AI 620 Emerging Topics in Artificial Intelligence

HOS01A Introduction to Amazon Rekognition

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 Before You Start

- The directory path shown in screenshots may be different from yours.
- Some steps are not explained in the tutorial**.** If you are not sure what to do:
    1. Consult the resources listed below.
    2. If you cannot solve the problem after a few tries, ask a TA for help.

Learning Outcomes

Students will be able to learn:

- Introduction to Amazon Rekognition
- Amazon rekognition setup

Resources

- AWS, (n.d), *Amazon Regnition*, what is Amazon Regnition?, https://docs.aws.amazon.com/rekognition/latest/dg/what-is.html
- flowers.zip

Introduction to Amazon Rekognition

Amazon Rekognition is a pre-trained computer vision AWS deep learning algorithm which can pull and index insights from images and videos. Amazon Rekognition is fully customized and can detect things like objects, scenes, faces, text pornography, violence, foul language, drug, alcohol use, and inappropriate content in images to automate the process of content moderation. Amazon Rekognition pricing operates on a pay-as-you-go model, and it provides the following services:

- Automated content moderation
- Facial recognition

- Sentiment analysis
- Labeling/metadata
- Text detection
- Celebrity recognition
- Video segment detection

Amazon Rekognition custom labels demonstration

Let's train a machine learning model using Amazon Rekognition to analyze images.

Note: - We need to have an AWS account. Please create an account if you don't have.

https://aws.amazon.com/

When you create your AWS account, you may be prompted to enter your credit card number. Please do so as you will be granted 1-year free-tier and Amazon Rekognition is provided in the free-tier plan.
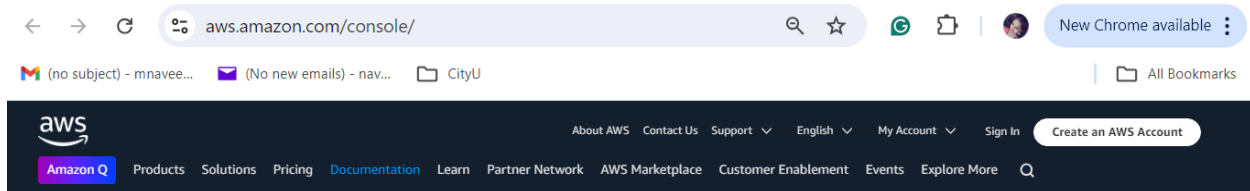
Step 1: Sign into the Console https://aws.amazon.com/console/
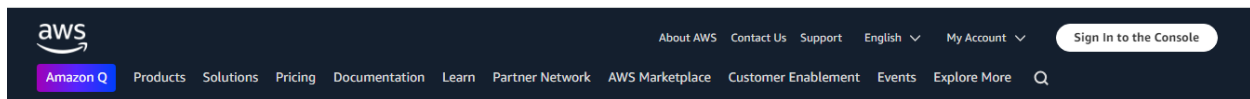
Step 2: Open the Amazon Rekognition console at https://console.aws.amazon.com/rekognition/ and click "Use Custom Labels"
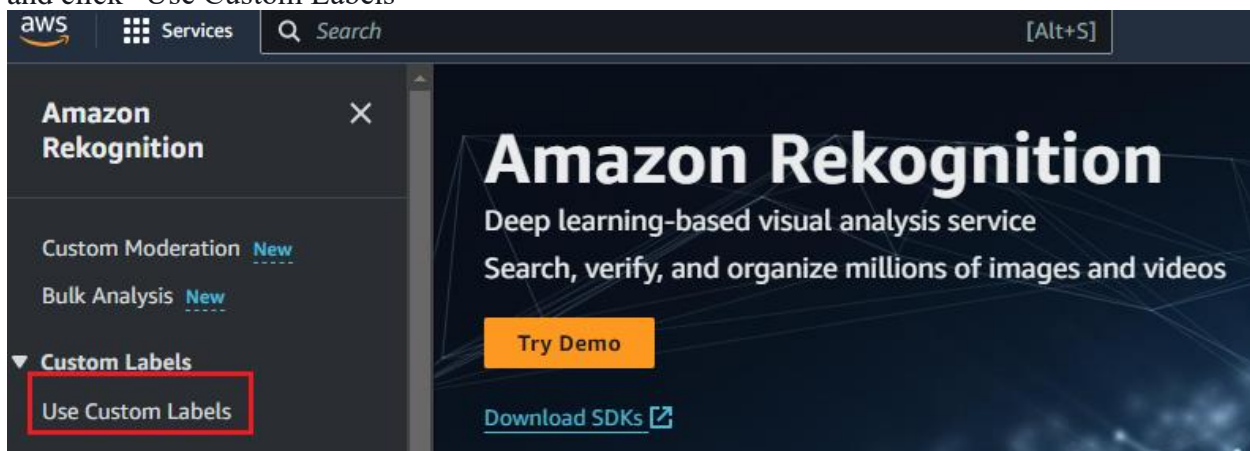
Step 3: Click on the icon at the left side to open Get Started and then click on the projects.
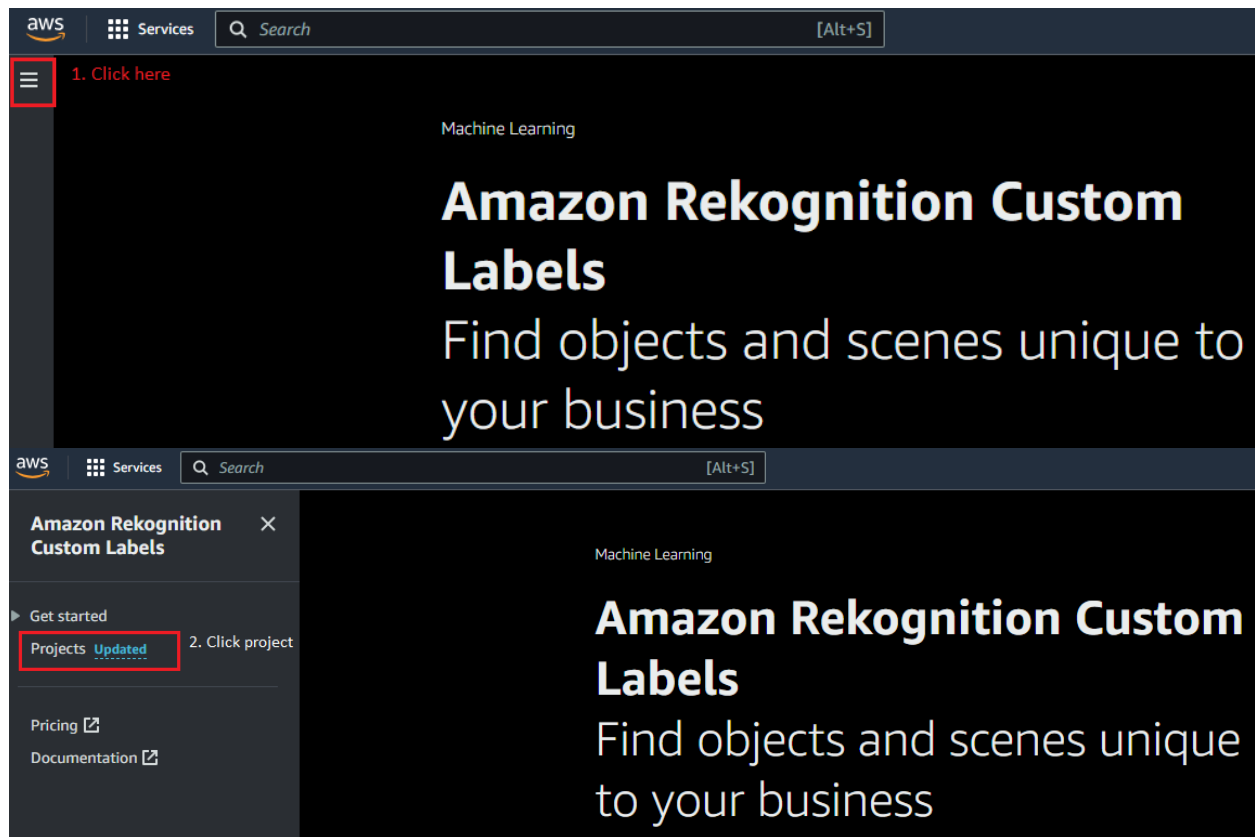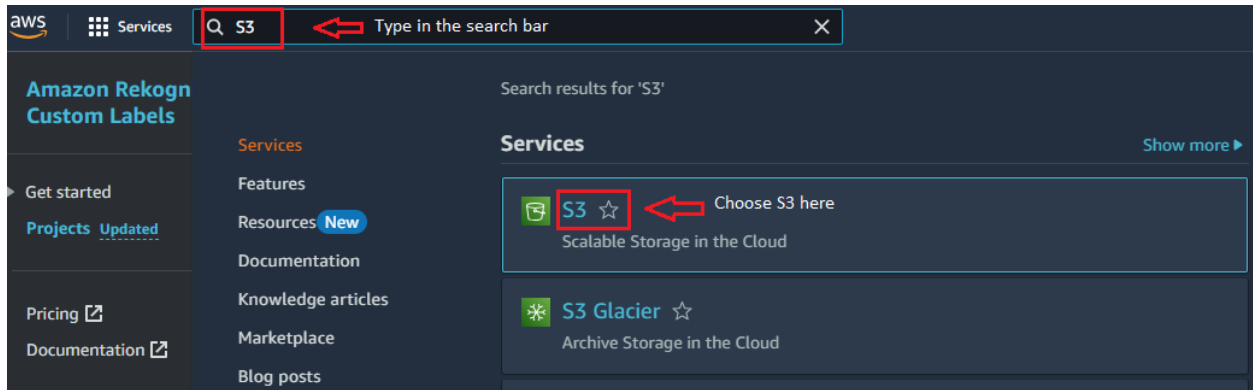
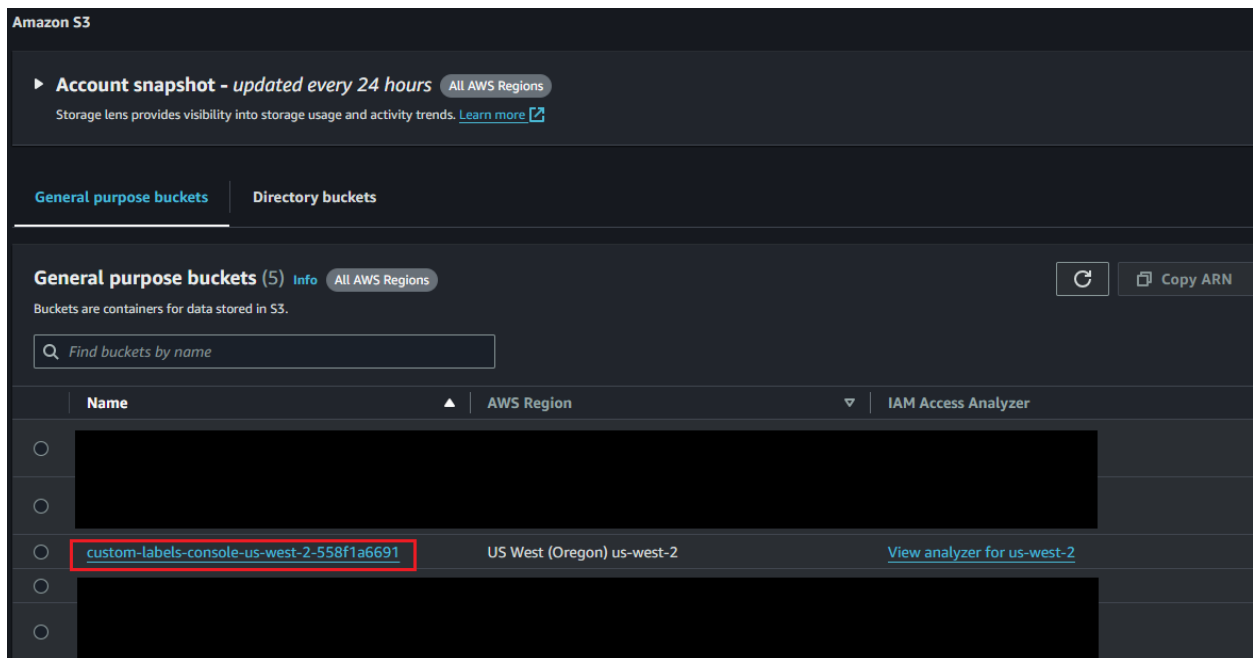Step 4: Create S3 bucket to store project file
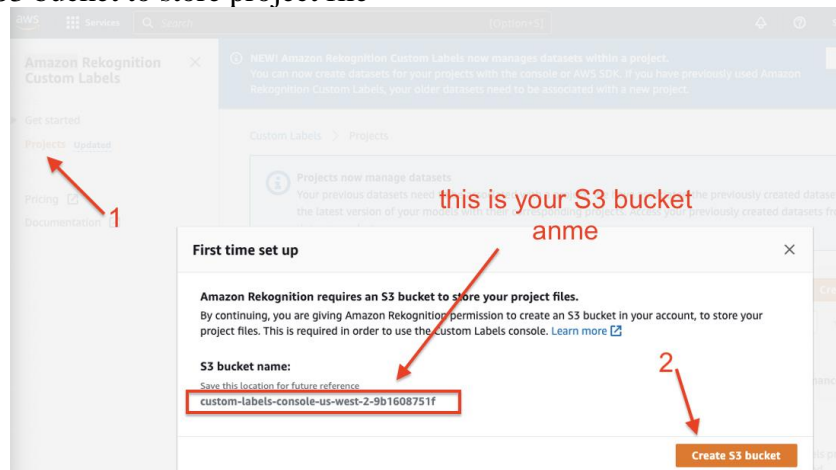
Step 5: Go to your AWS S3 service and upload image to S3 bucket name.

1. In the search bar, type S3. Under the Services list, select S3.

2. Select the bucket created in Step 4. It should have the prefix: custom-labels*


3. Inspect the dataset for model training.

When you clone the HOS repository, there is already a ZIP file named "flowers.zip", containing images of 5 flower species: daisy, dandelion, rose, sunflower, tulip. Each folder consists of 100 flower images, making the total number of images 500.

Note: - The original dataset is from this link. We cut down the number of images due to the original dataset size (approximately 4000 images).

Extract the zip file, you will see the following folders.

> Downloads > HOS Reviews > AI620 > 01 > flowers

Name ^	Date modified	Type	Size
daisy	9/14/2024 11:16 AM	File folder	
dandelion	9/14/2024 11:17 AM	File folder	
rose	9/14/2024 11:18 AM	File folder	
sunflower	9/14/2024 11:19 AM	File folder	
tulip	9/14/2024 11:20 AM	File folder	

You will need to upload the images to the S3 bucket. After selecting the bucket, click Upload.
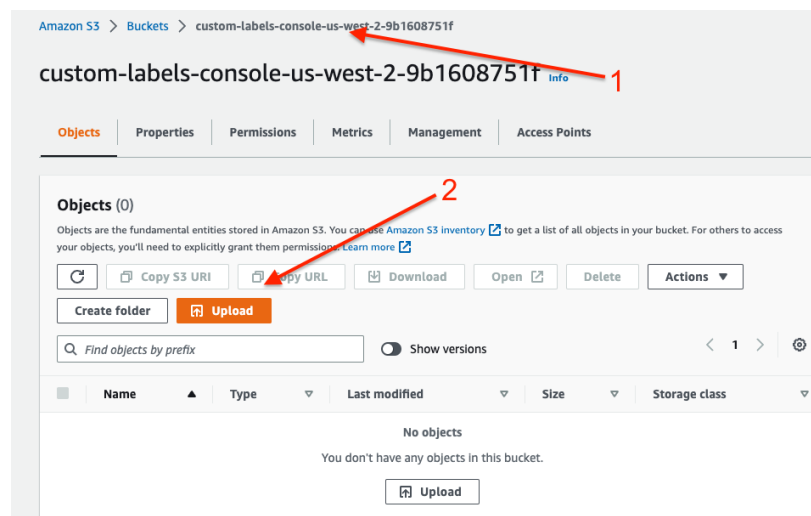
Step 6: Click "Add folder". Navigate to the "flower" folder you just extracted and click Upload. You might need to wait for 5 minutes until all images are uploaded.

Note: - The uploaded image status should be changed to Succeeded. Once the Upload status is successful, click Close to go back to the bucket.

Step 7: Copy the S3 URI form the uploaded folder

NOTE: For submission, Take the screenshot for all steps from step 8 and save it in your local repository.

Step 8: Go to Amazon Rekognition > Use Custom Labels > Projects and click on "Create project". Name the project "image"image_classified_project"

Step 9: Click on "Create dataset"

Step 10: Select "Start with a single dataset" and "Import images from S3 bucket"

Step 11: Turn on Automatic labeling and click on Create Dataset button to upload the image from S3.
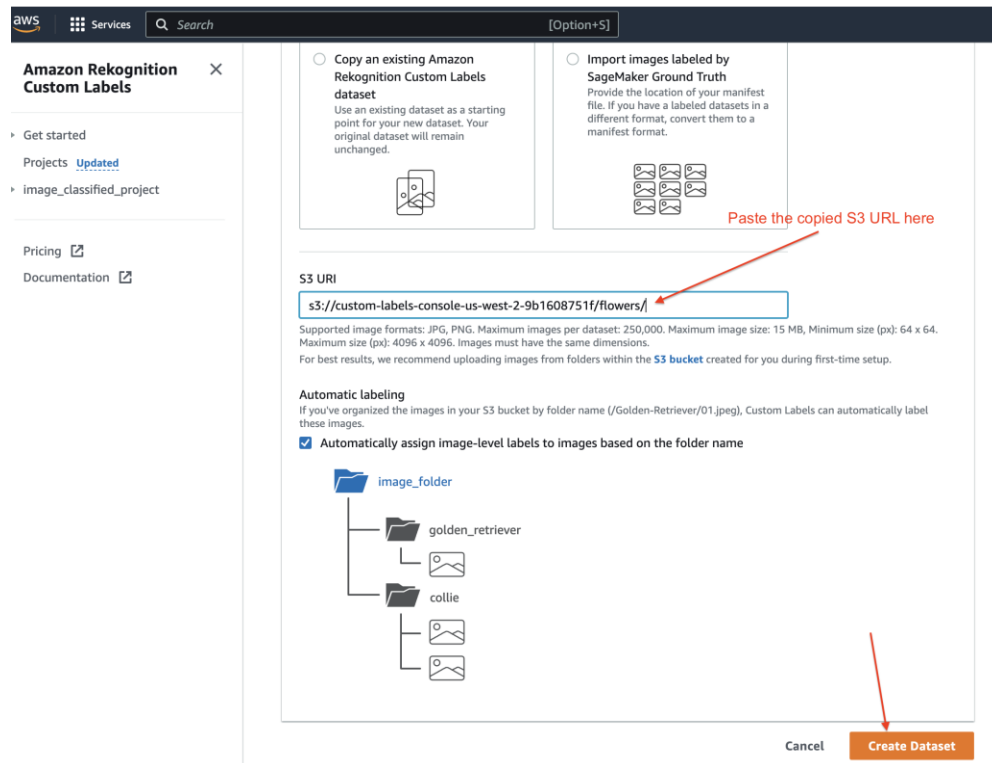
Step 12: Train the model
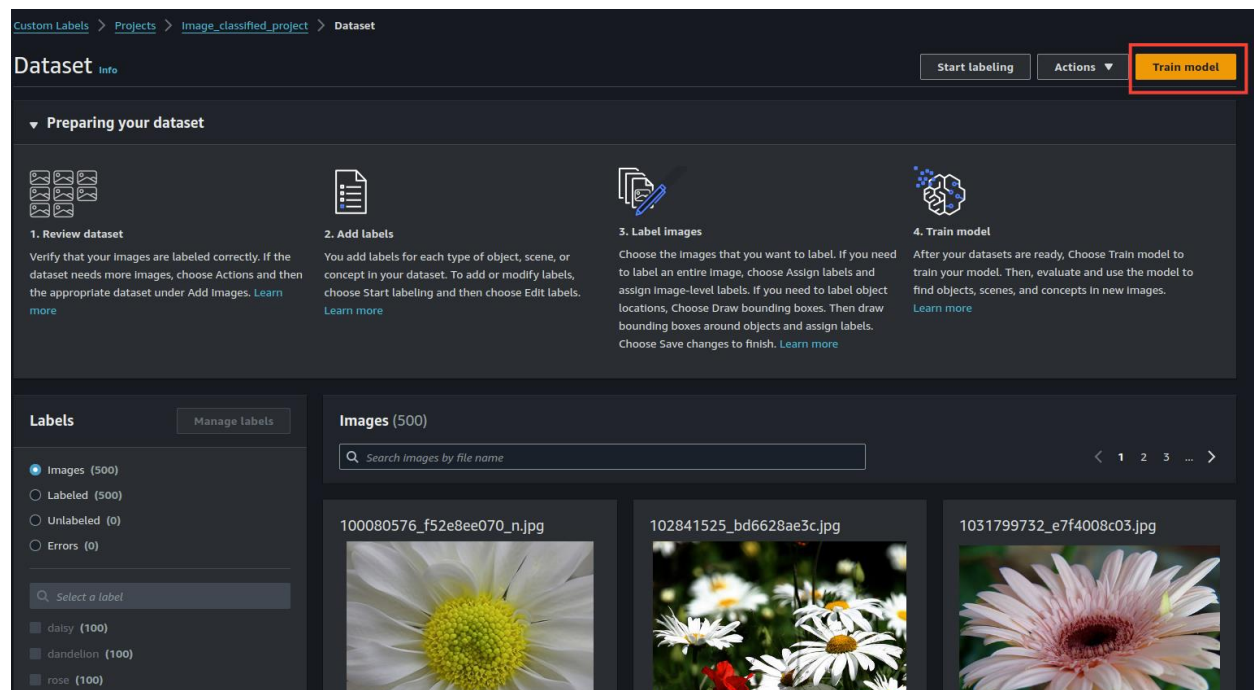
Step 13: Select the image_classified_project and click on the "train new model" button
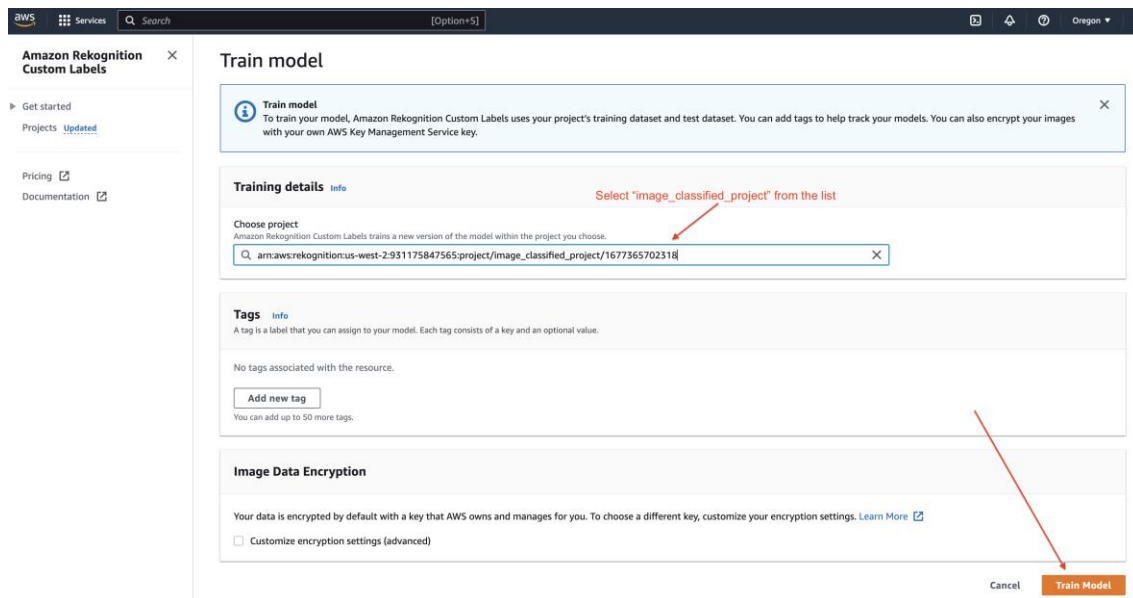
When you are prompted "Do you want to train your model?", click "Train model".
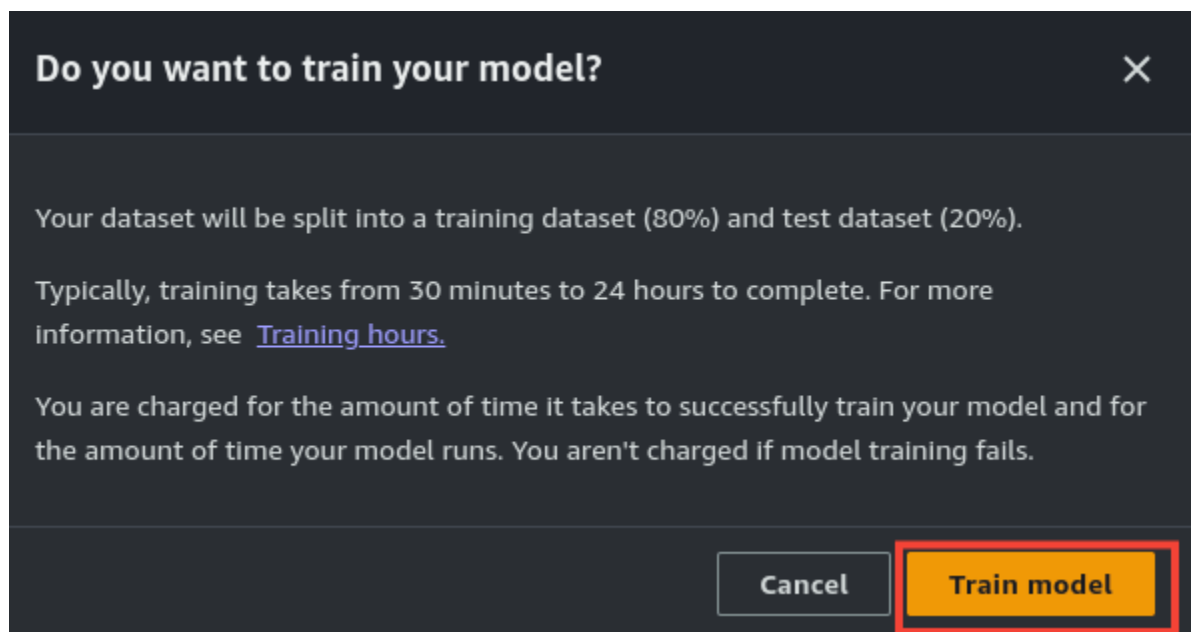
You might need to wait until the model status changes from TRAINING_IN_PROGRESS to TRAINING_COMPLETED.

Step 14: Check the performance of the trained model

image_classified_project Info

How it works

Creating your dataset

1. Create dataset
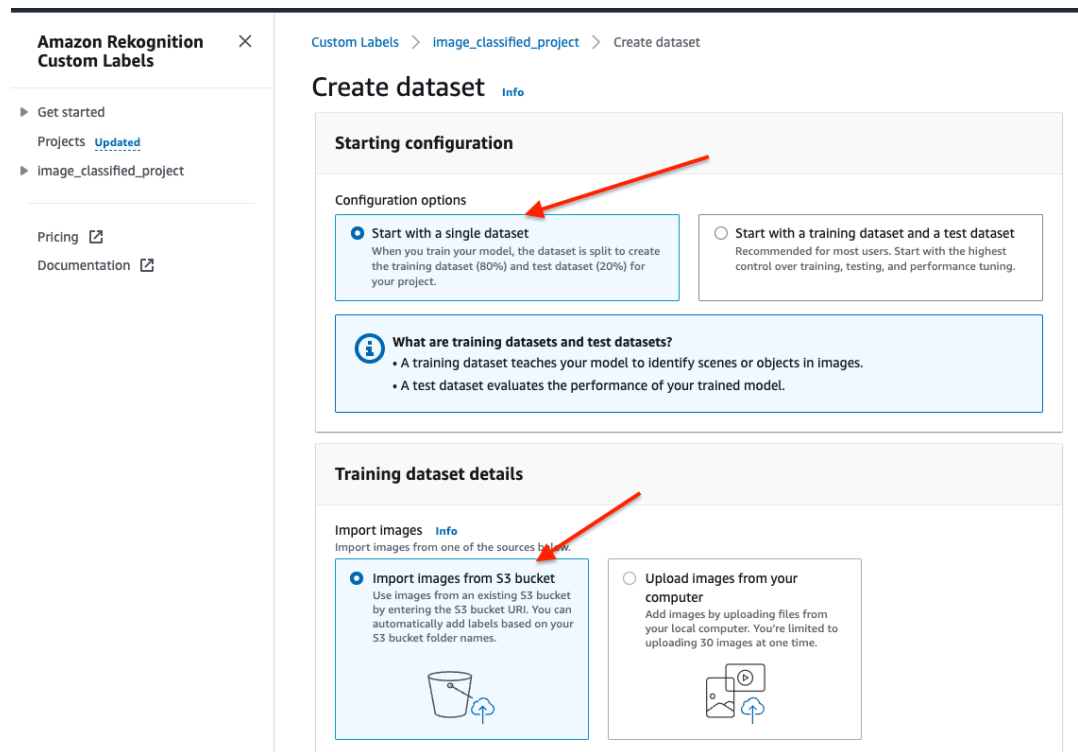A dataset is a collection of images, and image labels, that you use to train or test a model.

⊘ Created

2. Label images
Labels identify objects, scenes, or concepts on an entire image, or they identify object locations on an image.

Add labels

Training your model

3. Train model
Depending on the training dataset, the training model finds image-level scenes and concepts, or it finds object locations.

Train model

Evaluating your model

4. Check performance metrics
Performance metrics tell you if your model needs additional training before you can use it.

Check metrics

Project details

Check the performance of the model

Project name	Created	Dataset	Models
image_classified_project	February 25, 2023 at 14:55:02 (UTC-08:00)	5 training labels, 3452 training images, 5 test labels, 865 test images	1

Click here to see the detail of the trained model

Models (1)

This is F1 score

Delete model   Download validation results ▾

Training is completed

|	Name		Date created	Training dataset	Test dataset	Model performance (F1 score)	Model status	Status message
	image_classified_project.2023-02-25T15.16.32		February 25, 2023			0.956	TRAINING_COMPLETED	The model is ready to run.

image_classified_project.2023-02-25T15.16.32 Info

Delete model

Evaluation | Model details | Use model | Tags

ⓘ **Evaluation**
The Evaluation tab shows the testing results for your trained model. This helps you understand the overall performance of your model. To view the results for an image, choose the View test results button.

Evaluation results

View test results

F1 score Info	Average precision Info	Overall recall Info
0.956	0.966	0.946
Date completed	Training dataset	Testing dataset
February 25, 2023	5 labels, 3,452 images	5 labels, 865 images
Trained in 4.041 hours		

Per label performance (5)

Label name ▲	F1 score ▽	Test images ▽	Precision ▽	Recall ▽	Assumed threshold ▽
daisy	0.940	153	0.953	0.928	0.185
dandelion	0.981	211	0.981	0.981	0.663
rose	0.934	157	0.920	0.949	0.329
sunflower	0.972	147	0.993	0.952	0.812
tulip	0.950	197	0.984	0.919	0.912

HOS submission instructions:

1. Please install the GitHub Desktop: https://cityuseattle.github.io/docs/git/github_desktop/

2. Clone, organize, and submit your work through GitHub Desktop:
https://cityuseattle.github.io/docs/hoporhos