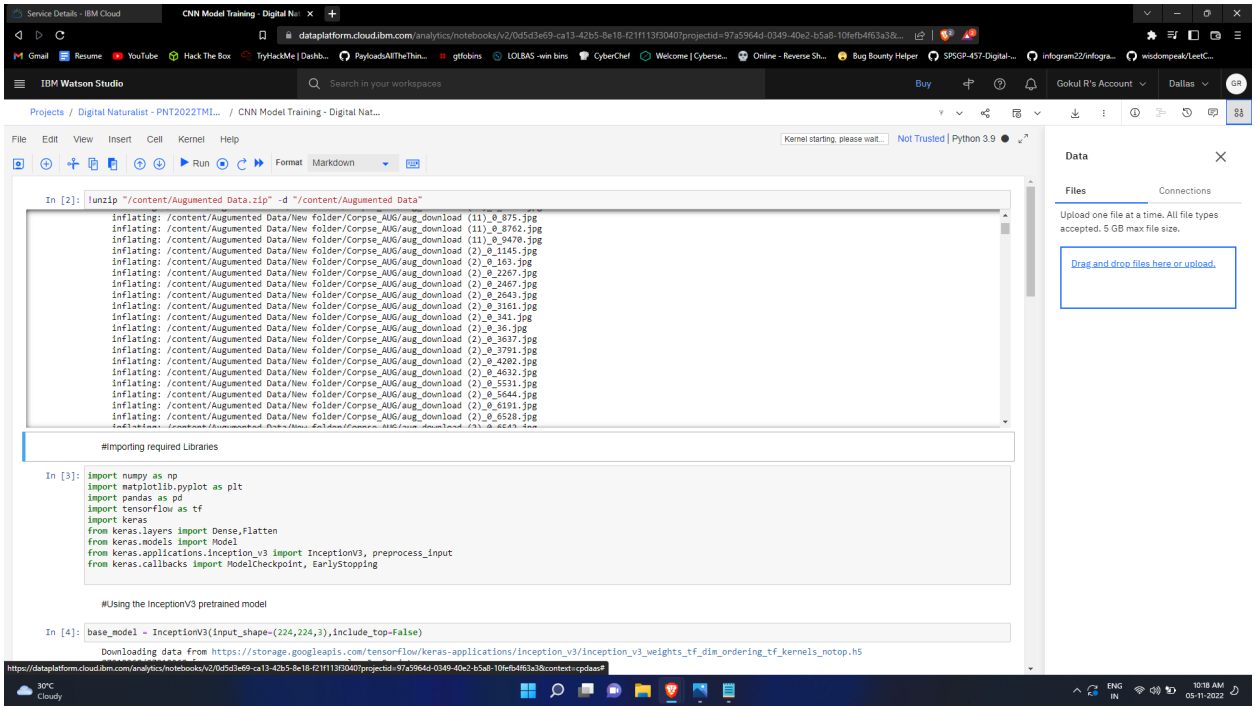
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_7466.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_8116.jpg
inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (1)_0_8371.jpg
#importing required Libraries
In [3]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import tensorflow as tf
import keras
from keras.layers import Dense,Flatten
from keras.models import Model
from keras.applications.inception_v3 import InceptionV3, preprocess_input
from keras.callbacks import ModelCheckpoint, EarlyStopping
#Using the InceptionV3 pretrained model
In [4]: base_model = InceptionV3(input_shape=(224,224,3),include_top=False)
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/inception_v3/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5



```
In [2]: !unzip "/content/Augumented Data.zip" -d "/content/Augumented Data"
```

```
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (11)_0_875.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (11)_0_8762.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (11)_0_9470.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_1145.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_163.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_2267.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_2467.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_2643.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_3161.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_341.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_36.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_3637.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_3791.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_4202.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_4632.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_5531.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_5644.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_6191.jpg
  inflating: /content/Augumented Data/New folder/Corpse_AUG/aug_download (2)_0_6528.jpg
```

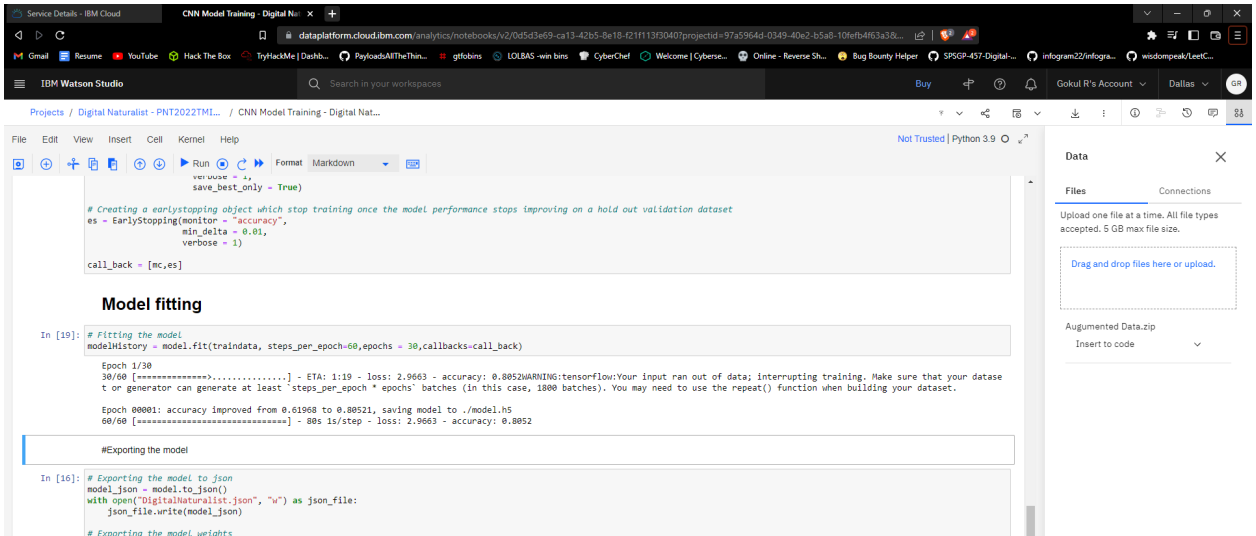
#importing required Libraries

```
In [3]: import numpy as np
        import matplotlib.pyplot as plt
        import pandas as pd
        import tensorflow as tf
        import keras
        from keras.layers import Dense,Flatten
        from keras.models import Model
        from keras.applications.inception_v3 import InceptionV3, preprocess_input
        from keras.callbacks import ModelCheckpoint, EarlyStopping
```

#Using the InceptionV3 pretrained model

```
In [4]: base_model = InceptionV3(input_shape=(224,224,3),include_top=False)
```

Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/inception_v3/inception_v3_weights_tf_dim_ordering_tf_kernels_notop.h5



```
    save_best_only = True)

# Creating a earlystopping object which stop training once the model performance stops improving on a hold out validation dataset
es = EarlyStopping(monitor = "accuracy",
                   min_delta = 0.01,
                   verbose = 1)

call_back = [mc,es]
```

Model fitting

```
In [19]: # Fitting the model
         modelHistory = model.fit(traindata, steps_per_epoch=60,epochs = 30,callbacks=call_back)
```

```
Epoch 1/30
30/60 [==============>.............] - ETA: 1:19 - loss: 2.9663 - accuracy: 0.8052WARNING:tensorflow:Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps_per_epoch * epochs` batches (in this case, 1800 batches). You may need to use the repeat() function when building your dataset.

Epoch 00001: accuracy improved from 0.61968 to 0.80521, saving model to ./model.h5
60/60 [==============================] - 80s 1s/step - loss: 2.9663 - accuracy: 0.8052
```

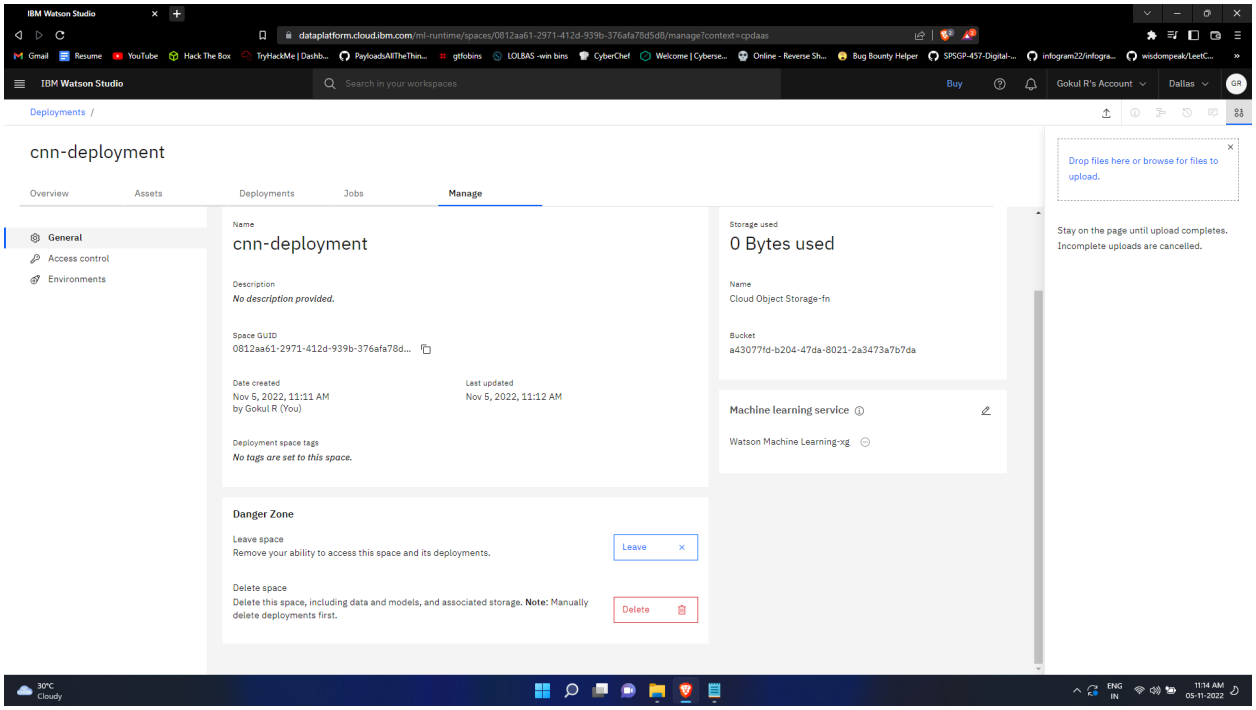
#Exporting the model

```
In [16]: # Exporting the model to json
         model_json = model.to_json()
         with open("DigitalNaturalist.json", "w") as json_file:
             json_file.write(model_json)

         # Exporting the model weights

         model.save_weights("DigitalNaturalist")
         print("Saved model to disk")
```

```
Saved model to disk
```

Testing the model

```
In [20]: #Testing the model
         predictions = ["Corpse Flower",
```


IBM Watson Studio
dataplatform.cloud.ibm.com/ml-runtime/spaces/0812aa61-2971-412d-939b-376afa78d5d8/manage?context=cpdaas
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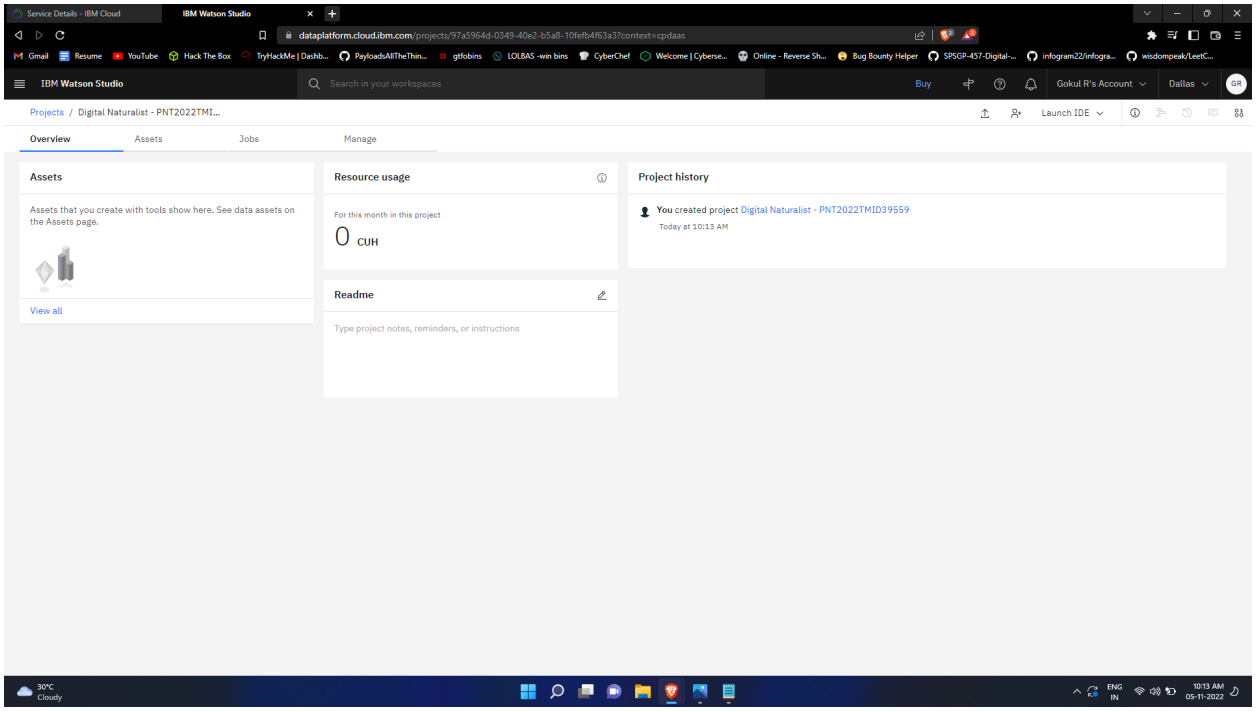
Dallas
Deployments /
cnn-deployment
Overview
Assets
Deployments
Jobs
Manage
General
Access control
Environments
Name
cnn-deployment
Description
No description provided.
Space GUID
0812aa61-2971-412d-939b-376afa78d...
Date created
Nov 5, 2022, 11:11 AM
by Gokul R (You)
Last updated
Nov 5, 2022, 11:12 AM
Deployment space tags
No tags are set to this space.
Storage used
0 Bytes used
Name
Cloud Object Storage-fn
Bucket
a43077fd-b204-47da-8021-2a3473a7b7da
Machine learning service
Watson Machine Learning-xg
Danger Zone
Leave space
Remove your ability to access this space and its deployments.
Leave
Delete space
Delete this space, including data and models, and associated storage. Note: Manually delete deployments first.
Delete
Drop files here or browse for files to upload.
Stay on the page until upload completes. Incomplete uploads are cancelled.
30°C
Cloudy
ENG
IN
11:14 AM
05-11-2022


Service Details - IBM Cloud
IBM Watson Studio
dataplatform.cloud.ibm.com/projects/97a5964d-0349-40e2-b5a8-10fefb4f63a3?context=cpdaas
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Projects / Digital Naturalist - PNT2022TMI...
Launch IDE
Overview
Assets
Jobs
Manage
Assets
Assets that you create with tools show here. See data assets on the Assets page.
View all
Resource usage
For this month in this project
0 CUH
Readme
Type project notes, reminders, or instructions
Project history
You created project Digital Naturalist - PNT2022TMID39559
Today at 10:13 AM
30°C
Cloudy
ENG
IN
10:13 AM
05-11-2022