

Building and Deploying a machine learning model-

1. Create and Deploy a machine learning workspace with the details.

Azure Machine Learning ...
Create a machine learning workspace

Basics Networking Encryption Identity Tags Review + create

Resource details

Every workspace must be assigned to an Azure subscription, which is where billing happens. You use resource groups like folders to organize and manage resources, including the workspace you're about to create.
[Learn more about Azure resource groups](#)

Subscription * ⓘ Azure for Students

Resource group * ⓘ BUS5001
[Create new](#)

Workspace details

Configure your basic workspace settings like its storage connection, authentication, container, and more. [Learn more](#)

Name * ⓘ Automl-your_21454877 ✓

Region * ⓘ Australia East

Storage account * ⓘ (new) automlyour21451258005342
[Create new](#)

Key vault * ⓘ (new) automlyour21452493090676

[Review + create](#) < Previous Next : Networking

2. Select Go to resource once the deployment is complete-

Microsoft.MachineLearningServices | Overview ...
Deployment

Search < Delete Cancel Redeploy Download Refresh

Overview

✓ Your deployment is complete

Deployment name : Microsoft.MachineLearningServices
Subscription : Azure for Students
Resource group : BUS5001

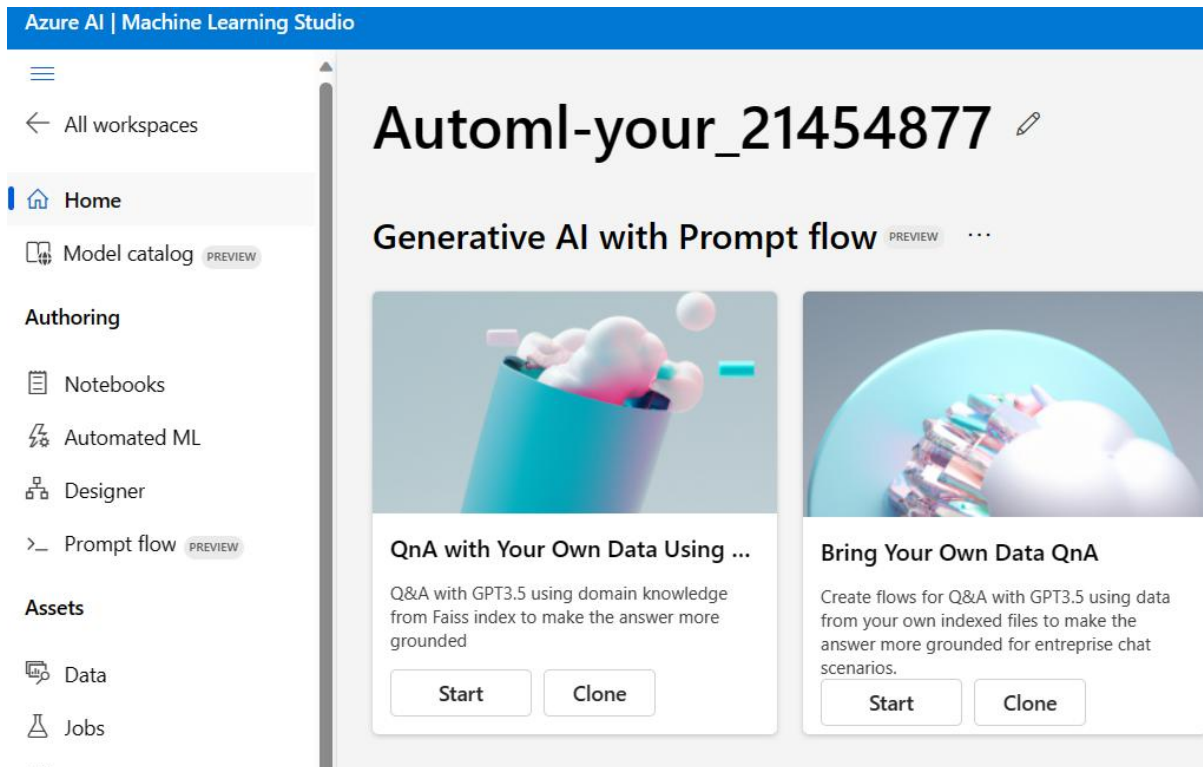
Start time : 11/11/2023, 3:53:27 PM
Correlation ID : b79dc07e-1a6f-4680-aef2-41524d750963

> Deployment details

▼ Next steps

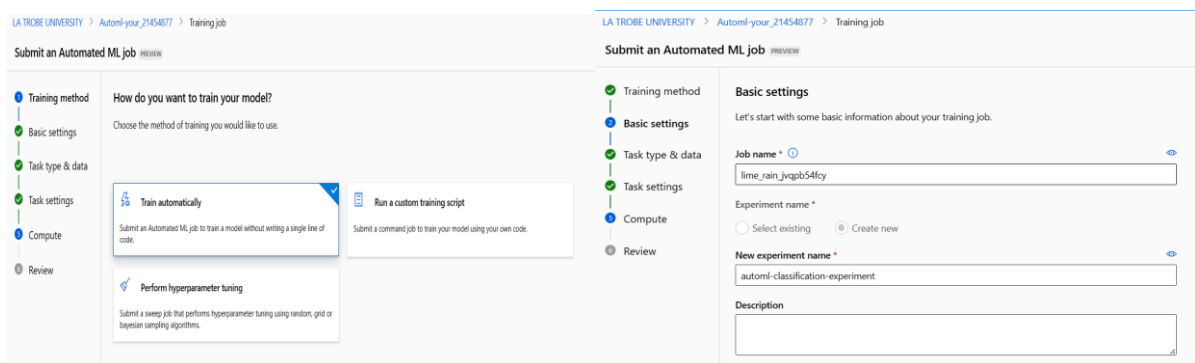
[Go to resource](#)

3. Under the machine learning studio, select AutomatedML on the left pane of the page.



4. Create a new Automated job and select the options as seen below-

- Training method- Train automatically, Click next
- Basic Settings- Add the experiment name, the job name will be filled automatically
- Task & Type data- Select as classification and add the bankmarketing_train csv file
- Select the target as y and under Valid & test select k-fold cross validation and number of cross validations as 2.
- Under Compute, select Compute instance and create a Compute Instance



LA TROBE UNIVERSITY > Automl-your_21454877 > Training job

Submit an Automated ML job PREVIEW

- Training method
- Basic settings
- Task type & data**
- Task settings
- Compute
- Review

Task type & data

Choose the type of task that you would like your model to perform and the dataset to use for training. [Learn more?](#)

Select task type *

Select dataset

Make sure your data is preprocessed into a supported format.

[+ Create](#) [Refresh](#) [Show supported data assets only](#)

Name	Type	Created on	Modified on
bankmarketing_train	Table	Nov 11, 2023 7:13 PM	Nov 11, 2023 7:13 PM

Task settings

Task type: Classification

Dataset: [bankmarketing_train \(View dataset\)](#)

Target column *

Classification settings

☐ Enable deep learning

[View additional configuration settings](#) [View featurization settings](#)

Limits

Validate and test

You can choose a validation type and select a test dataset as an optional step.

[Back](#) [Next](#)

LA TROBE UNIVERSITY > Automl-your_21454877 > Training job

Submit an Automated ML job PREVIEW

- Training method
- Basic settings
- Task type & data
- Task settings
- Compute**
- Review

Compute

Select and configure the compute resource for executing your training job.

Select compute type

Select Azure ML compute instance *

No compute instances found

[+ New](#)

Validate and test

You can choose a validation type and select a test dataset as an optional step.

Validation type

Number of cross validations *

Test dataset

Create compute instance

- Required settings**
- Scheduling optional
- Security optional
- Applications optional
- Tags optional
- Review

Compute name *

Virtual machine type ☒ CPU ☐ GPU

Virtual machine size ☒ Select from recommended options ☐ Select from all options

Name ↑	Category	Workload types	Available quota	Cost
<input type="radio"/> Standard_DS11_v2 2 cores, 14GB RAM, 28GB storage	Memory optimized	Development on Notebooks (or other IDE) and light weight testing	6 cores	\$0.20/hr
<input type="radio"/> Standard_DS3_v2 4 cores, 14GB RAM, 28GB storage	General purpose	Classical ML model training on small datasets	6 cores	\$0.34/hr
<input checked="" type="radio"/> Standard_E4ds_v4 4 cores, 32GB RAM, 150GB storage	Memory optimized	Data manipulation and training on medium-sized datasets (1-10GB)	4 cores	\$0.35/hr
<input type="radio"/> Standard_E4s_v2	Compute optimized	Data manipulation and training on large datasets (1-10GB)	16 cores	\$0.72/hr

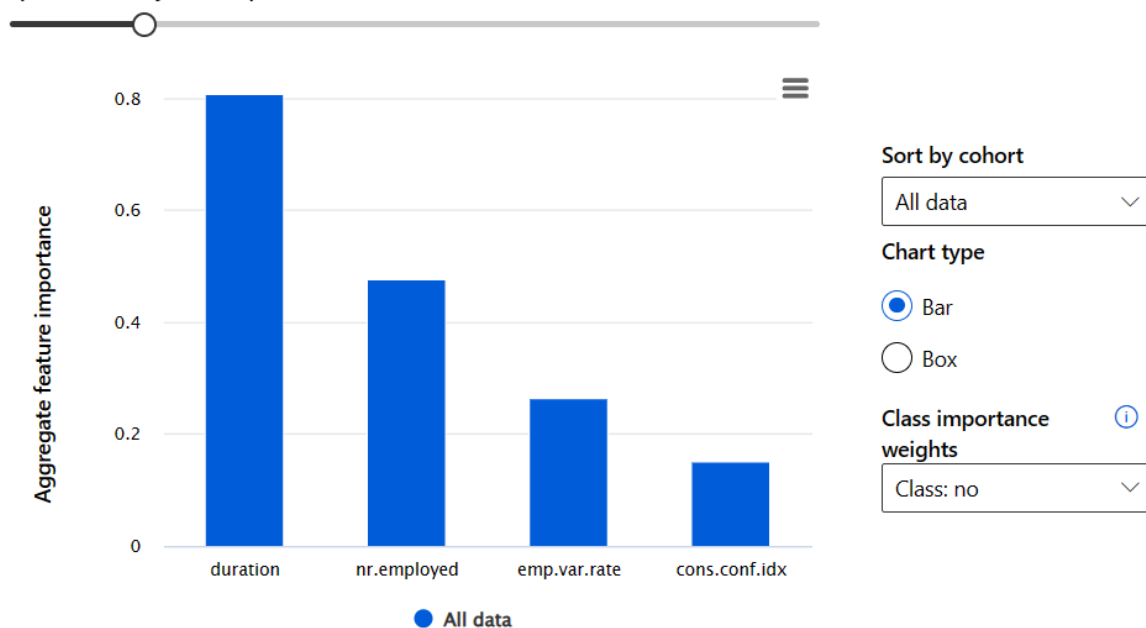
[Review + Create](#) [Back](#) [Next](#) [Cancel](#)

- Now click on Review and submit the job. Now wait for approximately 2 hours for the job to run and complete. Once the job is completed, we need to explore the models and describe how to select the best models.
- To evaluate the models, Azure calculates the weighted AUC and selects the best model. In this case, we see that the VotingEnsemble is the best algorithm with a weighted AUC of 0.94829 and a 100% sampling.

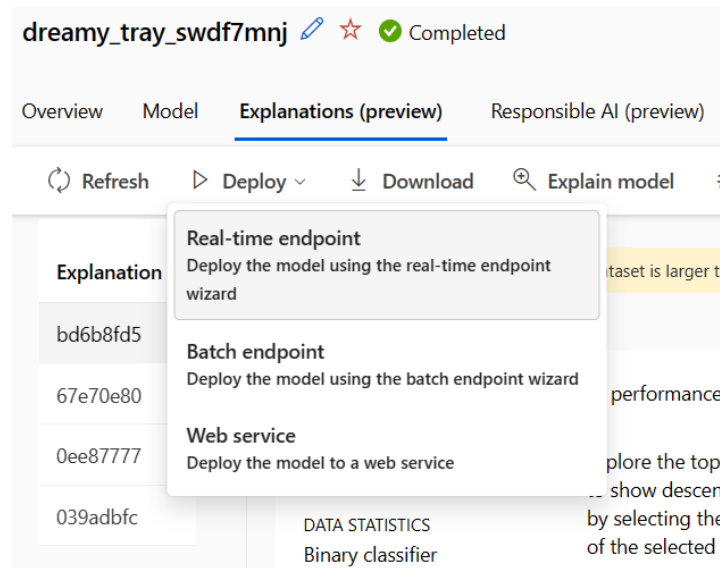
Algorithm name	Explained	Responsible AI	AUC weighted ↓
VotingEnsemble	View explanation	View responsible AI dashboard	0.94829
SparseNormalizer, XGBoostClassifier			0.94632
MaxAbsScaler, LightGBM			0.94606
StandardScalerWrapper, XGBoostClassifier			0.94593
SparseNormalizer, LightGBM			0.94593

7. On selecting the model, we can analyse the most important variables to be the duration, employed, variance rate and confidence index that's provided in the data.

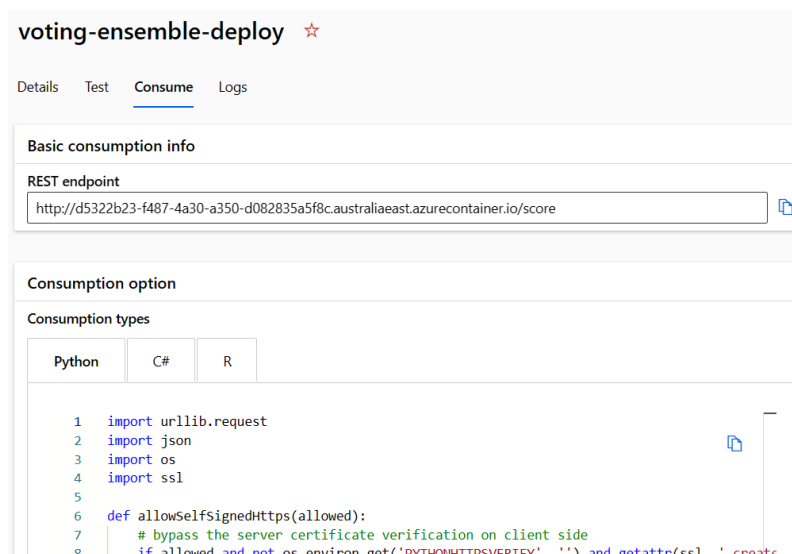
Top 4 features by their importance



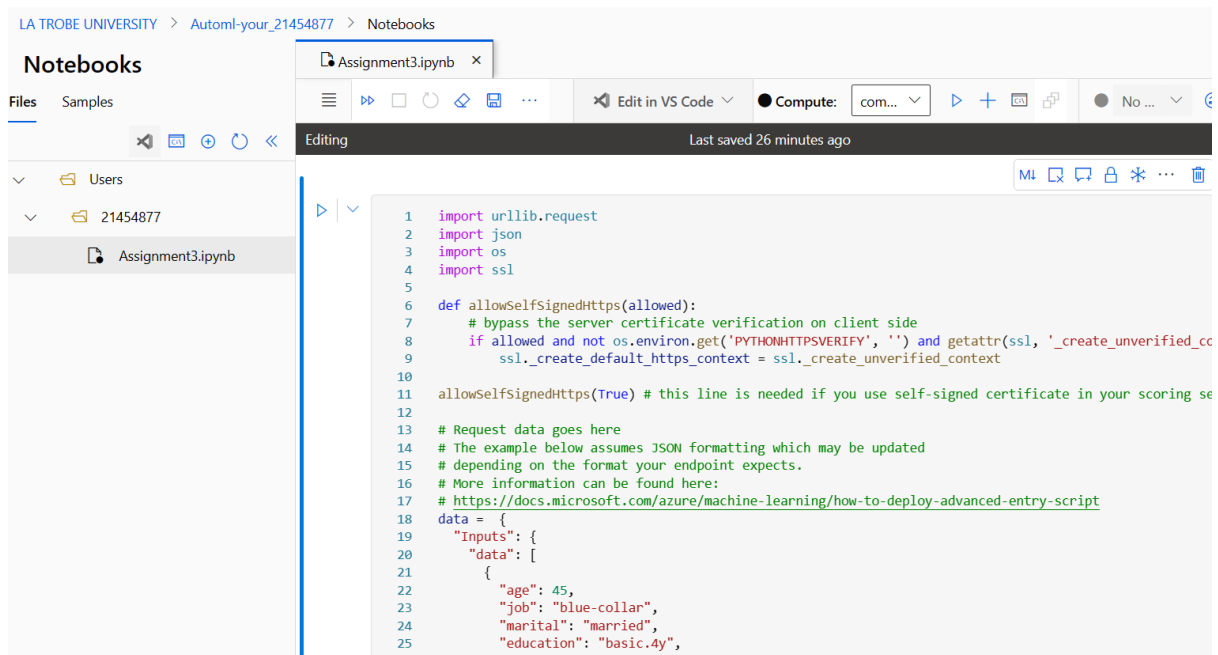
8. Now this model needs to be deployed, in order to deploy, open the selected model and click on Deploy> Real time endpoint and wait for 15 minutes for the model to deploy.



9. Now use this deployed model to classify the unknown data. To predict unknown data, click on the Endpoints option on the left pane. Under real time endpoints, we can see our selected model deployed. Open this model and select the Consume menu.
10. The python code to use for classification can be seen below, copy this python code for further use-



11. Select notebooks on the left pane and create a new notebook. Now create a new ipynb notebook and paste the code.



12. Replace the values in the data with the data provided in the classify file. Upon running each value, we get the predictions as below-

campaign.id	age	y
1501	41	Yes
1502	60	No
1502	35	No
1502	50	No
1502	50	No
1502	45	No

Benefits of no-code AutoML-

- **Saving resources-** AutoML accelerates the workflow as it allows the data scientists to spend more time on solving more complex problems rather than focusing on repetitive tasks. It increases their efficiency and thus reduces the time and capital needed to build the models.
- **Easy to implement-** AutoML makes machine learning accessible to broader audience. It can be used by business analysts and non technical users to analyze and predict the data they have. This democratizes the process and people with minimal coding experience can collaborate and innovate across teams. *(The complete list of pros and cons of Automl 2023)*

Drawbacks of no-code AutoML-

- **Lack of Control-** The models are created by data scientists in Azure and thus the data scientists of an organization won't have enough information about the running of the algorithm or fine tuning it for better results.

No domain specific knowledge- Prediction of outcomes greatly depends on the domain specific knowledge. These models make predictions just based on the data that is provided to them which is a smaller sample compared to the entire data. Still there are multiple factors that require a domain knowledge, which a no-code Automl lacks.