

1. Create Workspace

Create new workspace X

Specify a name of your workspace to get started. Optionally select a hub, to host your workspace in a shared environment for your team, with pre-configured security, access to company resources, and shared compute.

Name * i

Friendly name i

Hub i PREVIEW

 X

▼ Advanced settings

Subscription * i

 ▼

↻ Refresh subscriptions

Resource group * i

 ▼

[Create new](#)

Region * i

 ▼

Create Cancel

2. Launch studio

The screenshot shows the Microsoft Azure portal interface. The left sidebar displays the 'weather' workspace under 'All services'. The main content area shows an 'Overview' card for 'weather156928812'. It includes a download link for 'config.json', the name 'weather8835008156', and the 'MLflow tracking URI' (azurerm://southindia.api.azureml.ms/mlflow...). A large central area features a placeholder image and the text 'Work with your models in Azure Machine Learning Studio'. Below this, it says 'The Azure Machine Learning Studio is a web app where you can build, train, test, and deploy ML models. Launch it now to start exploring, or learn more about the Azure Machine Learning studio'. A blue 'Launch studio' button is at the bottom. The top right corner shows a 'Notifications' panel with a single notification: 'Deployment succeeded' (Deployment 'Microsoft.MachineLearningServices' to resource group 'weather_prediction' was successful). The bottom right corner shows system status icons.

3. Create data asset

The screenshot shows the 'Data' page in the Azure AI | Machine Learning Studio. The left sidebar has sections for 'Authoring' (Notebooks, Automated ML, Designer, Prompt flow) and 'Assets' (Data, Jobs, Components, Pipelines, Environments, Models, Endpoints). The main content area is titled 'Data' and shows a table of data assets. The table columns are: Name, Source, Version, Created on, Modified on, and Type. There is one visible row with a folder icon and a plus sign. At the top of the table are buttons for '+ Create', 'Refresh', 'Archive', 'Reset view', and checkboxes for 'Show latest version only', 'Include archived', and 'View my data'. The bottom of the table shows navigation buttons for 'Prev' and 'Next', and a page number '25/Page'. The top right corner shows the 'Azure for Students' logo and the word 'weather'. The bottom right corner shows system status icons.

a)

The screenshot shows the 'Create data asset' wizard in progress. The left sidebar lists steps 1 through 7: Data type, Data source, Destination storage type, File or folder selection, Settings, Schema, and Review. Step 1 is currently selected and highlighted in blue. The main panel is titled 'Set the name and type for your data asset'. It contains fields for 'Name' (set to 'weather_prediction') and 'Description' (set to 'Data asset description'). A dropdown menu for 'Type' is open, showing 'Tabular' as the selected option. To the right of the main panel, there is a sidebar titled 'Use cases for data types' which provides information about the recommended file type for most scenarios. Below the main panel, there are 'Back' and 'Next' buttons, and a 'Cancel' button in the bottom right corner.

b)

The screenshot shows the 'Create data asset' wizard in progress, with step 2: Data source selected. The left sidebar shows steps 1 (Data type) and 2 (Data source) as completed, indicated by green checkmarks. The main panel is titled 'Choose a source for your data asset' and provides instructions: 'Choose the data source you want to create your asset from. A data source can be from a local storage location on your computer, from an attached datastore, from Azure storage, or from a publicly available web location.' Below this, four options are listed: 'From Azure storage', 'From local files', 'From SQL databases', and 'From web files'. The 'From local files' option is currently selected and highlighted with a blue border. The bottom of the screen features standard Windows taskbar icons and system status indicators.

c)

The screenshot shows the 'Create data asset' wizard in progress, specifically step 3: 'Destination storage type'. On the left, a vertical navigation bar lists steps 1 through 7: Data type, Data source, Destination storage type (which is highlighted in blue), File or folder selection, Settings, Schema, and Review. The main panel title is 'Select a datastore' with the sub-instruction: 'Choose a storage type and a datastore to upload your data to in the next step. You can also create a new datastore for your data first.' A dropdown menu 'Datastore type *' is set to 'Azure Blob Storage'. Below it is a table titled 'Search datastore' showing two entries:

Name	Storage name	Created on
workspaceblobstore	weather1569288122	Jun 26, 2024 9:22:05 AM
workspaceartifactstore	weather1569288122	Jun 26, 2024 9:22:05 AM

At the bottom are 'Back', 'Next', and 'Cancel' buttons.

d)

The screenshot shows the 'Create data asset' wizard in progress, specifically step 5: 'Settings'. The left navigation bar shows steps 1 through 7: Data type, Data source, Destination storage type, File or folder selection, Settings (highlighted in blue), Schema, and Review. The main panel title is 'Settings' with the sub-instruction: 'These settings determine how the data is parsed. The initial settings are automatically detected; you can change them as needed to reparse the data.' It includes fields for 'File format' (set to 'Delimited'), 'Delimiter' (set to 'Comma'), 'Example' (showing 'Field1,Field2,Field3'), and 'Encoding' (set to 'UTF-8'). Below these are sections for 'Column headers' (set to 'All files have same headers') and 'Skip rows' (set to 'None'). There is also a checkbox for 'Dataset contains multi-line data'. At the bottom is a 'Data preview' table showing a sample of the dataset:

date	precipitation	temp_max	temp_min	wind	weather
2012-01-01 00:00:00	0	12.8	5	4.7	drizzle
2012-01-02 00:00:00	10.9	10.6	2.8	4.5	rain

At the bottom are 'Back', 'Next', 'Review', and 'Cancel' buttons.

e)

The screenshot shows the 'Create data asset' wizard in progress, specifically the 'Schema' step. On the left, a vertical navigation bar lists steps: Data type, Data source, Destination storage type, File or folder selection, Settings, Schema (which is highlighted in blue), and Review. The main area is titled 'Schema' with a sub-instruction: 'Column types are auto-detected based on the initial subset of the data and can be updated here. Values not aligning with the specified column type will fail conversion and would be either null-filled or replaced with error value. Any conversions preview errors are non-blocking and you can proceed.' Below this is a search bar labeled 'Search column name'. A table displays four columns: 'Include', 'Column name', 'Type', and 'Properties'. The columns are: Path (String, Not applicable to s..., Not applicable t...), date (Date, %Y-%m-%d, None), precipitation (Decimal (dot '.'), 0, 10.9, 0.8, Not applicable to s..., Not applicable t...), and temp_max (Decimal (dot '.'), 12.8, 10.6, 11.7, Not applicable to s..., Not applicable t...). At the bottom are 'Back', 'Next', and 'Cancel' buttons.

f)

The screenshot shows the 'Create data asset' wizard in the 'Review' step. The left sidebar shows the same navigation steps as before. The main area has two sections: 'Data type' and 'Schema'. The 'Data type' section shows: Name (weather_prediction), Description (--), and Type (tabular). The 'Schema' section shows a table of columns: date (Date), precipitation (Decimal), temp_max (Decimal), temp_min (Decimal), and wind (Decimal). A note '(showing 5 of 7 columns)' is visible. At the bottom are 'Back', 'Create', and 'Cancel' buttons.

g)

The screenshot shows the Azure AI | Machine Learning Studio interface. On the left, a sidebar titled 'Assets' has 'Data' selected. The main area displays the 'weather_prediction' dataset details. The 'Details' tab is active, showing the following information:

- Attributes**: Type: Table (mhtable), Dataset type: Tabular.
- Created by**: kanika 22csu198.
- Profile**: View profile, Job: --.
- Files in dataset**: 1.
- Tags**: No data.
- Description**: Click edit icon to add a description.
- Data sources**: Datastore: workspaceblobstore.

At the bottom right of the interface, there is a status bar with icons for battery, signal, and date/time (26-06-2024).

4. Create compute instance

The screenshot shows the Azure AI | Machine Learning Studio interface. On the left, a sidebar titled 'Assets' has 'Compute' selected. The main area displays the 'Compute' section, which includes a large blue hexagonal icon representing cloud computing. Below the icon, there is a call-to-action text and a 'New' button.

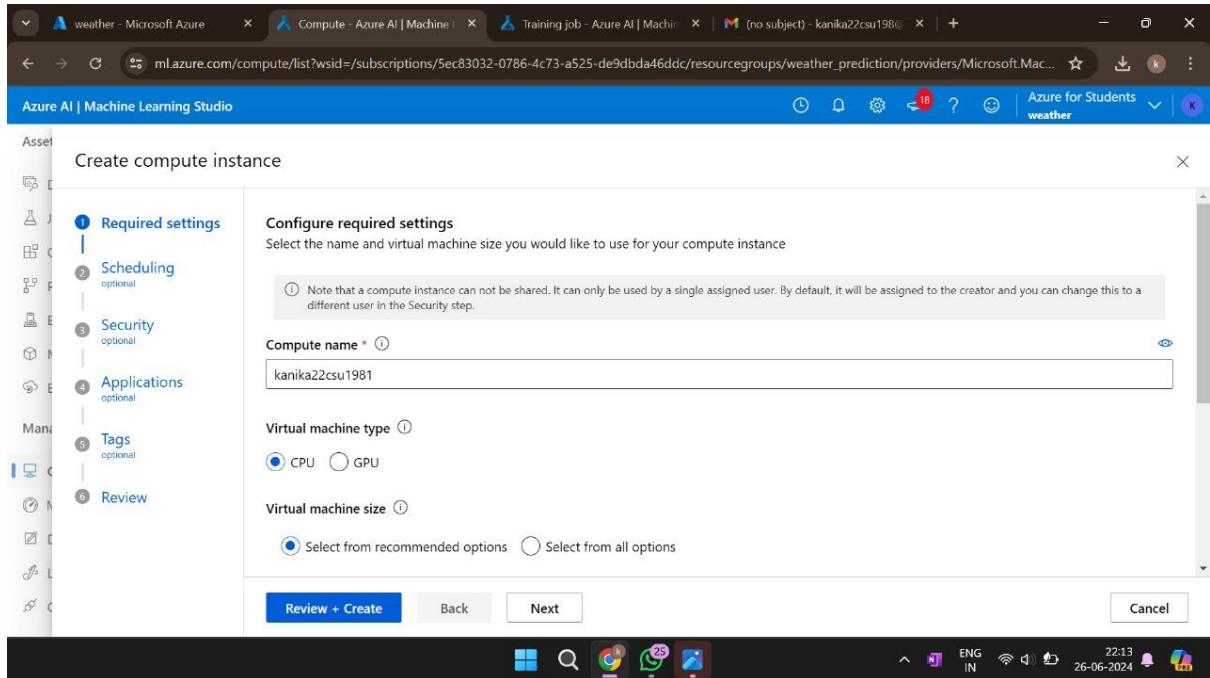
Get started with Azure Machine Learning notebooks and R scripts by creating a compute instance

Choose from a selection of CPU or GPU instances preconfigured with popular tools such as VS Code, JupyterLab, Jupyter, and RStudio, ML packages, deep learning frameworks, and GPU drivers. [Learn more](#)

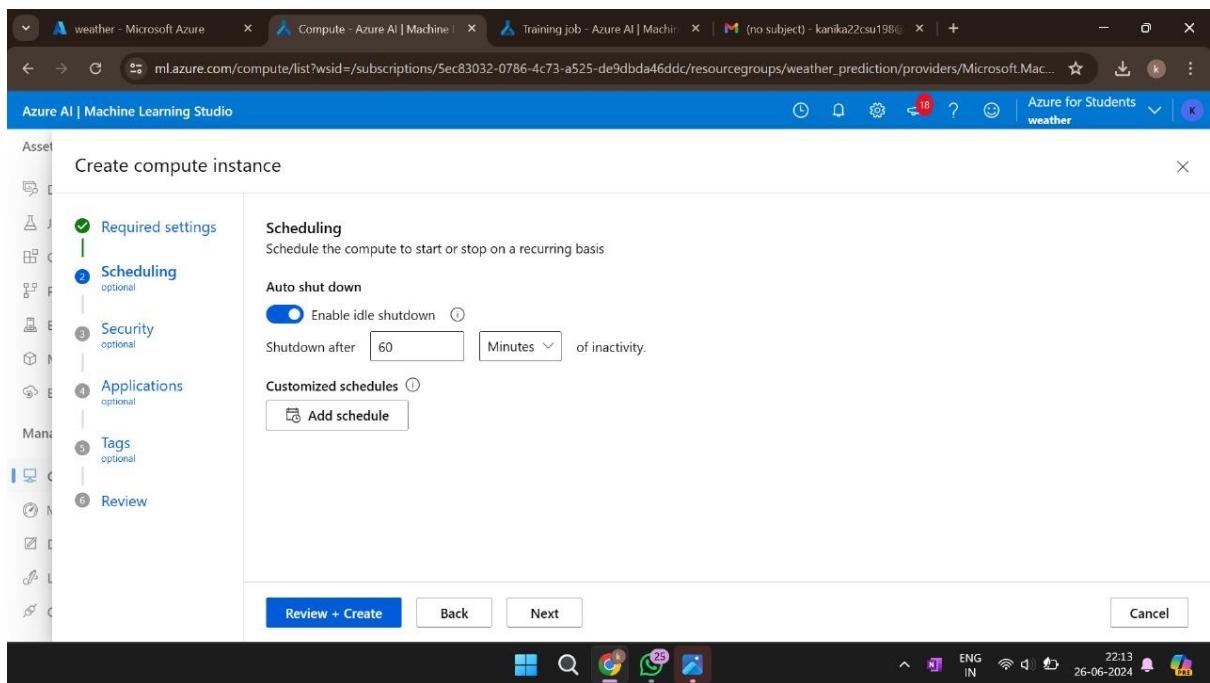
+ New

At the bottom right of the interface, there is a status bar with icons for battery, signal, and date/time (26-06-2024).

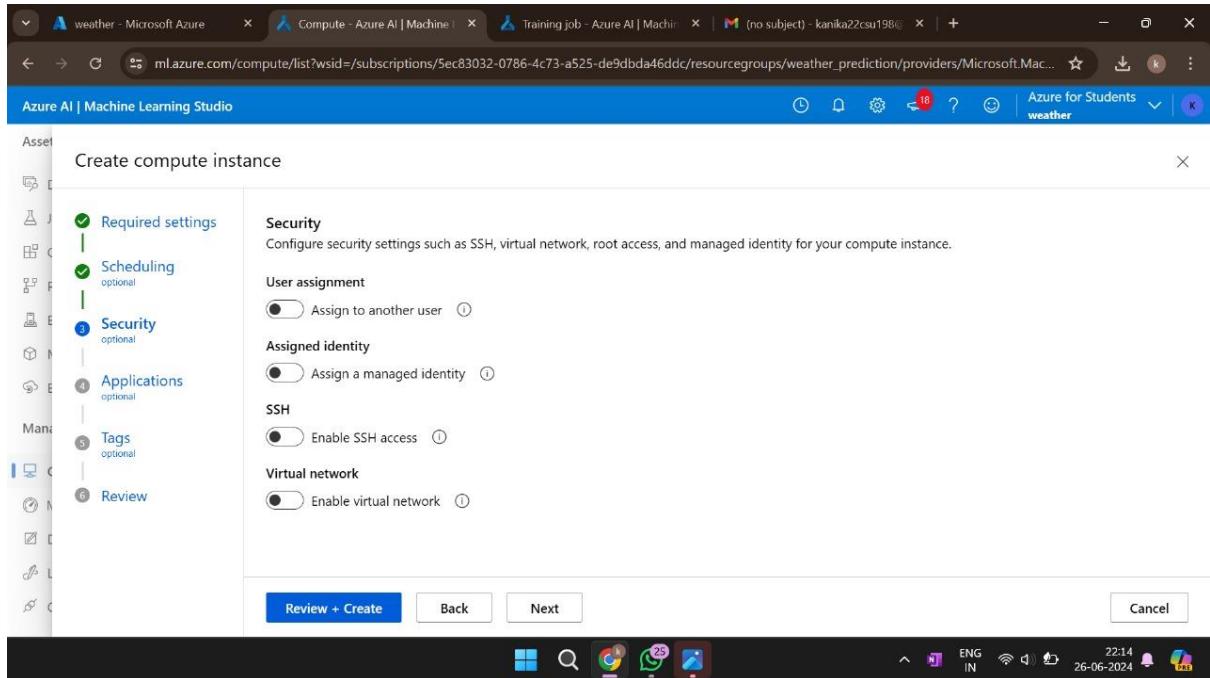
a)



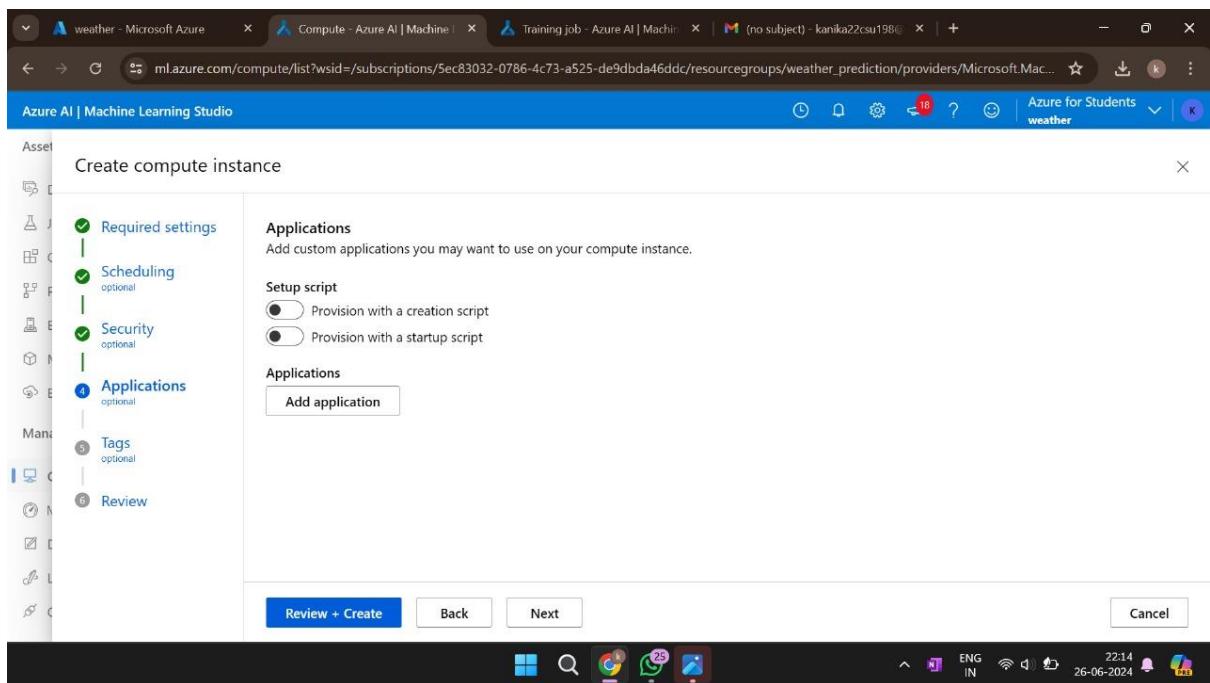
b)



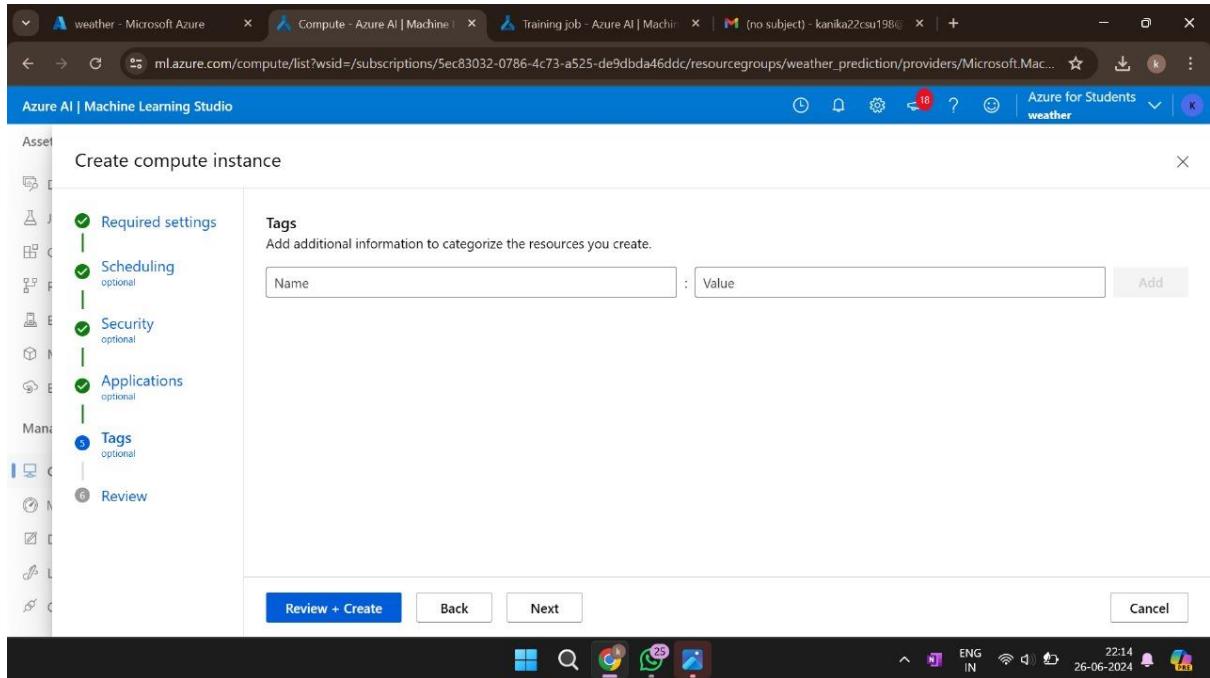
c)



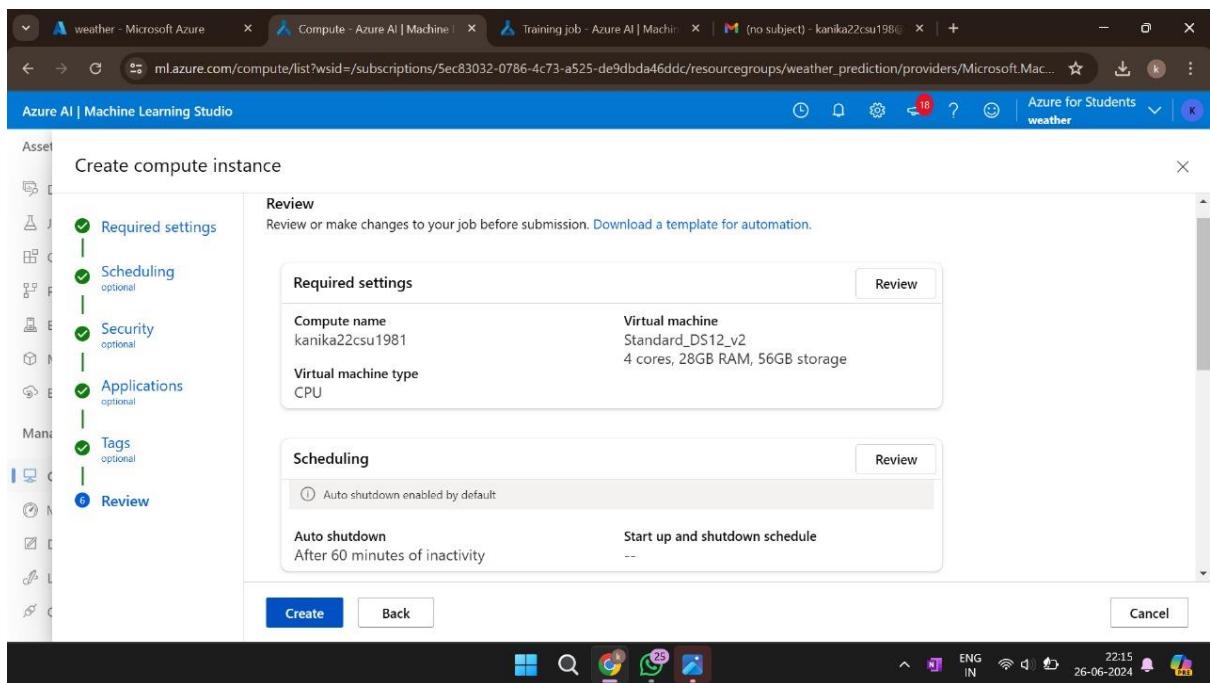
d)



e)



f)



g)

The screenshot shows the Azure AI | Machine Learning Studio interface. On the left, a sidebar titled 'Assets' lists various components like Data, Jobs, Components, Pipelines, Environments, Models, and Endpoints. Under 'Compute', it shows 'Compute instances' with one entry: 'kanika22csu1981' which is 'Running'. At the top, there's a message about 'Kubernetes clusters'. The main area has tabs for Compute instances, Compute clusters, Kubernetes clusters, Attached computes, and Serverless instances. A toolbar at the top includes buttons for New, Refresh, Start, Stop, Restart, Schedule and idle shutdown, Delete, and View quota. Below the toolbar is a search bar and filter options. The bottom right corner shows system status icons.

5. Submit Automated ML job

The screenshot shows the Azure AI | Machine Learning Studio interface under the 'Automated ML' section. The left sidebar includes 'Authoring' (Notebooks, Automated ML - Designer, Prompt flow), 'Assets' (Data, Jobs, Components, Pipelines, Environments, Models, Endpoints), and 'Manage' (Compute, Monitoring, Data Labeling, Linked Services, Connections). The main area is titled 'Automated ML' and displays a message: 'Let Automated ML train and find the best model based on your data without writing a single line of code.' It features a 'New Automated ML job' button and a 'Documentation' section with a link to 'View all documentation'. The bottom right corner shows system status icons.

a)

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The left sidebar shows the navigation path: The Northcap university > weather > Training job. The main panel is titled 'Basic settings' with the sub-instruction: 'Let's start with some basic information about your training job.' It includes fields for 'Job name' (set to 'upbeat_eye_366sn3d9zm'), 'Experiment name' (radio button selected for 'Create new'), 'New experiment name' (set to 'Default'), and a 'Description' field. A progress bar on the left indicates steps 1 through 6, with 'Training method' and 'Basic settings' completed.

b)

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The left sidebar shows the navigation path: The Northcap university > weather > Training job. The main panel is titled 'Task type & data' with the sub-instruction: 'Choose the type of task that you would like your model to perform and the data to use for training.' It includes a dropdown for 'Select task type' (set to 'Classification') and a 'Select data' section showing a table of assets. The table has columns for Name, Type, Created on, and Modified on. One asset is listed: 'weather_prediction' (Table, Jun 26, 2024 1..., Jun 26, 2024 1...). A progress bar on the left indicates steps 1 through 6, with 'Training method', 'Basic settings', and 'Task type & data' completed.

c)

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The current step is 'Task settings'. The left sidebar shows a navigation tree with 'Training method', 'Basic settings', 'Task type & data' (which is expanded), 'Task settings' (selected and highlighted in blue), 'Compute', and 'Review'. The main panel displays 'Task type' set to 'Classification', 'Data' set to 'weather_prediction (View data)', and 'Target column *' set to 'weather (String)'. Under 'Classification settings', there is an unchecked checkbox for 'Enable deep learning'. Buttons at the bottom include 'Back', 'Next', and 'Cancel'. The status bar at the bottom right shows the date as 26-06-2024.

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The current step is 'Limits'. The left sidebar shows a navigation tree with 'Training method', 'Basic settings', 'Task type & data', 'Task settings' (selected and highlighted in blue), 'Compute', and 'Review'. The main panel displays validation and test settings. It shows 'Validation type' set to 'Automatic', 'Test data' set to 'Train-test split', and 'Percentage test of data *' set to '10'. A note below states: 'Automated ML recommends that between 10 and 30 percent of data is held out for test'. Buttons at the bottom include 'Back', 'Next', and 'Cancel'. The status bar at the bottom right shows the date as 26-06-2024.

d)

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The current step is 'Compute'. The left sidebar shows the navigation path: 'The Northcap university > weather > Training job'. The main panel title is 'Submit an Automated ML job'. A vertical progress bar on the left indicates steps 1 through 6, with steps 1-4 completed (green checkmarks) and step 5 partially completed (blue circle). The 'Compute' section contains fields for 'Select compute type' (set to 'Compute instance') and 'Select Azure ML compute instance' (set to 'kanika22csu1981 - Running'). Buttons at the bottom include 'Back', 'Next', and 'Cancel'.

e)

The screenshot shows the 'Submit an Automated ML job' wizard in the Azure AI | Machine Learning Studio. The current step is 'Review'. The left sidebar shows the navigation path: 'The Northcap university > weather > Training job'. The main panel title is 'Submit an Automated ML job'. A vertical progress bar on the left indicates steps 1 through 6, all completed (green checkmarks). The 'Review' section contains a summary of the job configuration. On the right, two side-by-side tables show 'Basic settings' and 'Task type & data'. The 'Basic settings' table includes fields for Name (set to 'tender_garage_b10nbgb0q5'), Experiment name (set to 'Default'), Description (set to '--'), and Timeout (hours) (set to '--'). The 'Task type & data' table includes fields for Task type (set to 'Classification') and Data (set to 'weather_prediction'). Buttons at the bottom include 'Back', 'Submit training job', and 'Cancel'.

f)

The screenshot shows the Azure AI | Machine Learning Studio interface. The left sidebar navigation includes Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Components, Pipelines), and Jobs. The main content area displays a completed job named "tender_garage_b10nbgb0q5". The "Models + child jobs" tab is selected. A table lists the following data:

Algorithm name	Explained	Responsible AI	AUC weighted	Sampling
VotingEnsemble	View explanation	View responsible AI ...	0.95630	100.00 %
StandardScalerWrapper, LightGBM			0.95319	100.00 %
StandardScalerWrapper, LightGBM			0.95302	100.00 %

6. Explain Job

The screenshot shows the Azure AI | Machine Learning Studio interface. The left sidebar navigation includes Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Components, Pipelines), and Jobs. The main content area displays a completed job named "amiable_whale_1zby5pds". The "Explanations (preview)" tab is selected. A warning message states: "This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime." The interface shows an "Explanation ..." section with two cohorts: "1aeb70ab" and "e857a9e1". The "Aggregate feature importance" tab is selected, displaying a chart titled "Top 4 features by their importance". Below the chart, a "DATA STATISTICS" section indicates a Multiclass classifier with 1314 datapoints.

a)

The screenshot shows the Azure AI | Machine Learning Studio interface. A modal window titled "Explain model" is open. In the top right of the modal, there is a dropdown menu labeled "Select compute type" with "Compute instance" selected. Below it is another dropdown labeled "Select Azure ML compute instance*" with "kanika22csu1981 - Running" selected. The main content area of the modal shows an explanation for a run named "amiable_whale_1zby5pds". It includes tabs for "Explanation ...", "Model performance", "Dataset explorer", and "Aggregate feature importance". The "Aggregate feature importance" tab is active, displaying a chart titled "Top 4 features by their importance". The chart lists four features: "DATA STATISTICS", "Multiclass classifier", "1314 datapoints", and "e857a9e1". At the bottom of the modal are "Create" and "Cancel" buttons.

b)

The screenshot shows the same Azure AI | Machine Learning Studio interface as in panel (a). A green success message at the top of the page states: "Success: Explainability job successfully created. You can view the job status in the "Child jobs" tab. Once the run is complete, the explainability tab will populate with your e...". The rest of the interface is identical to panel (a), showing the "Explain model" dialog with the "Aggregate feature importance" tab selected.

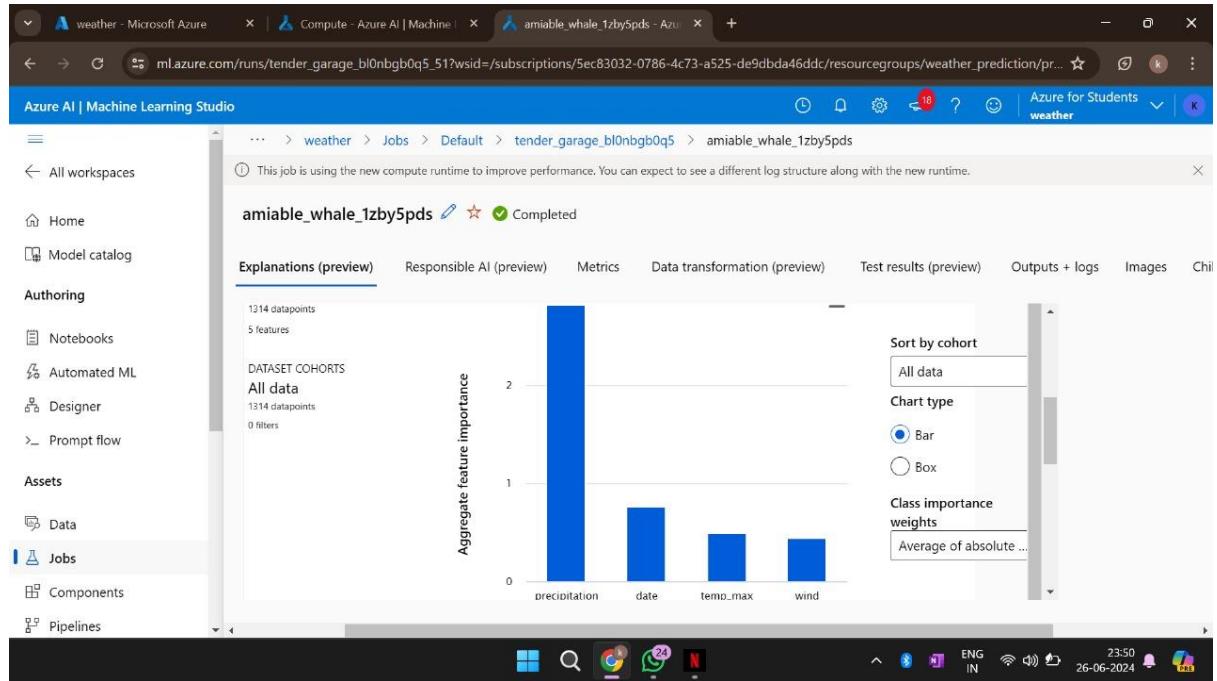
7. Test model

The screenshot shows the Azure AI | Machine Learning Studio interface. On the left, there's a sidebar with options like All workspaces, Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Components, Pipelines), and Jobs. The main area displays a completed job named "amiable_whale_1zby5pds". The "Explanations (preview)" tab is selected. A modal window titled "Test model (preview)" is overlaid, asking for a compute type (Compute instance), an Azure ML compute instance (selected as "kanika22csu1981 - Running"), and a dataset (selected as "weather_prediction"). Below the modal, the main interface shows an explanation section with "Explainer: mimic.lightgbm" and a "Top 4 features by their importance" chart.

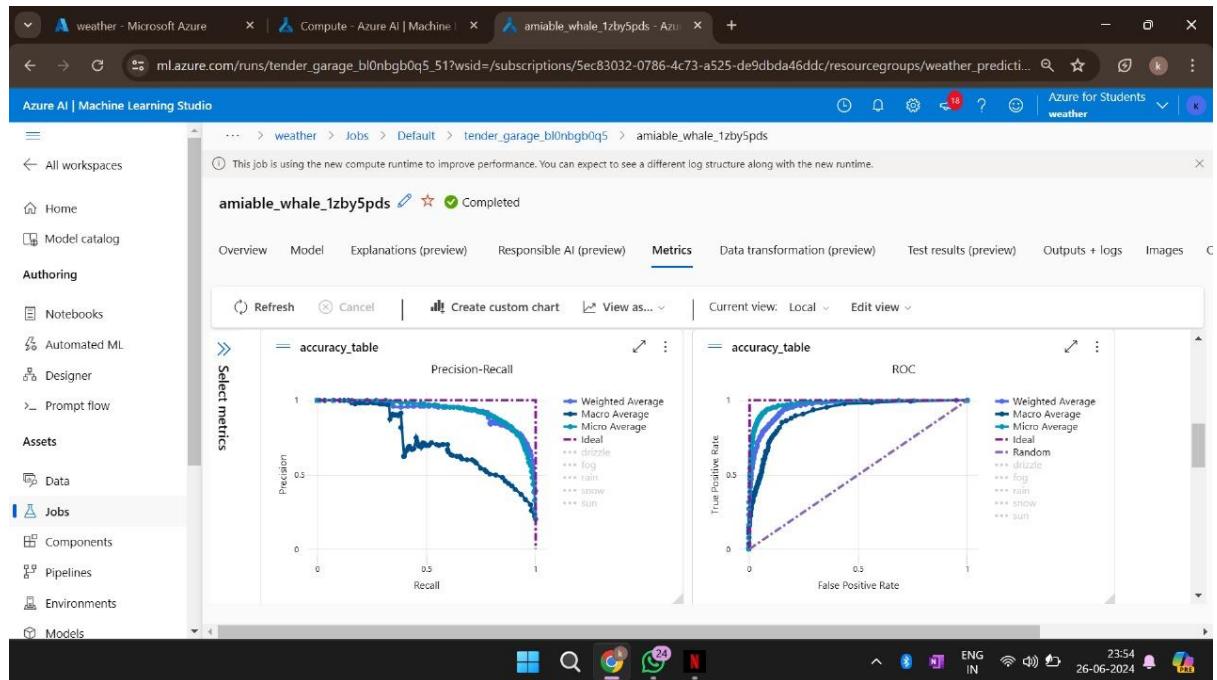
This screenshot is similar to the previous one, showing the same Azure AI | Machine Learning Studio interface. The "Explanations (preview)" tab is still selected for the completed job "amiable_whale_1zby5pds". However, a new modal window titled "Test results (preview)" is now open, indicating a "Success: Test model run successfully created". The main interface below shows the "Explanation ..." section and the "Explainer: mimic.lightgbm" details.

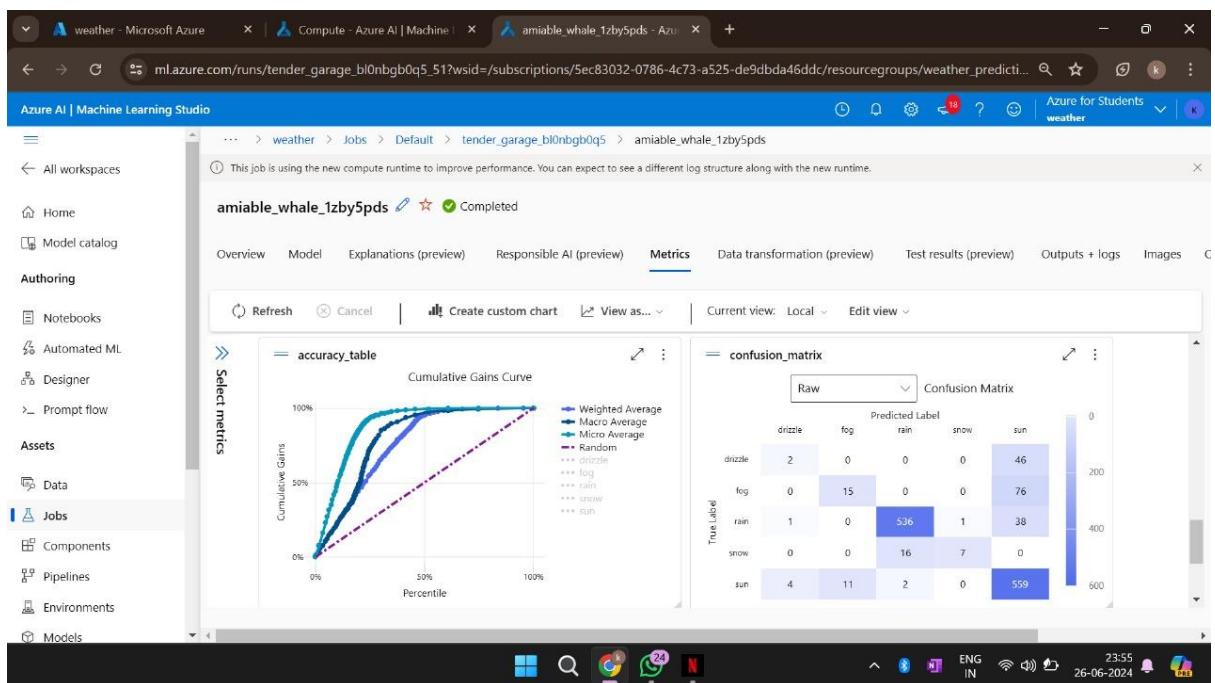
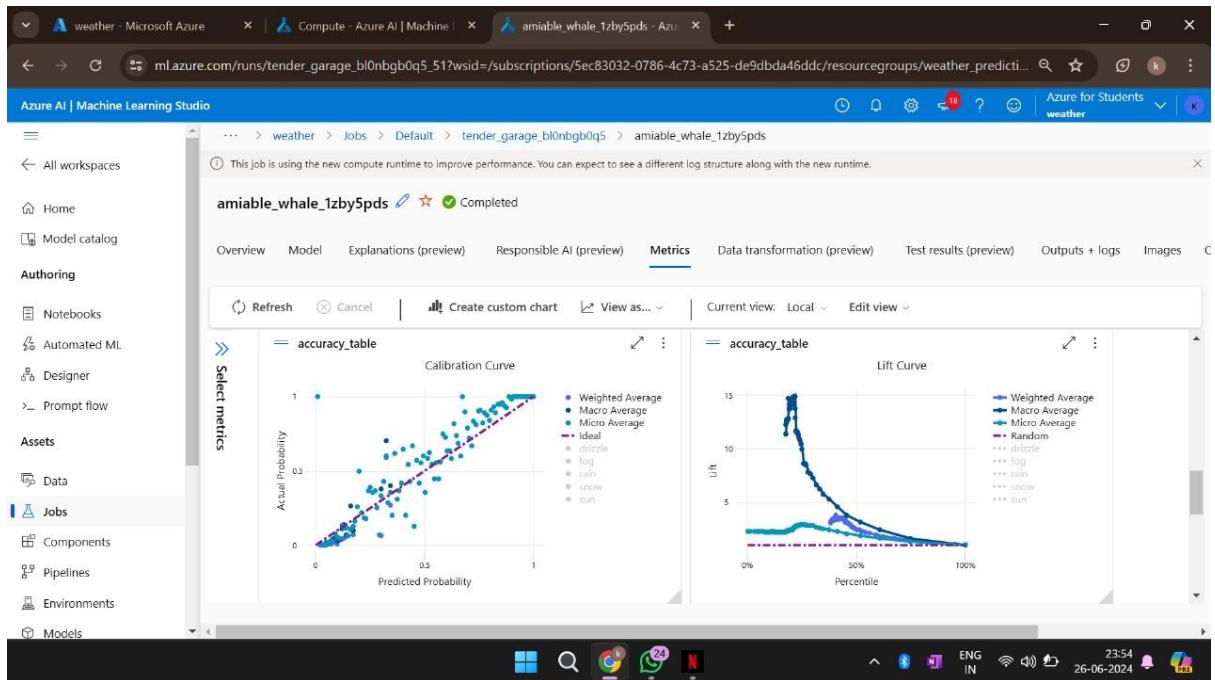
8. Previewing

a) Explanations:



b) Metrics:





The screenshot shows two identical views of the Azure AI | Machine Learning Studio interface, both displaying the 'Metrics' tab for a completed job run named 'amiable_whale_1zby5pds'. The top view shows a grid of various performance metrics with their corresponding values. The bottom view shows a detailed breakdown of the 'accuracy_table' and 'confusion_matrix' metrics.

Metrics View (Top Screenshot):

Metric	Value
accuracy	0.8515982
AUC_macro	0.9375289
AUC_micro	0.9778031
AUC_weighted	0.9562999
average_precision_score	0.6673424
average_precision_score_weighted	0.9312443
balanced_accuracy	0.8768491
f1_score_macro	0.5016608
f1_score_micro	0.5276283
f1_score_weighted	0.8515982
log_loss	0.8220469
	0.4652823

Table Metrics View (Bottom Screenshot):

Percentile thresholds	0.01226838908452374
drizzle(True Positive)	48
drizzle(False Positive)	1266
drizzle(True Negative)	0
drizzle(False Negative)	0
fog(True Positive)	91
fog(False Positive)	1223

	confusion_matrix
	drizzle
drizzle	2
fog	0
rain	1
snow	0
sun	4

9. Deploy Automated ML job

The screenshot shows the Azure AI | Machine Learning Studio interface. The left sidebar has sections for All workspaces, Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Jobs, Components, Pipelines, Environments, Models), and Models. The main content area is titled 'tender_garage_b10nbgb0q5' and shows the 'Overview' tab selected. It displays various metrics and details about the run, including:

- Compute duration: 53m 13.19s
- Compute target: kanika22csu1981
- Name: tender.garage_b10nbgb0q5
- Script name: --
- Created by: kanika22csu1981
- Job type: Automated ML
- Experiment: Default

A sidebar on the right titled 'Best model summary' provides more detailed information about the ensemble model:

- Algorithm name: VotingEnsemble
- Ensemble details: View ensemble details
- AUC weighted: 0.95630 (View all other metrics)
- Sampling: 100.00 %
- Registered models: tendergarageb1051:1
- Deploy status: No deployment yet

The bottom of the screen shows the Windows taskbar with icons for File Explorer, Search, Task View, and Google Chrome.

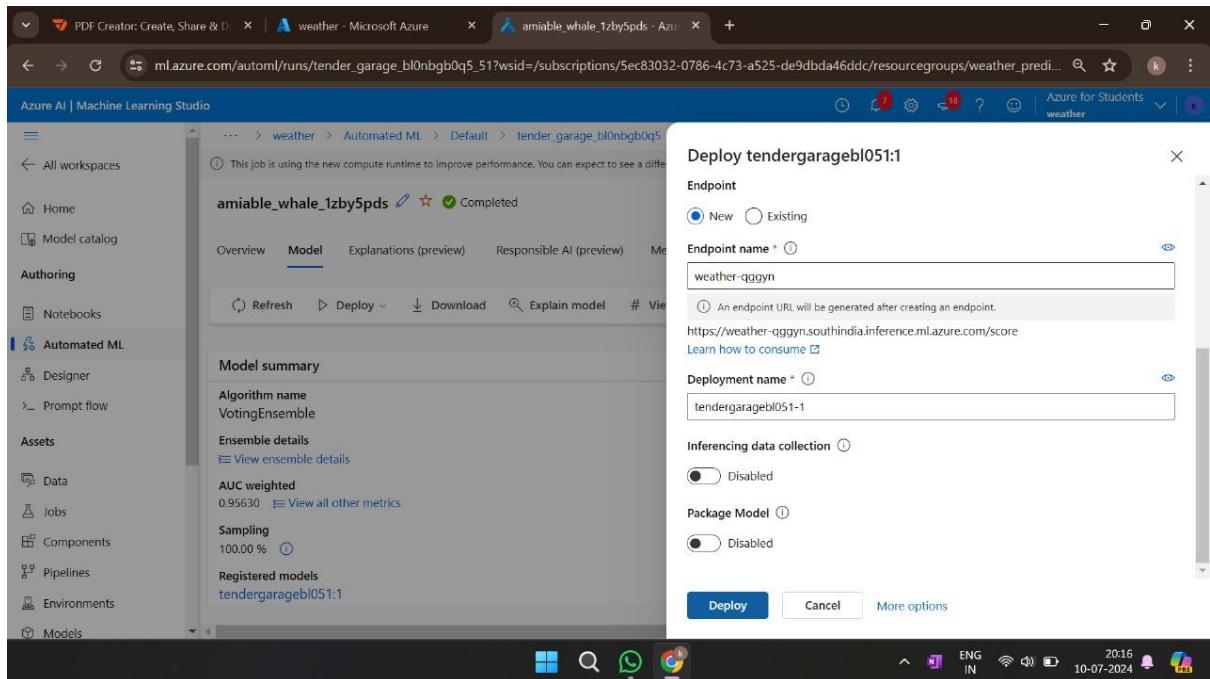
a)

This screenshot shows the same interface as above, but with the 'Model' tab selected in the navigation bar. A message at the top states: "This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime." The 'Model' tab has several options: Refresh, Deploy, Download, Explain model, View generated code, Test model (preview), Register model, Cancel, and a three-dot menu. Below these options, the 'Model summary' section is expanded, showing:

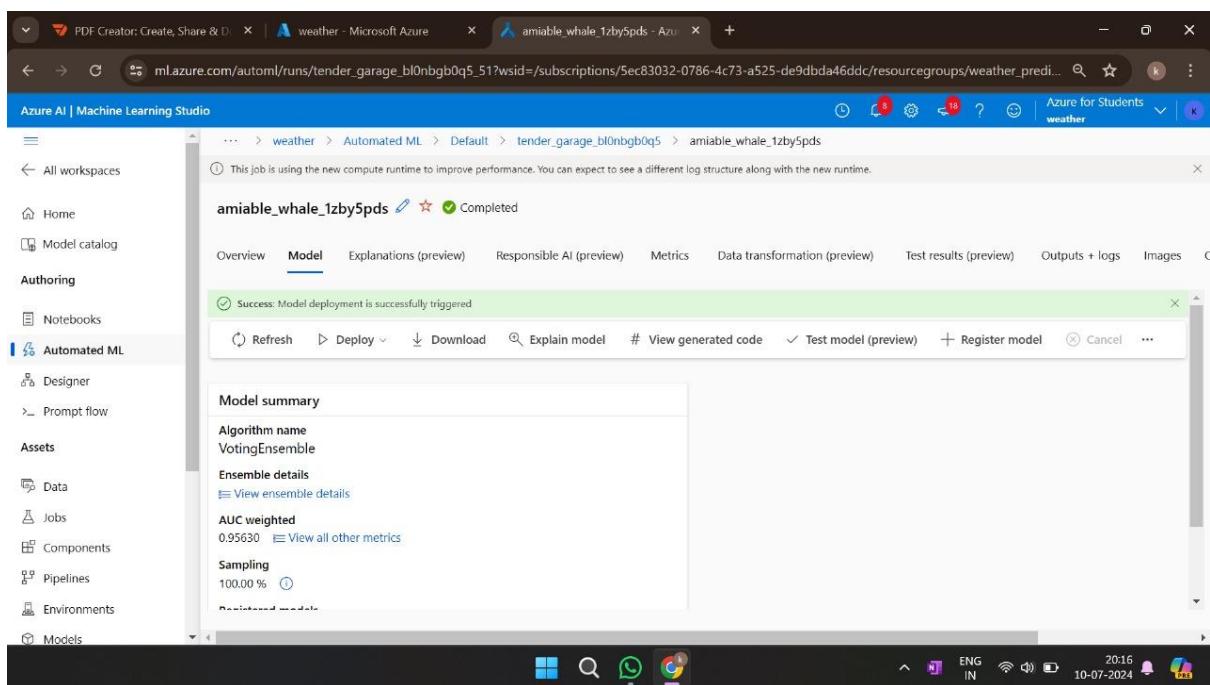
- Real-time endpoint: Deploy the model using the real-time endpoint wizard
- Algorithm name: VotingEnsemble
- Batch endpoint: Deploy the model using the batch endpoint wizard
- Ensemble detail: View ensemble
- AUC weighted: 0.95630 (View)
- Sampling: 100.00 %
- Registered models: tendergarageb1051:1

The rest of the interface is identical to the previous screenshot, including the sidebar and taskbar.

b)



c)



10. Consume real-time end points created

The screenshot shows the Azure AI | Machine Learning Studio interface. In the top navigation bar, there are tabs for PDF Creator, weather - Microsoft Azure, and Endpoints - Azure AI | Machine. The main content area is titled "Endpoints" and shows a list of endpoints under the "Real-time endpoints" tab. There is one endpoint listed:

Name	Description	Quota type	Created on	Created by	Updated on
weather-xezdq		Dedicated	Jul 10, 2024 12:59 PM	kanika22csu198	Jul 10, 2024 12:59 PM

The left sidebar contains sections for All workspaces, Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, Jobs, Components, Pipelines, Environments, Models), and a bottom section for Data, Jobs, Components, Pipelines, Environments, and Models.

a)

The screenshot shows the Azure AI | Machine Learning Studio interface, specifically the consumption settings for the "weather-xezdq" endpoint. The top navigation bar includes PDF Creator, weather - Microsoft Azure, and Endpoints - Azure AI | Machine. The main content area is titled "weather-xezdq" and shows the "Consumption" tab selected. The "Basic consumption info" section displays the REST endpoint as "https://weather-xezdq.southindia.inference.ml.azure.com/score". The "Authentication" section shows two key fields: "Primary key" and "Secondary key", each with an "Regenerate" button. The "Consumption option" section includes a "Consumption types" section with radio buttons for "JavaScript", "Python", "C#", and "R".

b)

The screenshot shows the Azure AI | Machine Learning Studio interface. On the left, the navigation sidebar includes 'All workspaces', 'Home', 'Model catalog', 'Authoring' (selected), 'Notebooks' (selected), 'Automated ML', 'Designer', 'Prompt flow', 'Assets', 'Data', 'Jobs', 'Components', 'Pipelines', 'Environments', 'Models', and 'Endpoints'. The main area displays a Jupyter Notebook titled 'Untitled.ipynb'. The notebook contains the following Python code:

```
1 import requests
2 import json
3
4 url = "https://weather-xezdq.southindia.inference.ml.azure.com/score"
5 headers = {
6     'Content-Type': 'application/json',
7     'Authorization': 'Bearer IidxPSPwQJUUbRg5P30c1T4gZKKy073'
8 }
9
10 data = [
11     {
12         "date": "06-01-2012",
13         "precipitation": 2.5,
14         "temp_max": 4.4,
15         "temp_min": 2.2,
16         "wind": 2.2
17     }
18 ]
```

The notebook status bar indicates it was last saved 2 minutes ago. The system tray at the bottom right shows the date as 10-07-2024.

c)

The screenshot shows the continuation of the Jupyter Notebook from the previous image. The code has been executed, and the output is displayed in the notebook cells:

```
11     ]
12     }
13 }
```

```
1 input_data = json.dumps(data)
2 response = requests.post(url, data=input_data, headers=headers)
3 print(response.json())
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