

CHALLENGE 3

AZURE MACHINE LEARNING

AI INFRASTRUCTURE AND ARCH.

Samrat Thapa -- 200481763

CREATING AZURE MACHINE LEARNING RESOURCE

Azure Machine Learning - Micro... AI_Infrastructure - Microsoft Az... +

portal.azure.com/#create/Microsoft.MachineLearningServices

Imported From IE (2) FASTEST Way to... conversational AI ethics Georgian College... YouTube Inbox (45) - hamrat... math Data Connectors... AI for decision mak... machine learning fr... vision system SKINOPATHY AI Infra. - AWS Other bookmarks

Microsoft Azure Search resources, services, and docs (5+)

200503303@student.ge... GEORGIAN COLLEGE (GEORGIAN...

Home > Create a resource > Marketplace > Azure Machine Learning >

Azure Machine Learning

Create a machine learning workspace

Basics Networking Advanced 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 * AI_Infrastructure [Create new](#)

Workspace details

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

Workspace name * machinelearning-samrat

Region * North Central US

Storage account * (new) machinelearnin4261402581 [Create new](#)

Key vault * (new) machinelearnin6037230918 [Create new](#)

Application insights * (new) machinelearnin4988145474 [Create new](#)

Container registry * None [Create new](#)

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

Microsoft.MachineLearningServices | Overview

Deployment

Search

DeleteCancelRedeployDownloadRefresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name: Microsoft.MachineLearningServices

Subscription: Azure for Students

Resource group: AI_Infrastructure

Start time: 11/12/2022, 1:38:39 PM

Correlation ID: 1b6475f9-0702-40ca-b4b7-33fceb8c8a3c

Deployment details

Resource	Type	Status	Operation details
✓ machinelearning-samrat	Microsoft.MachineLearningServices/workspaces	OK	Operation details
✓ machinelearn4261402561	Microsoft.Storage/storageAccounts	OK	Operation details
✓ machinelearn6037230918	Microsoft.KeyVault/vaults	OK	Operation details
✓ machinelearn4988145474	Microsoft.Insights/components	OK	Operation details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

Cost Management

Get notified to stay within your budget and prevent unexpected charges on your bill.

Set up cost alerts >

Microsoft Defender for Cloud

Secure your apps and infrastructure

Go to Microsoft Defender for Cloud >

Free Microsoft tutorials

Start learning today >

Work with an expert

Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.

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AZURE MACHINE LEARNING PORTAL

The screenshot displays the Microsoft Azure Machine Learning Studio web interface. The browser's address bar shows the URL: `ml.azure.com/7lid=da9a94b6-4681-49bc-bd7c-bab9eac0ad3c&wsid=/subscriptions/6c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-samrat`. The page title is "Microsoft Azure Machine Learning Studio".

Left Navigation Panel:

- Georgian College
- New
- Home
- Assets
 - Notebooks
 - Automated ML
 - Designer
 - Data
 - Jobs
 - Components
 - Pipelines
 - Environments
 - Models
 - Endpoints
- Manage
 - Compute
 - Linked Services
 - Data Labeling

Main Content Area:

The workspace is titled "machinelearning-samrat". It features four primary action cards:

- Create new:** Represented by a plus icon and a dropdown arrow.
- Notebooks:** "Code with Python SDK and run sample experiments." Includes a "Start now" button.
- Automated ML:** "Automatically train and tune a model using a target metric." Includes a "Start now" button.
- Designer:** "Drag-and-drop interface from prepping data to deploying models." Includes a "Start now" button.

Recent resources:

Below the action cards, there is a section for "Recent resources" with tabs for "Jobs", "Compute", "Models", and "Data". The "Jobs" tab is active, showing a table with columns: "Display name", "Experiment", "Status", "Logs", "Submitted time", "Submitte...", and "Job type". The table is currently empty, displaying a message: "No jobs to display" with a folder icon. A "View all jobs" link with a right arrow is located at the bottom right of the table.

Documentation:

At the bottom, there is a "Documentation" section with tabs for "Learning components", "Tutorials", and "Additional resources". The "Learning components" tab is selected.

machinelearning-samrat - Micro...Compute - Microsoft Azure Mac...AI Infrastructure - Microsoft Az...

ml.azure.com/compute/list?wsid=/subscriptions/9c1bcaa6-91ae-435f-9dc6-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-samrat&tid=da9a94b6-4681-49bc-bd7e...

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Microsoft Azure Machine Learning Studio

Search within your workspace (preview)This workspace

Azure for Studentsmachinelearning-samrat

Georgian Collegemachinelearning-samrat

Compute

Compute instancesCompute clustersInferen...

Create compute instance

Required Settings

Advanced Settings

Configure required settings

Select the name and virtual machine size you would like to use for your compute instance. Please note that a compute instance can not be shared. It can only be used by a single assigned user. By default, it will be assigned to the creator and you can change this to a different user in the advanced settings section.

Compute name *

mlsamrat

Location

northcentralus

Virtual machine type

CPU

GPU

Virtual machine size

Select from recommended options

Select from all options

Add filter

Search by VM name...

Showing 1 of 153 VM sizes | Current selection: Standard_DS2_v2

Name	Category	Available quota	Cost
Standard_DS2_v2 2 cores, 708 RAM, 14GB storage	General purpose	6 cores	\$0.15/hr

Create

Back

Next: Advanced Settings

Cancel

Training Regression Problem

The screenshot displays the Microsoft Azure Machine Learning Studio interface. The top navigation bar shows the workspace name 'machinelearning-samrat' and the 'Notebooks' section. The left sidebar contains a navigation menu with options like 'New', 'Home', 'Notebooks', 'Automated ML', 'Designer', 'Assets', 'Data', 'Jobs', 'Components', 'Pipelines', 'Environments', 'Models', 'Endpoints', 'Manage', 'Compute', 'Linked Services', and 'Data Labeling'. The main area shows a notebook titled 'regression-automated-ml.ipynb' under the 'Files' tab. The notebook content includes a copyright notice, a title 'Tutorial: Use automated machine learning to predict taxi fares', an introduction paragraph, a list of tasks, a prerequisite section, and a note about the tutorial's availability on GitHub.

Copyright (c) Microsoft Corporation. All rights reserved.

+ Code + Markdown

Tutorial: Use automated machine learning to predict taxi fares

In this tutorial, you use automated machine learning in Azure Machine Learning service to create a regression model to predict NYC taxi fare prices. This process accepts training data and configuration settings, and automatically iterates through combinations of different feature normalization/standardization methods, models, and hyperparameter settings to arrive at the best model.

In this tutorial you learn the following tasks:

- Download, transform, and clean data using Azure Open Datasets.
- Train an automated machine learning regression model.
- Calculate model accuracy.

If you don't have an Azure subscription, create a free account before you begin. Try the [free](#) or [paid](#) version of Azure Machine Learning service today.

Prerequisites

- Complete the [setup tutorial](#) if you don't already have an Azure Machine Learning service workspace or notebook virtual machine.
- After you complete the setup tutorial, open the [tutorials/regression-automated-ml.ipynb](#) notebook using the same notebook server.

This tutorial is also available on [GitHub](#) if you wish to run it in your own local environment.

machinelearning-samrat - Micro...Notebooks - Microsoft Azure M...AI Infrastructure - Microsoft Az...+
ml.azure.com/fileexplorer?wsid=/subscriptions/Bc1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-samrat&tid=da9a94b6-4681-49bc-b...
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Microsoft Azure Machine Learning Studio
Search within your workspace (preview)This workspace
Georgian College > machinelearning-samrat > Notebooks
Notebooks
FilesSamples
Users
200503303
regression-automl-nyc-taxi-data
regression-automated-ml.ipynb
regression-automated-ml.yml
New
Home
Author
Notebooks
Automated ML
Designer
Assets
Data
Jobs
Components
Pipelines
Environments
Models
Endpoints
Manage
Compute
Linked Services
Data Labeling

regression-automate Xregression-automate X
Edit in VS Code (pr...Compute instance: mlsamrat - RunningPython 3.8 - AzureML
mlsamrat - Kernel busy CPU: 0% RAM: 6%Last saved a few seconds agoPython 3.8 - AzureML

Create a workspace object from the existing workspace. A `Workspace` is a class that accepts your Azure subscription and resource information. It also creates a cloud resource to monitor and track your model runs. `Workspace.from_config()` reads the file `config.json` and loads the authentication details into an object named `ws`. `ws` is used throughout the rest of the code in this tutorial.

```
1 from azureml.core.workspace import Workspace
2 ws = Workspace.from_config()
```

[*] 3 min 4 sec - Running

To sign in, use a web browser to open the page <https://microsoft.com/device/login> and enter the code `ECM4ZT8UV` to authenticate.

Split the data into train and test sets

Split the data into training and test sets by using the `train_test_split` function in the `scikit-learn` library. This function segregates the data into the `x (features)` data set for model training and the `y (values to predict)` data set for testing. The `test_size` parameter determines the percentage of data to allocate to testing. The `random_state` parameter sets a seed to the random generator, so that your train-test splits are deterministic.

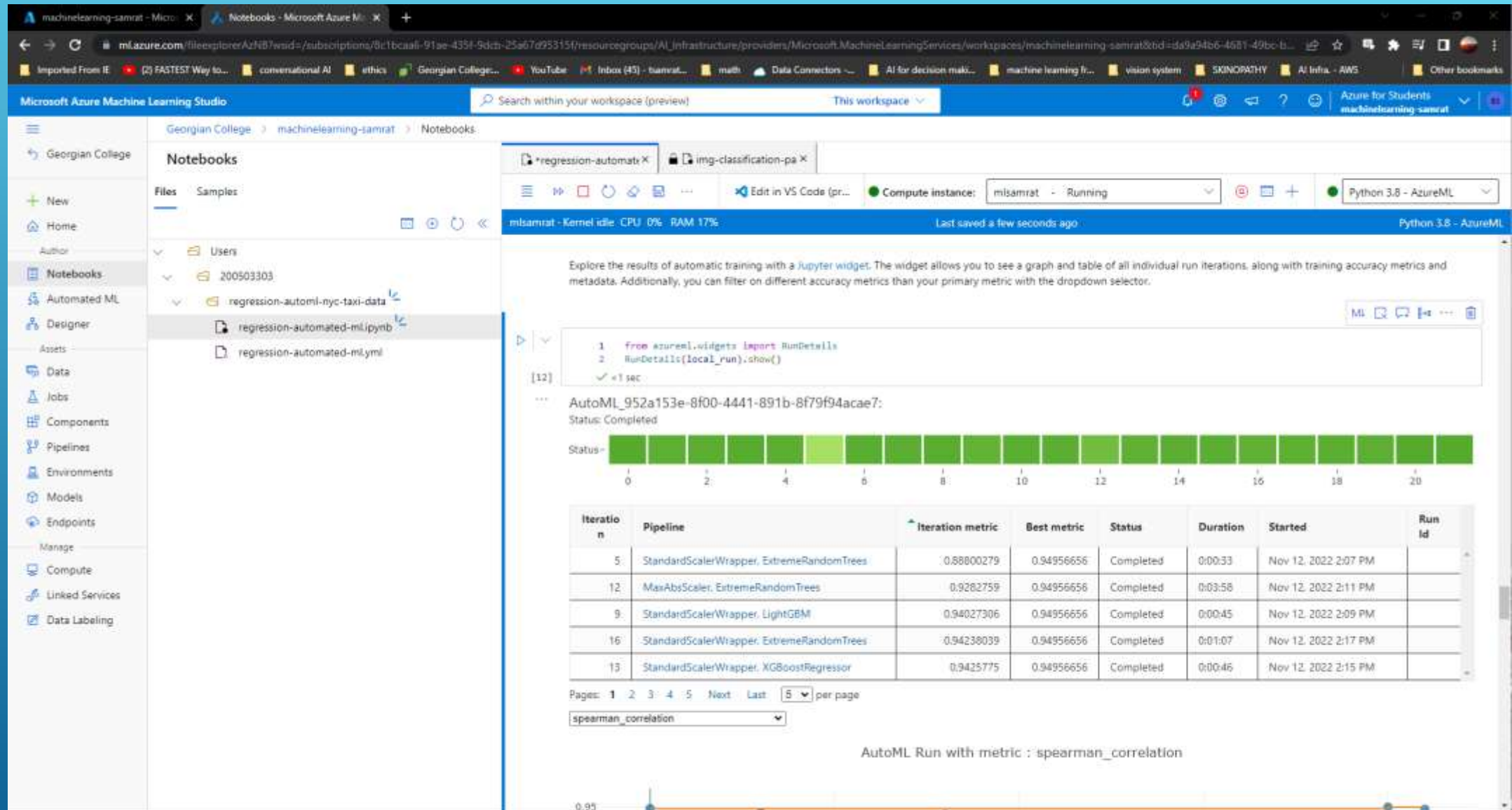
```
1 from sklearn.model_selection import train_test_split
2
3 x_train, x_test = train_test_split(final_df, test_size=0.2, random_state=223)
```

[*] Queued

The purpose of this step is to have data points to test the finished model that haven't been used to train the model, in order to measure true accuracy.

In other words, a well-trained model should be able to accurately make predictions from data it hasn't already seen. You now have data prepared for auto-training a machine learning model.

TRAINING RESULT



machinelearning-samrat - Micro

Notebooks - Microsoft Azure Ma

Jobs - Microsoft Azure Machine L

+

mlazure.com/runs?wsid=/subscriptions/8c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft.MachineLearningServices/workspaces/machinelearning-samrat&tid=da9a94b6-4681-49bc-bd7c-bab9eac...

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Microsoft Azure Machine Learning Studio

Search within your workspace (preview) This workspace

Georgian College

machinelearning-samrat

Jobs

Jobs

All experiments All jobs

Initial chart load: Charts displayed are rendered from the first five jobs, until you make selection of the charts you'd like to see.

Create job (preview) Add chart Refresh Compare (preview) Edit columns Cancel Delete

Current view: default Save view Edit view Share view

Search

Status Created by Include child jobs View only my jobs All filters Clear all

Running: 0 Completed: 1 Failed: 0 Canceled: 0 Queued: 0 Other: 0

Add a new chart

Show only selected rows (0 selected) Page Size: 25

Display name	Experiment	Status	Created on	Duration	Created by	Compute target	Job type	Tags
teal_bell_mdgn3fk4	Tutorial-NYCTaxi	Completed	Nov 12, 2022 2:02 PM	21m 14s	Babin Shrestha	local	Automate...	best_pipeline : VotingEnsemble best_score : 0.94994911808

machinelearning-samrat - Micro...

Notebooks - Microsoft Azure M...

teal_bell_mdgn3fk4 - Microsoft A...

+

← → ↺

ml.azure.com/experiments/id/2a90e24f-91cf-4239-8833-a9a9f79f9807/runs/AutoML_952a153e-8f00-4441-891b-8f79f94acae7?wsid=/subscriptions/8c1bcaa6-91ae-435f-9dc6-25a67d95315f/resourcegroups/Al_Infrastructure/providers/Micros...

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Microsoft Azure Machine Learning Studio

Search within your workspace (preview) This workspace

Georgian College

Georgian College

New

Home

Author

Notebooks

Automated ML

Designer

Assets

Data

Jobs

Components

Pipelines

Environments

Models

Endpoints

Manage

Compute

Linked Services

Data Labeling

Georgian College > machinelearning-samrat > Jobs > Tutorial-NYCTaxi > teal_bell_mdgn3fk4

teal_bell_mdgn3fk4 Completed

Overview Data guardrails Models Outputs + logs Child jobs

Refresh Edit and submit (preview) Register model Cancel Delete Compare (preview)

Properties

Status

Completed

Warning: Experiment timeout reached, hence experiment stopped.
Current experiment timeout: 0 hour(s) 18 minute(s)

[See more details](#)

Script name

--

Created by

Babin Shrestha

Job type

Automated ML

Experiment

Tutorial-NYCTaxi

Arguments

None

See all properties

Raw JSON

See YAML job definition

Job YAML

Created on

Nov 12, 2022 2:02 PM

Start time

Nov 12, 2022 2:02 PM

Duration

21m 14.09s

Compute duration

21m 14.09s

Compute target

local

Name

AutoML_952a153e-8f00-4441-891b-8f79f94acae7

Tags

best_pipeline : VotingEnsemble

best_score : 0.9499491180839128

Best model summary

Algorithm name

VotingEnsemble

Ensemble details

[View ensemble details](#)

Spearman correlation

0.94995 [View all other metrics](#)

Sampling

100.00 %

Registered models

No registration yet

Deploy status

No deployment yet

Run summary

Task type

Regression [View configuration settings](#)

Featurization

Auto

Primary metric

Spearman correlation

Experiment name

Tutorial-NYCTaxi

machinelearning-samrat - Micro

Notebooks - Microsoft Azure ML

teal_bell_mdgn3fk4 - Microsoft

mlazure.com/experiments/id/2a90e24f-91cf-4239-b833-a9a9f79f9807/runs/AutoML_952a153e-8f00-4441-891b-8f79f94acae77?wid=.../subscriptions/8c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Micros...

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Microsoft Azure Machine Learning Studio

Search within your workspace (preview) This workspace

Georgian College

machinelearning-samrat

Jobs

Tutorial-NYCTaxi

teal_bell_mdgn3fk4

teal_bell_mdgn3fk4

Completed

Overview Data guardrails Models Outputs + logs Child jobs

Refresh Edit and submit (preview) Register model Cancel Delete Deploy Download Explain model View generated code Edit columns Reset view

Search

Created on All filters Clear all

Showing 1-22 of 22 models

Page size: 25

Algorithm name	Explained	Spearman corr...	Sampling	Created on	Duration	Hyperparameter
VotingEnsemble		0.94995	100.00 %	Nov 12, 2022 2:22 PM	43s	algorithm : [LightGBM, XGBoost] ...
MaxAbsScaler, LightGBM		0.94957	100.00 %	Nov 12, 2022 2:03 PM	37s	min_data_in_leaf : 20 ...
StackEnsemble		0.94937	100.00 %	Nov 12, 2022 2:23 PM	44s	algorithm : [LightGBM, XGBoost] ...
StandardScalerWrapper, XGBoostRegressor		0.94831	100.00 %	Nov 12, 2022 2:05 PM	43s	booster : gbtree colsample_byl... ..
StandardScalerWrapper, LightGBM		0.94788	100.00 %	Nov 12, 2022 2:09 PM	36s	boosting_type : gbdtr colsampli... ..
StandardScalerWrapper, RandomForest		0.94691	100.00 %	Nov 12, 2022 2:07 PM	48s	bootstrap : true criterion : mse ...
StandardScalerWrapper, ElasticNet		0.94582	100.00 %	Nov 12, 2022 2:10 PM	31s	alpha : 0.05357894736842105 ...
StandardScalerWrapper, DecisionTree		0.94575	100.00 %	Nov 12, 2022 2:08 PM	34s	criterion : mse max_features ...
MaxAbsScaler, ElasticNet		0.94565	100.00 %	Nov 12, 2022 2:05 PM	31s	alpha : 0.001 l1_ratio : 1 norm ...
StandardScalerWrapper, ElasticNet		0.94564	100.00 %	Nov 12, 2022 2:17 PM	34s	alpha : 0.05357894736842105 ...
StandardScalerWrapper, ElasticNet		0.94558	100.00 %	Nov 12, 2022 2:11 PM	51s	alpha : 0.001 l1_ratio : 0.478947 ...
StandardScalerWrapper, DecisionTree		0.94550	100.00 %	Nov 12, 2022 2:16 PM	33s	criterion : friedman_mse max_fr ...

machinelearning-samrat - Micro

Notebooks - Microsoft Azure Ma

silver_curtain_dpwyg99 - Micro

ml.azure.com/experiments/id/2a90e24f-91cf-4239-8833-a9a9f79f9807/runs/AutoML_952a153e-8f00-4441-891b-8f79f94acae7_20?wsid=/subscriptions/8c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Mic...

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ethics

Georgian College...

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Inbox (45) - tsamrat...

math

Data Connectors - ...

AI for decision maki...

machine learning fr...

vision system

SKINOPATHY

AI Infra. - AWS

Other bookmarks

Microsoft Azure Machine Learning Studio

Search within your workspace (preview)

This workspace

1

?

Azure for Students

machinelearning-samrat

BS

...

>

machinelearning-samrat

>

Jobs

>

Tutorial-NYCTaxi

>

teal_bell_mdgn3fk4

>

silver_curtain_dpwyg99

silver_curtain_dpwyg99

Completed

Overview

Model

Explanations (preview)

Metrics

Data transformation (preview)

Test results (preview)

Outputs + logs

Images

Child jobs

Code

Monitoring (preview)

Refresh

Deploy

Download

Explain model

View generated code

Test model (preview)

Register model

Cancel

Delete

Select a metric to see a visualization or table of the data.

Search

☒ explained_variance

☒ mean_absolute_error

☒ mean_absolute_percentage_error

☒ median_absolute_error

☒ normalized_mean_absolute_error

☐ normalized_median_absolute_error

☐ normalized_root_mean_squared_error

☐ normalized_root_mean_squared_log_error

☐ predicted_true

☒ r2_score

☐ residuals

☐ root_mean_squared_error

☐ root_mean_squared_log_error

☐ spearman_correlation

View as:

☒ Chart

☐ Table

explained_variance	mean_absolute_error	mean_absolute_percentage_e...	median_absolute_error	normalized_mean_absolute_e...	r2_score
0.8635231	1.995536	65.26391	1.165227	0.01041022	0.8623919

machinelearning-samrat - Micro...

Notebooks - Microsoft Azure M...

silver_curtain_dpwygf99 - Micro...

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mLazure.com/experiments/cd2a9de24f-91cf-4239-8633-a9a97969807/runs/AutoML_952a153e-8f00-4441-891b-8779694cae7_20?wid=/subscriptions/8c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_infrastructure/providers/Mic...

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Microsoft Azure Machine Learning Studio

Search within your workspace (preview)This workspace

Georgian College

NewHomeAuthorNotebooksAutomated MLDesignerAssetsDataJobsComponentsPipelinesEnvironmentsModelsEndpointsManageComputeLinked ServicesData Labeling

silver_curtain_dpwygf99

Completed

OverviewModelExplanations (preview)MetricsData transformation (preview)Test results (preview)Outputs + logsImagesChild jobsCodeMonitoring (preview)

Refresh

Deploy

Download

Explain model

View generated code

Test model (preview)

Register model

Cancel

Delete

The following diagram illustrates the data preprocessing, feature engineering, scaling techniques and the machine learning algorithm that Automated ML applied to generate this particular model.

data_source - 5 col

2 col

2 col

1 col

DateTime

Categorical

Numeric

ModeCatImputer-StringCast-DateTimeTransformer

StringCast-CharGramCountVectorizer

ModeCatImputer-StringCast-LabelEncoder

MeanImputer

10 col

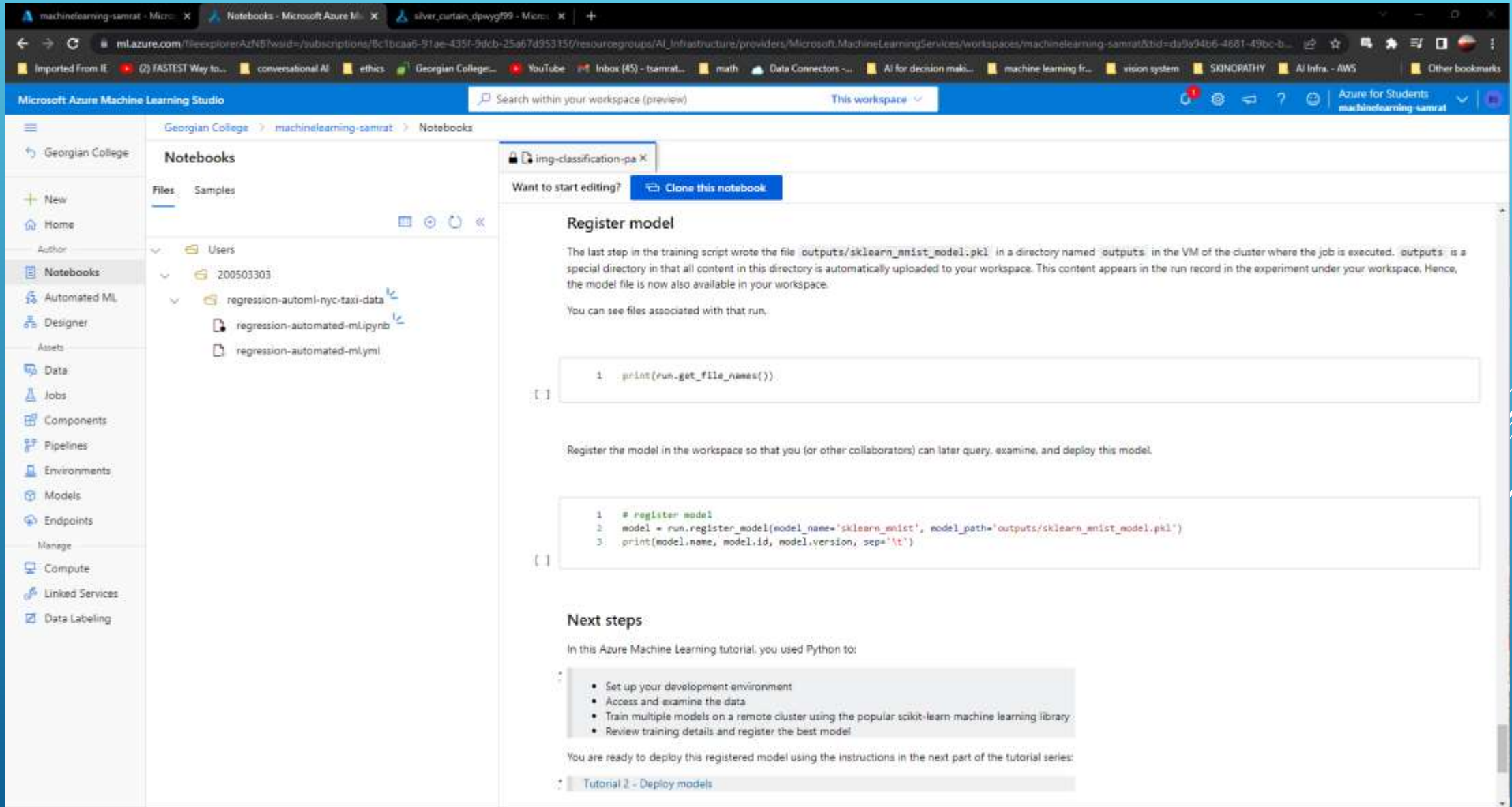
1 col

1 col

1 col

prefittedsoftvotingregressor

CHALLENGE 3.6 → TRAINING IMAGE CLASSIFIER



The screenshot displays the Microsoft Azure Machine Learning Studio interface. The left sidebar shows the navigation pane with options like 'New', 'Home', 'Notebooks', 'Automated ML', 'Designer', 'Data', 'Jobs', 'Components', 'Pipelines', 'Environments', 'Models', 'Endpoints', 'Compute', 'Linked Services', and 'Data Labeling'. The main area shows a notebook titled 'img-classification-pa' with a 'Files' tab selected. The notebook content includes a section titled 'Register model' with a text block explaining the process and a code cell with the following Python code:

```
1 print(run.get_file_names())
```

Below the code cell, there is a text block stating: 'Register the model in the workspace so that you (or other collaborators) can later query, examine, and deploy this model.'

Another code cell contains the following Python code:

```
1 # register model
2 model = run.register_model(model_name='sklearn_mnist', model_path='outputs/sklearn_mnist_model.pkl')
3 print(model.name, model.id, model.version, sep='\t')
```

Below the code cell, there is a section titled 'Next steps' with a text block stating: 'In this Azure Machine Learning tutorial, you used Python to:' followed by a list of steps:

- Set up your development environment
- Access and examine the data
- Train multiple models on a remote cluster using the popular scikit-learn machine learning library
- Review training details and register the best model

Below the list, there is a text block stating: 'You are ready to deploy this registered model using the instructions in the next part of the tutorial series:' followed by a link to 'Tutorial 2 - Deploy models'.

The screenshot displays the Microsoft Azure Machine Learning Studio interface. On the left, the 'Notebooks' section is active, showing a file explorer with a folder named 'image-classification-mnist-data' containing several files, including 'img-classification-part1-training.ipynb'. The main workspace shows a Jupyter Notebook with Python code for loading and visualizing MNIST data. The code includes comments and imports for 'utils' and 'glob'. The output of the code is a 10x10 grid of handwritten digits. The top status bar indicates the compute instance 'mlsamrat' is running on Python 3.8 - AzureML.

```
1 # make sure utils.py is in the same directory as this code
2 from utils import load_data
3 import glob
4
5
6 # note we also shrink the intensity values (X) from 0-255 to 0-1. This helps the model converge faster.
7 X_train = load_data(glob.glob(os.path.join(data_folder, "*/train-images-idx3-ubyte.gz")), recursive=True)[0], False) / 255.0
8 X_test = load_data(glob.glob(os.path.join(data_folder, "*/t10k-images-idx3-ubyte.gz")), recursive=True)[0], False) / 255.0
9 y_train = load_data(glob.glob(os.path.join(data_folder, "*/train-labels-idx1-ubyte.gz")), recursive=True)[0], True).reshape(-1)
10 y_test = load_data(glob.glob(os.path.join(data_folder, "*/t10k-labels-idx1-ubyte.gz")), recursive=True)[0], True).reshape(-1)
11
12
13 # now let's show some randomly chosen images from the training set.
14 count = 0
15 sample_size = 30
16 plt.figure(figsize = (16, 6))
17 for i in np.random.permutation(X_train.shape[0])[:sample_size]:
18     count = count + 1
19     plt.subplot(1, sample_size, count)
20     plt.axhline('')
21     plt.axvline('')
22     plt.text(x=10, y=-10, s=y_train[i], fontsize=18)
23     plt.imshow(X_train[i].reshape(28, 28), cmap=plt.cm.Greys)
24 plt.show()
```

[6] ✓ 3 sec

0	1	6	2	6	3	0	7	5	5	1	2	8	2	8	7	0	4	0	1	1	6	3	0	9	9	5	8	5	4
0	1	6	2	6	3	0	7	5	5	1	2	8	2	8	7	0	4	0	1	1	6	3	0	9	9	5	8	5	4

Train on a remote cluster

For this task, you submit the job to run on the remote training cluster you set up earlier. To submit a job you:

- Create a directory

The screenshot displays the Microsoft Azure Machine Learning Studio interface. The left sidebar shows the navigation pane with options like 'New', 'Home', 'Notebooks', 'Automated ML', 'Designer', 'Assets', 'Data', 'Jobs', 'Components', 'Pipelines', 'Environments', 'Models', 'Endpoints', 'Manage', 'Compute', 'Linked Services', and 'Data Labeling'. The main workspace is titled 'Notebooks' and shows a file explorer with a folder named 'image-classification-mnist-data'. Inside this folder, the notebook 'img-classification-part1-training.ipynb' is selected. The notebook content is displayed in the center, showing a Jupyter cell with the following code:

```
[15]: print(run.get_metrics())
```

The output of the cell is:

```
{'regularization rate': 0.5, 'accuracy': 0.9193}
```

Below the code cell, there is a section titled 'Display run results' which states: 'You now have a model trained on a remote cluster. Retrieve all the metrics logged during the run, including the accuracy of the model:'.

Further down, there is a section titled 'Register model' which states: 'The last step in the training script wrote the file outputs/sklearn_mnist_model.pkl in a directory named outputs in the VM of the cluster where the job is executed. outputs is a special directory in that all content in this directory is automatically uploaded to your workspace. This content appears in the run record in the experiment under your workspace. Hence, the model file is now also available in your workspace.'

At the bottom, there is a section titled 'You can see files associated with that run.'

machinelearning-samrat - Micro... x jovial_nerve_zrvhp6xw - Micro... x silver_curtain_dpwyg98 - Micro... x

ml.azure.com/experiments/id/33499534-c550-49b5-a020-c34bbd7df277/runs/Tutorial-sklearn-mnist_1668281543_b7da5343?wsid=/subscriptions/8c1bcaa6-81aa-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft...
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Microsoft Azure Machine Learning Studio Search within your workspace (preview) This workspace

Georgian College > machinelearning-samrat > Jobs > Tutorial-sklearn-mnist > jovial_nerve_zrvhp6xw

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.

jovial_nerve_zrvhp6xw Completed

Overview Metrics Images Child jobs Outputs + logs Code Explanations (preview) Fairness (preview) Monitoring (preview)

Refresh Connect to compute Resubmit Register model Cancel Delete Compare (preview)

Properties

Status Completed	Job type Command
Created on Nov 12, 2022 2:32 PM	Experiment Tutorial-sklearn-mnist
Start time Nov 12, 2022 2:45 PM	Environment tutorial-env:1
Duration 3m 30.61s	Arguments --data-folder DatasetConsumptionConfig:input_8bafc498 -- regularization 0.5
Compute duration 3m 30.61s	Registered models sklearn_mnist:1
Name Tutorial-sklearn-mnist_1668281543_b7da5343	See all properties Raw JSON
Script name train.py	See YAML job definition Job YAML
Created by Babin Shrestha	

Compute

Target cpu-cluster	Instance count 1
------------------------------	----------------------------

Inputs

Input name: input_8bafc498
Dataset: mnist_opendataset:1

Tags

No tags

Metrics

accuracy 0.9193	regularization rate 0.5
--------------------	----------------------------

Description

Click edit icon to add a description

machinelearning-samrat - Micros

jovial_nerve_zrvhp6xw - Micros

silver_curtain_dpwygf99 - Micros

+

ml.azure.com/experiments/id/33499534-c550-49f6-a020-c34bbd2fdf27/runs/Tutorial-sklearn-mnist_1668281543_b7da5343?wsid=/subscriptions/8c1bcaa6-91ae-435f-9dcb-25a67d95315f/resourcegroups/AI_Infrastructure/providers/Microsoft...

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vision system

SKINOPATHY

AI Infra. - AWS

Other bookmarks

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This workspace

4

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Models

Endpoints

Manage

Compute

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Data Labeling

Georgian College > machinelearning-samrat > Jobs > Tutorial-sklearn-mnist > jovial_nerve_zrvhp6xw

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.

jovial_nerve_zrvhp6xw

Completed

Overview

Metrics

Images

Child jobs

Outputs + logs

Code

Explanations (preview)

Fairness (preview)

Monitoring (preview)

Refresh

Connect to compute

Resubmit

Register model

Cancel

Delete

Select a metric to see a visualization or table of the data.

Search

accuracy

regularization rate

View as: Chart Table

accuracy

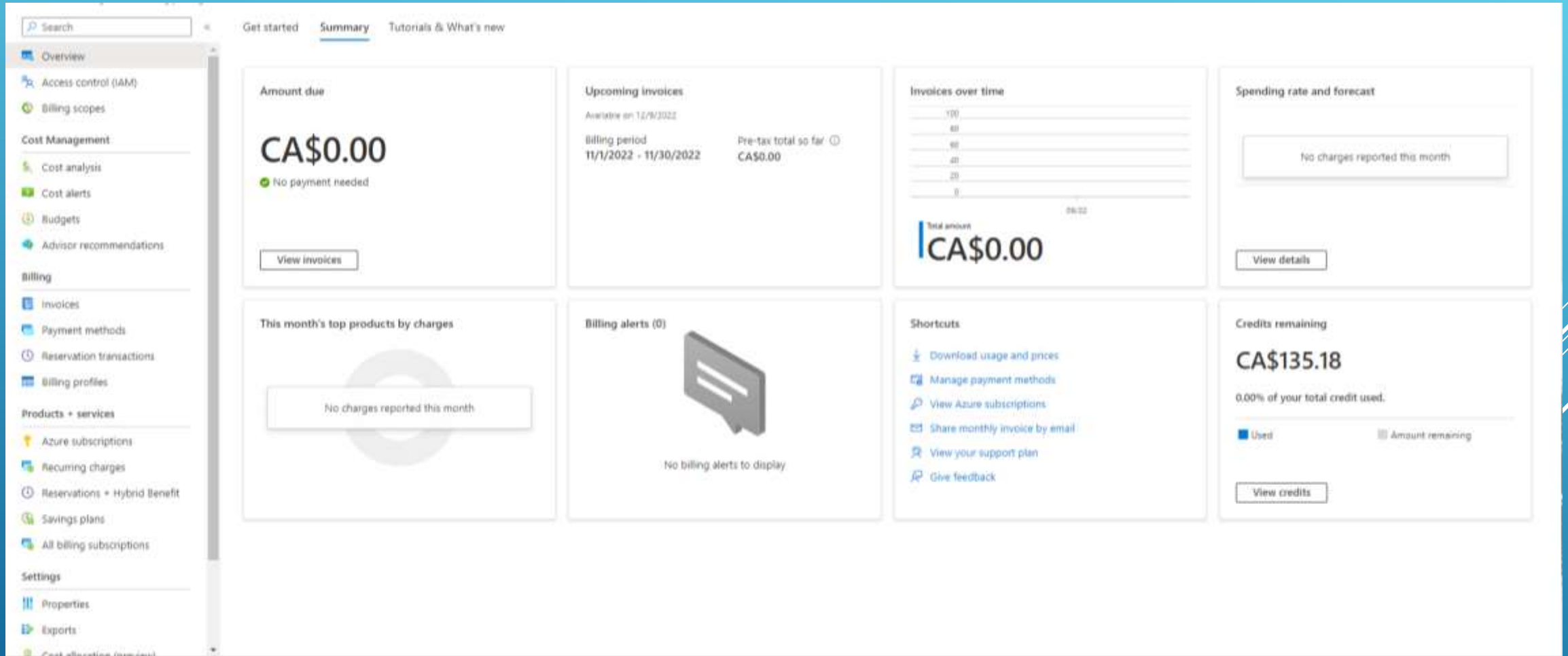
0.9193

regularization rate

0.5

- ▶ After running the image classifier model, we got an accuracy of 91% which is really good for a image classifier.

CHECKING SUBSCRIPTION



THANK YOU