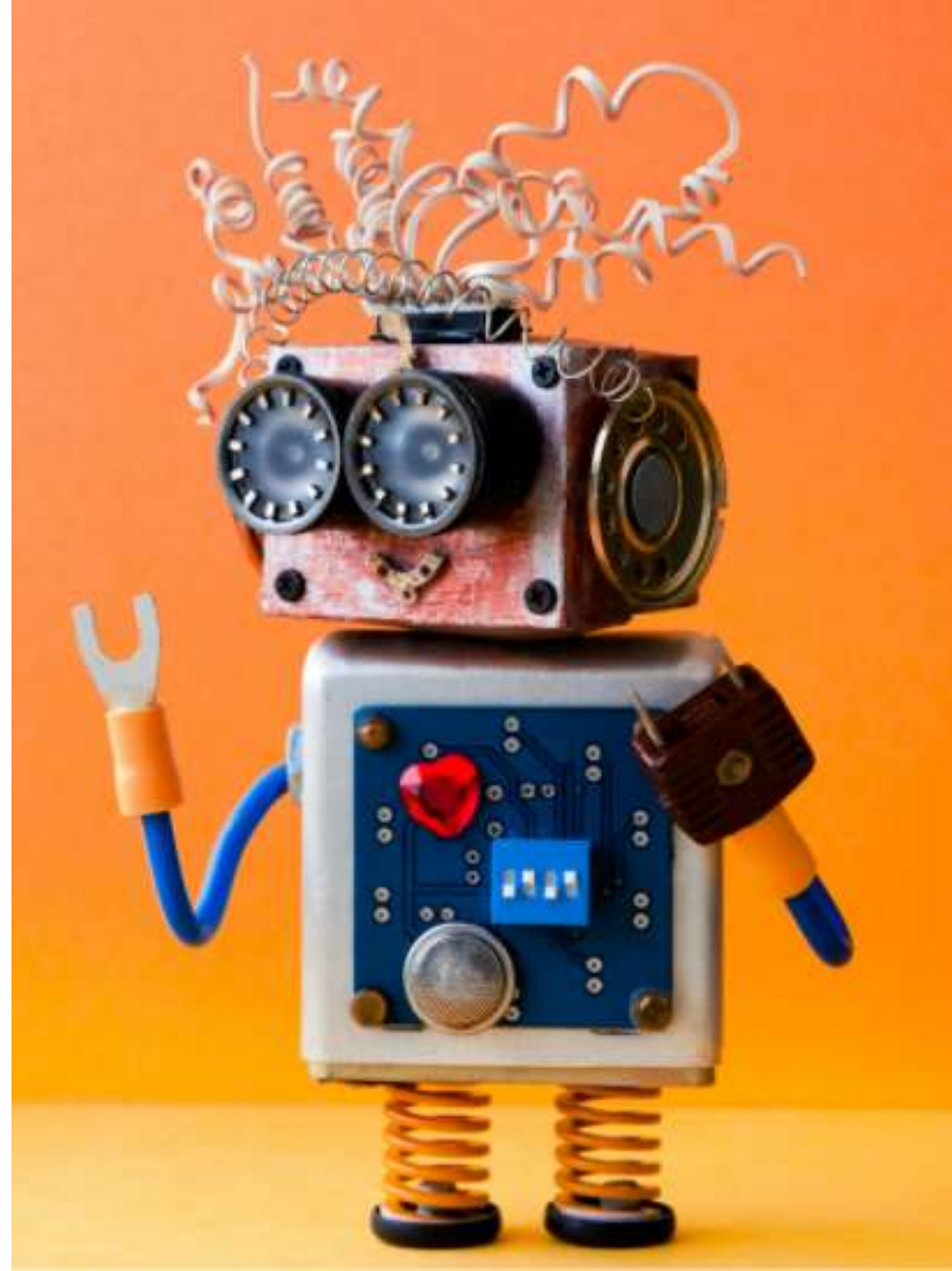


INTRODUCTION & KEY LEARNING OUTCOMES



KEY LEARNING OUTCOMES

1. Understand Amazon SageMaker components and overall architecture.
2. Learn how to build and train a simple machine learning model using Amazon SageMaker Canvas.
3. Go over Amazon SageMaker Demo/Walkthrough.
4. Learn how to write your first code in SageMaker notebooks.
5. Learn about Amazon SageMaker Studio key capabilities.
6. Run a demo of a trained model in the AWS SageMaker marketplace.
7. Final Capstone Project

AMAZON SAGEMAKER

- Amazon SageMaker is a fully-managed machine learning workflow platform that provides services on data labeling, model building, training, tuning and deployment.
- SageMaker allows data scientists and developers to build scalable AI/ML models easily and efficiently.
- Models could be deployed in production at a much faster rate and with a fraction of the cost.
- Let's explore SageMaker:
<https://aws.amazon.com/sagemaker/#>

BUILD

- SageMaker offers data labeling service
- Prebuilt available notebooks with state of the art algorithms on AWS marketplace

TRAIN

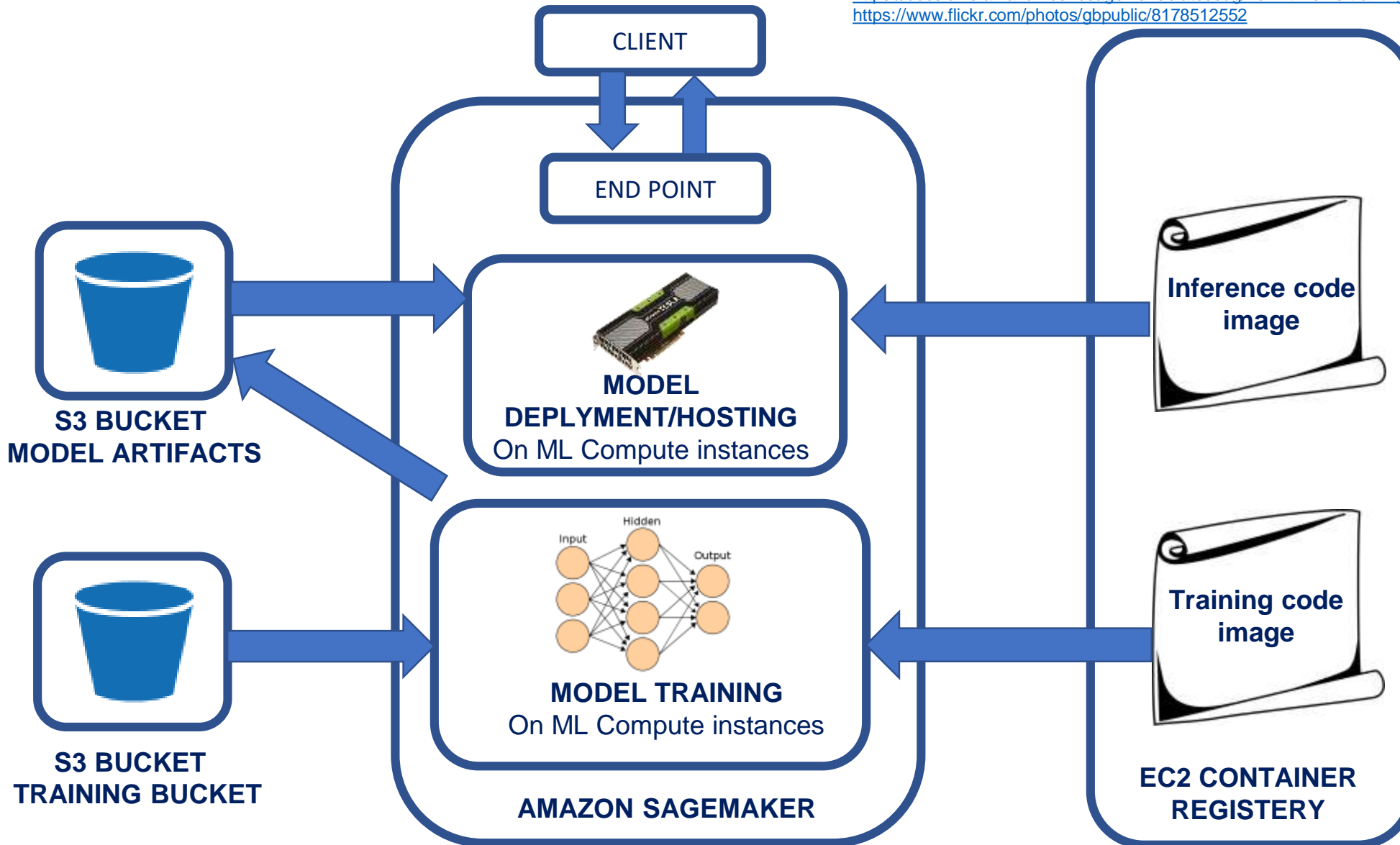
- Train models using EC2 instances (on-demand and spot)
- Manage environments for training
- Hyperparameters optimization for model tuning

DEPLOY

- Easily deploy and scale models
- Autoscaling with 75% savings

AMAZON SAGEMAKER MODEL TRAINING AND DEPLOYMENT OVERVIEW

Source: <https://docs.aws.amazon.com/sagemaker/latest/dg/how-it-works-training.html>
https://commons.wikimedia.org/wiki/File:Artificial_neural_network.svg
https://commons.wikimedia.org/wiki/File:AWS_Simple_Icons_Storage_Amazon_S3.svg
<https://docs.aws.amazon.com/sagemaker/latest/dg/how-it-works-training.html>
<https://www.flickr.com/photos/gbpublic/8178512552>



AMAZON SAGEMAKER COMPONENTS

- Two components are present in Amazon SageMaker:
 - Model training
 - Model deployment
- To start training an AI/ML model using Amazon SageMaker, you will need to create a training job with the following:
 - Amazon S3 bucket URL (training data): where training data is located.
 - Compute resources: Amazon SageMaker will train the model using instances managed by Amazon SageMaker.
 - Amazon S3 bucket URL (Output): this bucket will host the output from the training.
 - Amazon Elastic Container Registry path: where training code is stored.
- Amazon SageMaker uses: (1) training code and (2) training dataset to train the model.
- Amazon SageMaker saves the trained model artifacts in an S3 bucket.

TRAINING OPTIONS OFFERED BY SAGEMAKER

USE AN ALGORITHM PROVIDED BY AMAZON SAGEMAKER

- Amazon SageMaker provides ready, off the shelf training algorithms such as: Linear Learner Algorithm and the XGBoost Algorithm, K Means, Principal Component Analysis, image classification, LDA, Sequence to Sequence Algorithm.

CUSTOM CODE TRAINING USING POPULAR DEEP LEARNING FRAMEWORKS

- Custom python code with TensorFlow or Apache MXNet for model training.

USE YOUR OWN CUSTOM ALGORITHMS

- The code could be placed in a docker container and then registry path of the image could be provided to Amazon SageMaker CreateTrainingJob API call.

AWS MARKETPLACE

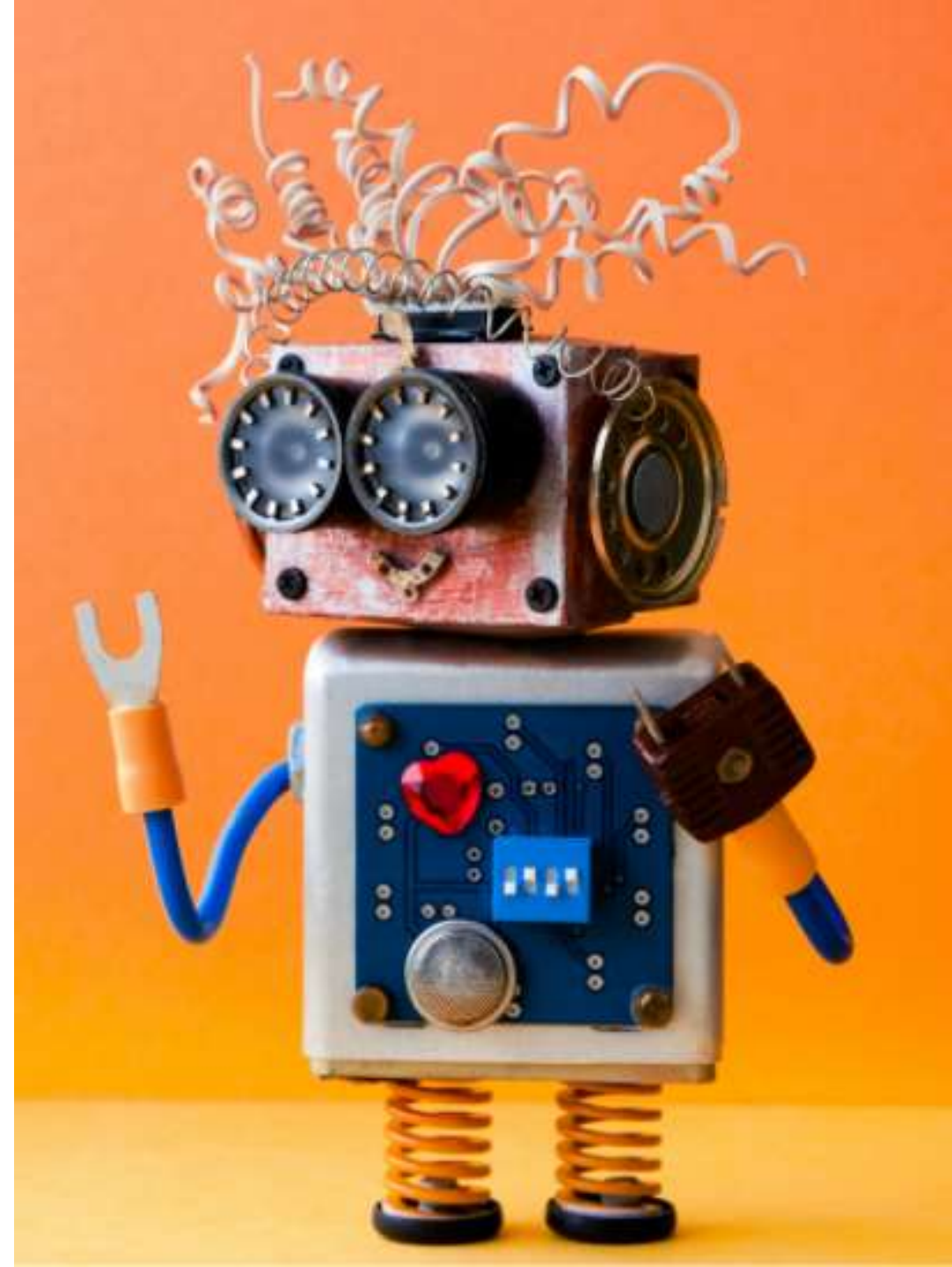
- choose an algorithm from Amazon marketplace,
<https://aws.amazon.com/marketplace/solutions/machine-learning>

USE APACHE SPARK WITH AMAZON SAGEMAKER

- Apache Spark can be used to train models with Amazon SageMaker.

Source: <https://docs.aws.amazon.com/sagemaker/latest/dg/how-it-works-training.html>

AWS SAGEMAKER DEMO – PART #1 (NOTEBOOK INSTANCE)



MACHINE LEARNING COMPONENTS IN AWS: 1. DATA

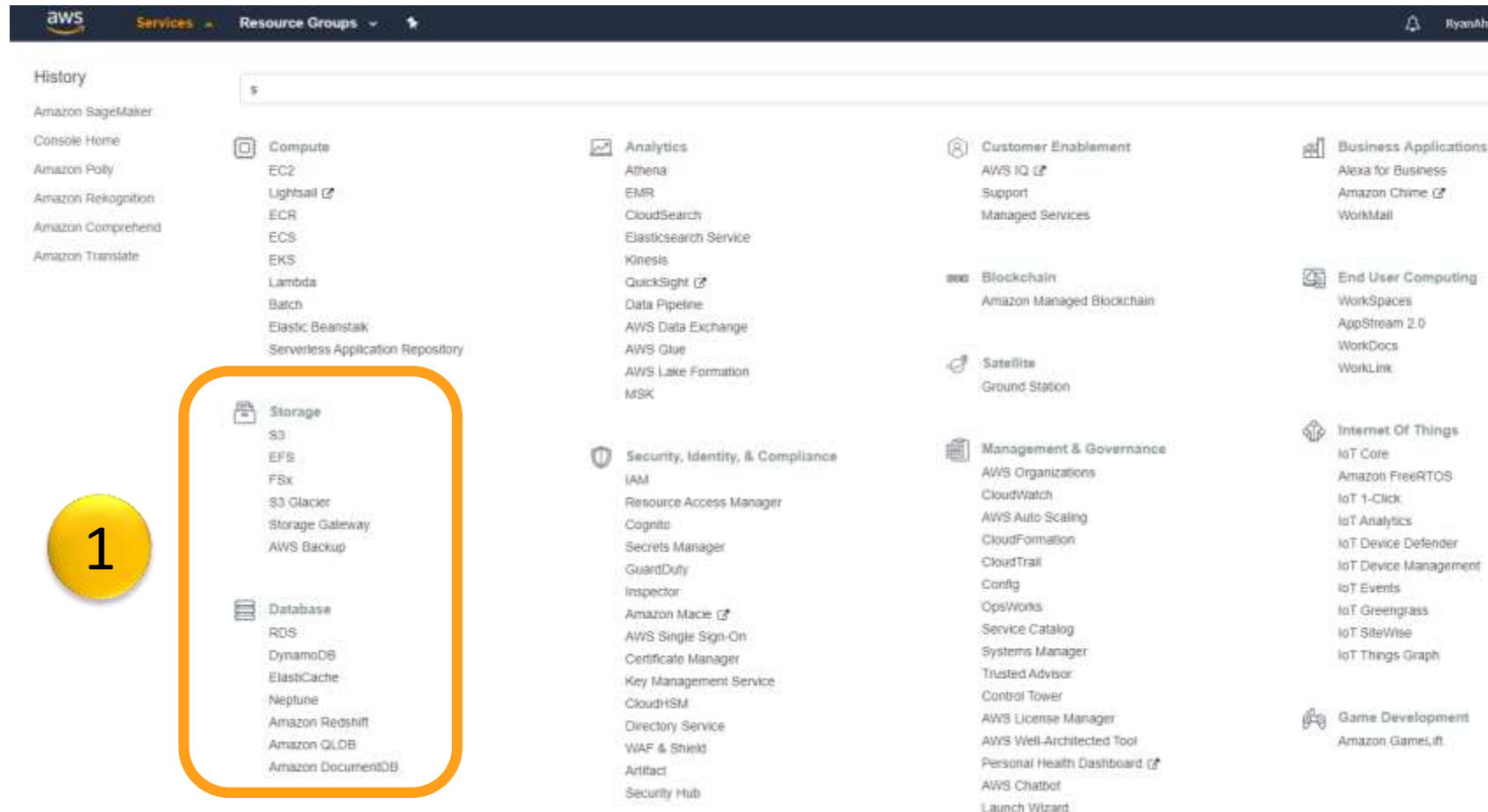
1. DATA



2. MODEL



3. COMPUTE



MACHINE LEARNING COMPONENTS IN AWS: 2. MODEL

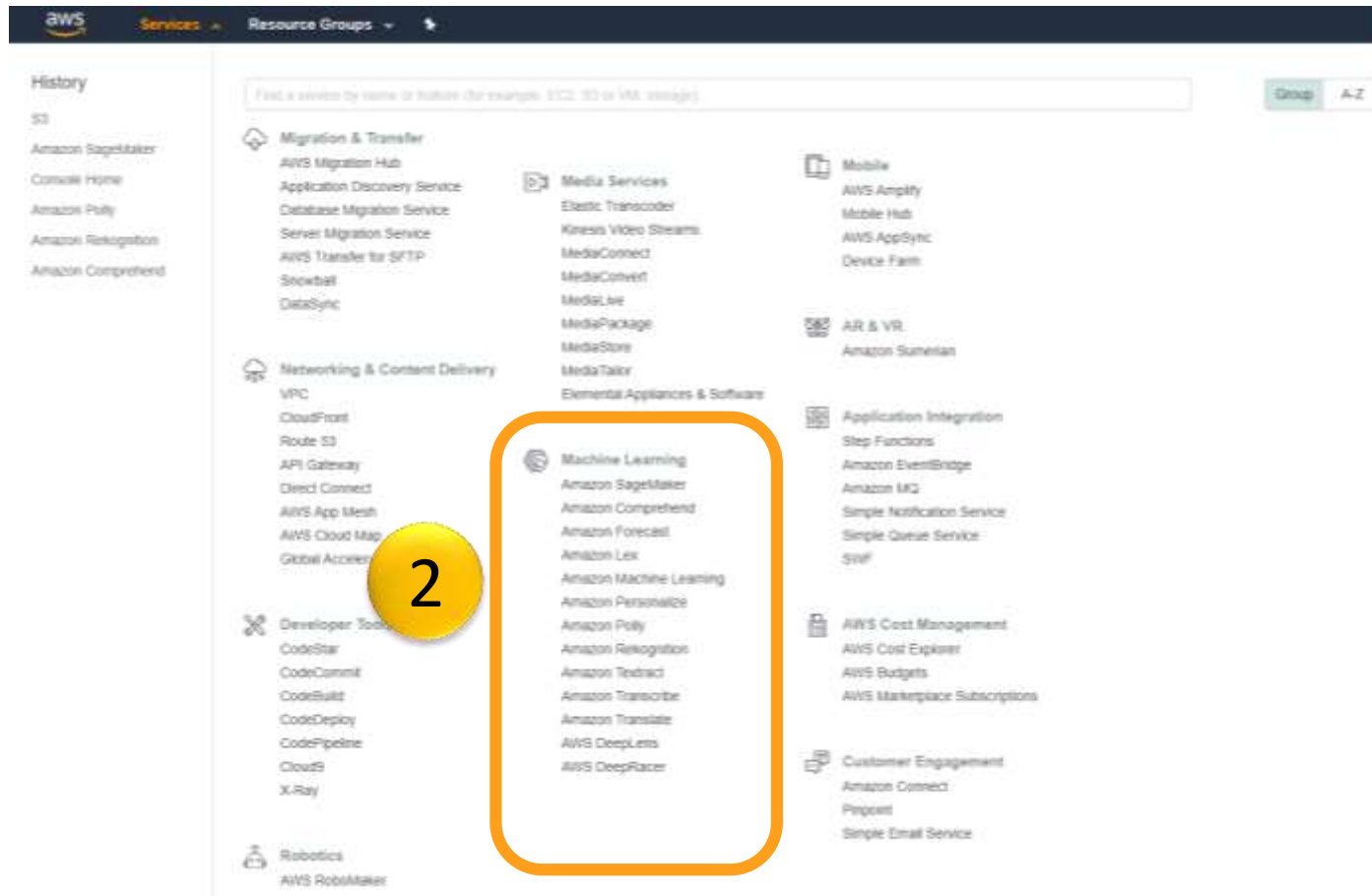
1. DATA



2. MODEL



3. COMPUTE



MACHINE LEARNING COMPONENTS IN AWS: 3. COMPUTE

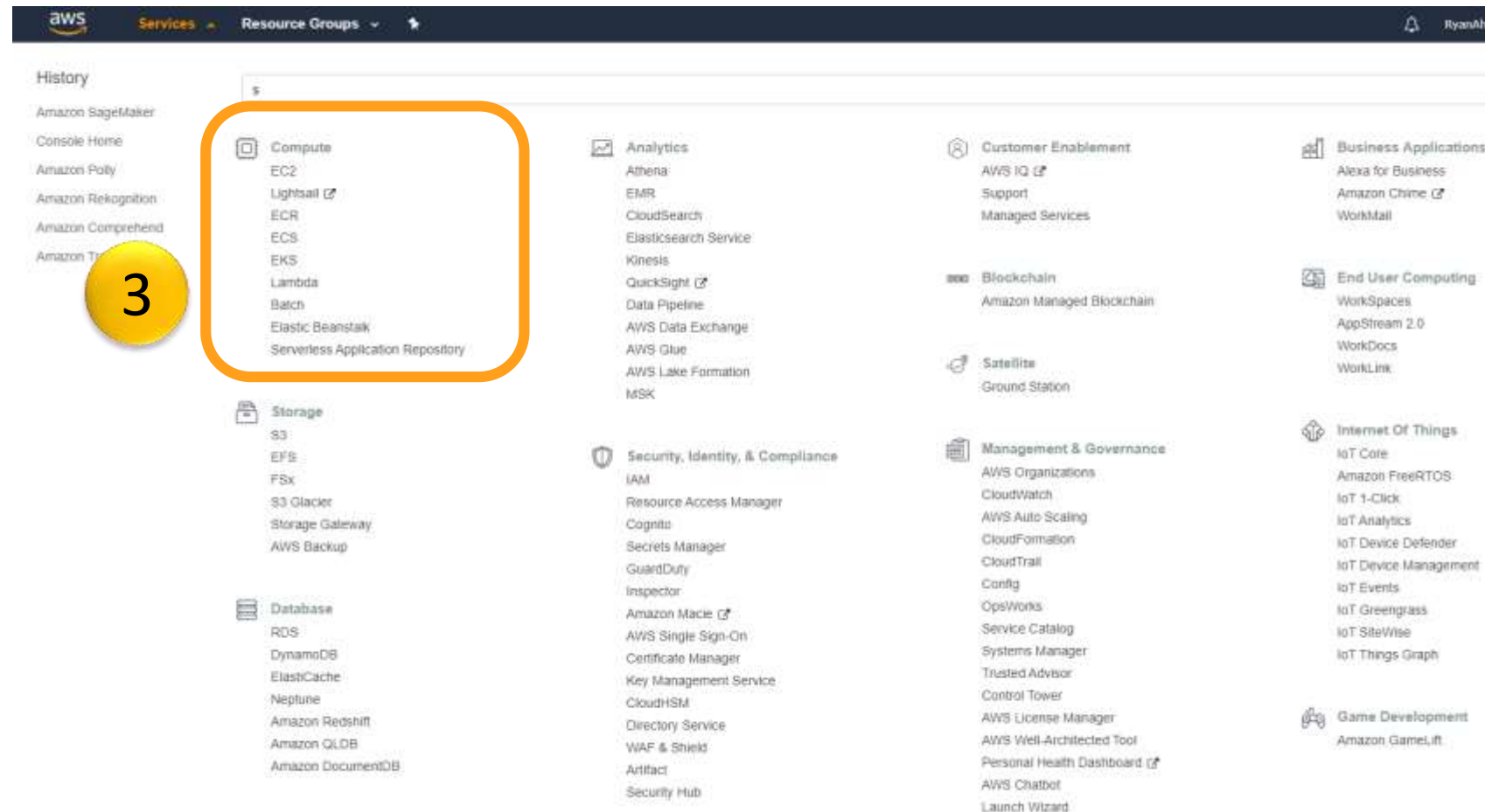
1. DATA



2. MODEL

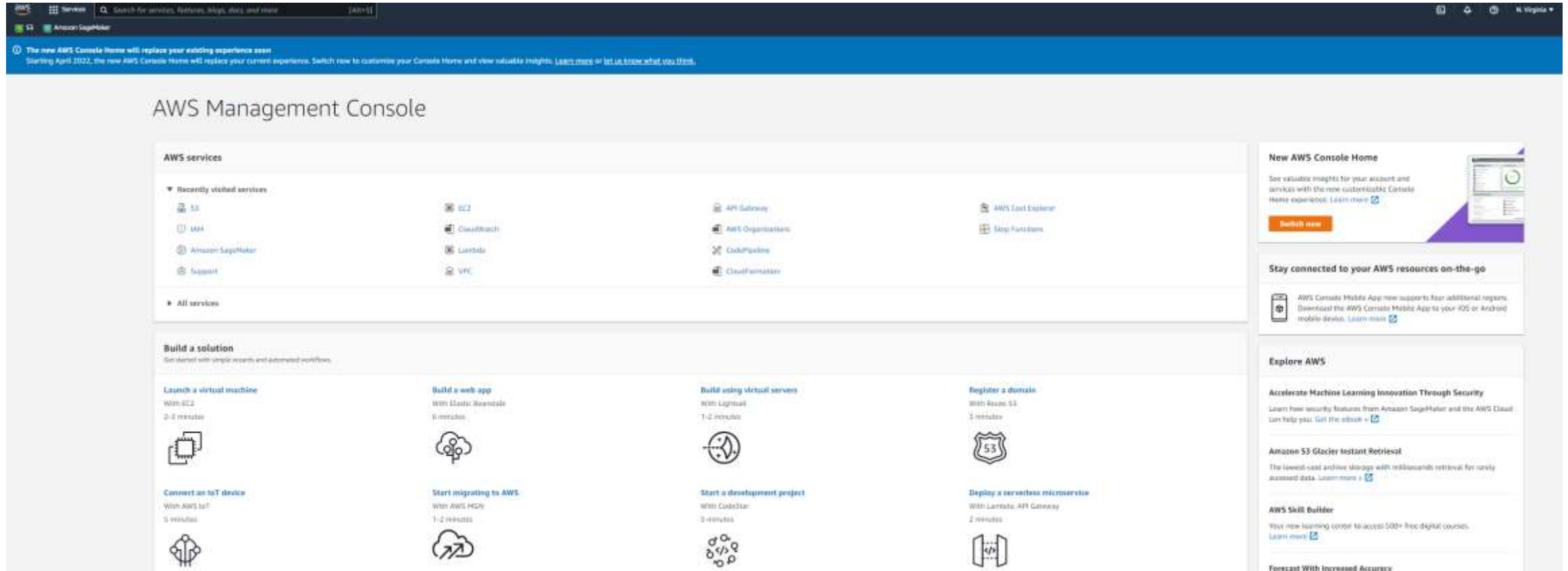


3. COMPUTE



DEMO: AWS SAGEMAKER

NAVIGATE TO AWS MANAGEMENT CONSOLE AND SEARCH FOR SAGEMAKER



DEMO: AWS SAGEMAKER

YOU CAN LAUNCH A NOTEBOOK INSTANCE FROM THE LEFT PANEL OR YOU CAN LAUNCH SAGEMAKER STUDIO.

The screenshot displays the Amazon SageMaker console interface. On the left, a navigation sidebar lists various SageMaker components: SageMaker dashboard, Search, SageMaker Domain (Studio, RStudio, Canvas), Images, Ground Truth, Notebook, Processing, Training, Inference, Edge Manager, Augmented AI, and AWS Marketplace. The main content area features a dark header with the SageMaker logo and the text 'Build, train, and deploy machine learning models at scale'. Below this, a 'How it works' section illustrates the machine learning workflow with three steps: Label (setting up and managing labeling jobs), Build (connecting to other AWS services and transferring data), and Train (using SageMaker's algorithms and frameworks). Each step is accompanied by an icon and a brief description. On the right side of the console, there are several informational panels: 'Get started' with a 'SageMaker Studio' button, 'Pricing (US)' explaining pay-per-use pricing, 'Related services' listing AWS Glue, Amazon EC2, and Amazon ElastiBlock Store, and 'More resources' with links to developer resources and the AWS Developer Forum.

Amazon SageMaker

MACHINE LEARNING

Amazon SageMaker

Build, train, and deploy machine learning models at scale

The quickest and easiest way to get ML models from idea to production.

How it works

Label

Set up and manage labeling jobs for highly accurate training datasets within Amazon SageMaker, using active learning and human labeling

Build

Connect to other AWS services and transfer data in Amazon SageMaker notebooks

Train

Use Amazon SageMaker's algorithms and frameworks, or bring your own, for distributed training

Get started

Explore SageMaker Studio, a machine learning Integrated Development Environment (IDE) for building, training, and debugging models, tracking experiments, deploying models, and monitoring their performance.

[SageMaker Studio](#)

Pricing (US)

With Amazon SageMaker, you pay only for what you use. Authoring, training and hosting is billed by the second, with no minimum fees and no upfront commitments.

[Learn more](#)

Related services

- [AWS Glue](#)
- [Amazon EC2](#)
- [Amazon ElastiBlock Store \(EBS\)](#)

More resources

- [Developer resources](#)
- [AWS Developer Forum](#)

DEMO: AWS SAGEMAKER

YOU CAN CREATE A LABELING JOB BY NAVIGATING TO
GROUNDTRUTH ON THE LEFT-HAND SIDE

The screenshot displays the Amazon SageMaker console interface. On the left, the navigation pane is expanded, showing the 'Ground Truth' section with 'Labeling jobs' selected. The main content area is titled 'Labeling jobs' and includes a search bar. Below the search bar is a table with the following columns: Name, Status, Task type, Labeled objects/total, and Creation time. A message in the center of the table states 'There are currently no labeling jobs created.' and a 'Create labeling job' button is located below the message. The top of the console shows the AWS logo, a search bar, and the user's profile information.

DEMO: AWS SAGEMAKER

YOU CAN CHOOSE WHAT KIND OF LABELING YOU WANT TO PERFORM. WE WILL COVER THIS IN DETAIL IN THE NEXT SECTION.

aws Services Search for services, features, blogs, docs, and more [Alt+S]

S3 Amazon SageMaker

Amazon SageMaker

Dashboard
Search

SageMaker Domain

- Studio
- RStudio
- Canvas

Images

- ▼ Ground Truth
 - Labeling jobs
 - Labeling datasets
 - Labeling workforces
 - Plus [New](#)
- Notebook
- Processing
- Training
- Inference
- Edge Manager
- Augmented AI
- AWS Marketplace

Task type [Info](#)


Task category
Select the type of data being labeled to view available task templates for it or select 'Custom' to create your own.

Image

Task selection
Select the task that a human worker will perform to label objects in your dataset.


☒ Image Classification (Single Label)
Get workers to categorize images into individual classes. [Info](#)

☒ Basketball
☐ Soccer




☐ Image Classification (Multi-label)
Get workers to categorize images into one or more classes. [Info](#)


☒ Human
☒ Vehicle
☐ Animal



☐ Bounding box
Get workers to draw bounding boxes around specified objects in your images. [Info](#)




☐ Semantic segmentation
Get workers to draw pixel level labels around specific objects and segments in your images. [Info](#)



☐ Label verification
Get workers to verify existing labels in your dataset. [Info](#)

☒ Correct label
☐ Incorrect label

Car



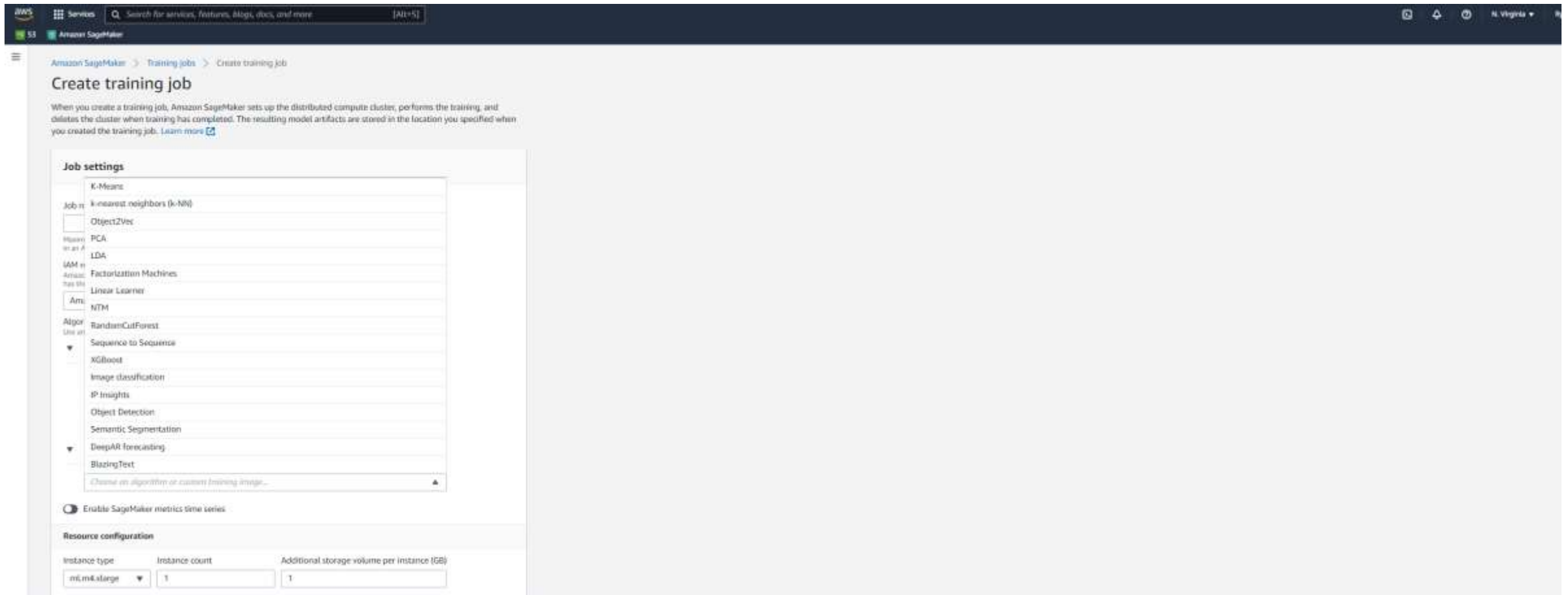
DEMO: AWS SAGEMAKER

CLICK ON TRAINING JOBS AND CLICK ON
CREATE TRAINING JOB

The screenshot displays the AWS SageMaker console interface. The top navigation bar includes the AWS logo, a search bar, and the user's account information (N. Virginia, Ryan Ahmed). The left sidebar shows the SageMaker dashboard and a list of services, with 'Training jobs' highlighted under the 'Training' category. The main content area is titled 'Training jobs' and features a search bar, a refresh button, and an 'Actions' dropdown menu. A prominent orange button labeled 'Create training job' is visible. Below these elements is a table with columns for 'Name', 'Creation time', 'Duration', and 'Status'. The table currently displays the message 'There are currently no resources.'

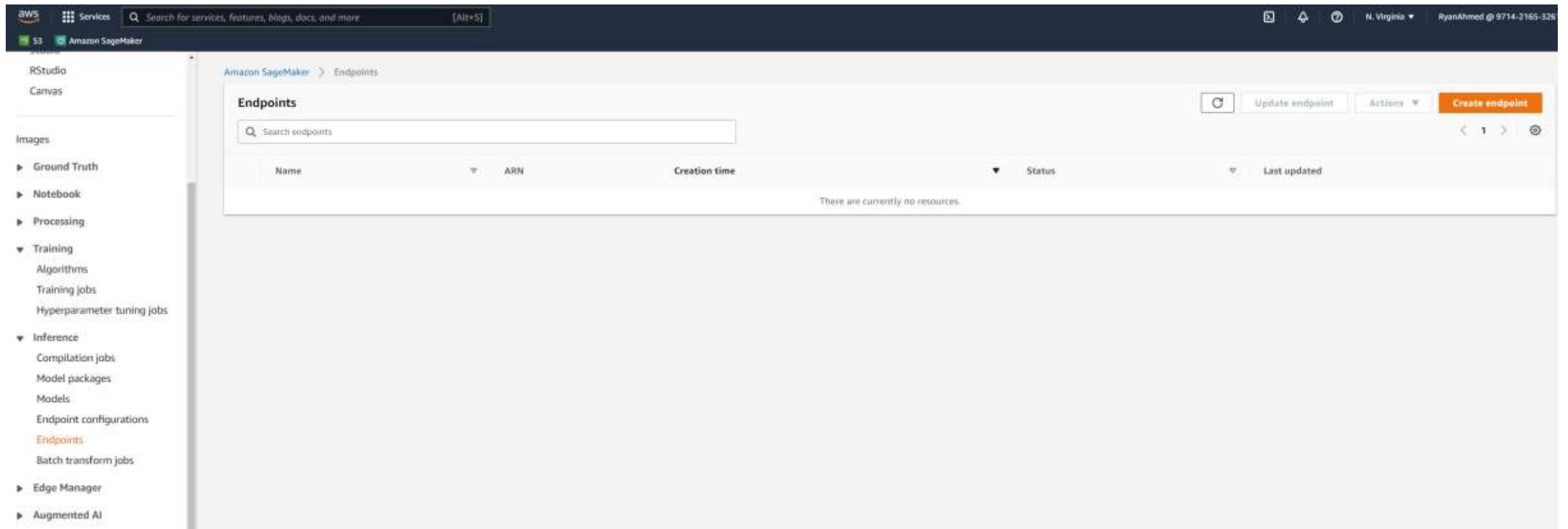
DEMO: AWS SAGEMAKER

YOU CAN CREATE A NEW TRAINING JOB AND SELECT AN ALGORITHM FROM THE LIST. NOTE THAT WE WILL COVER THIS IN GREAT DETAILS IN THE NEXT COUPLE OF DAYS!



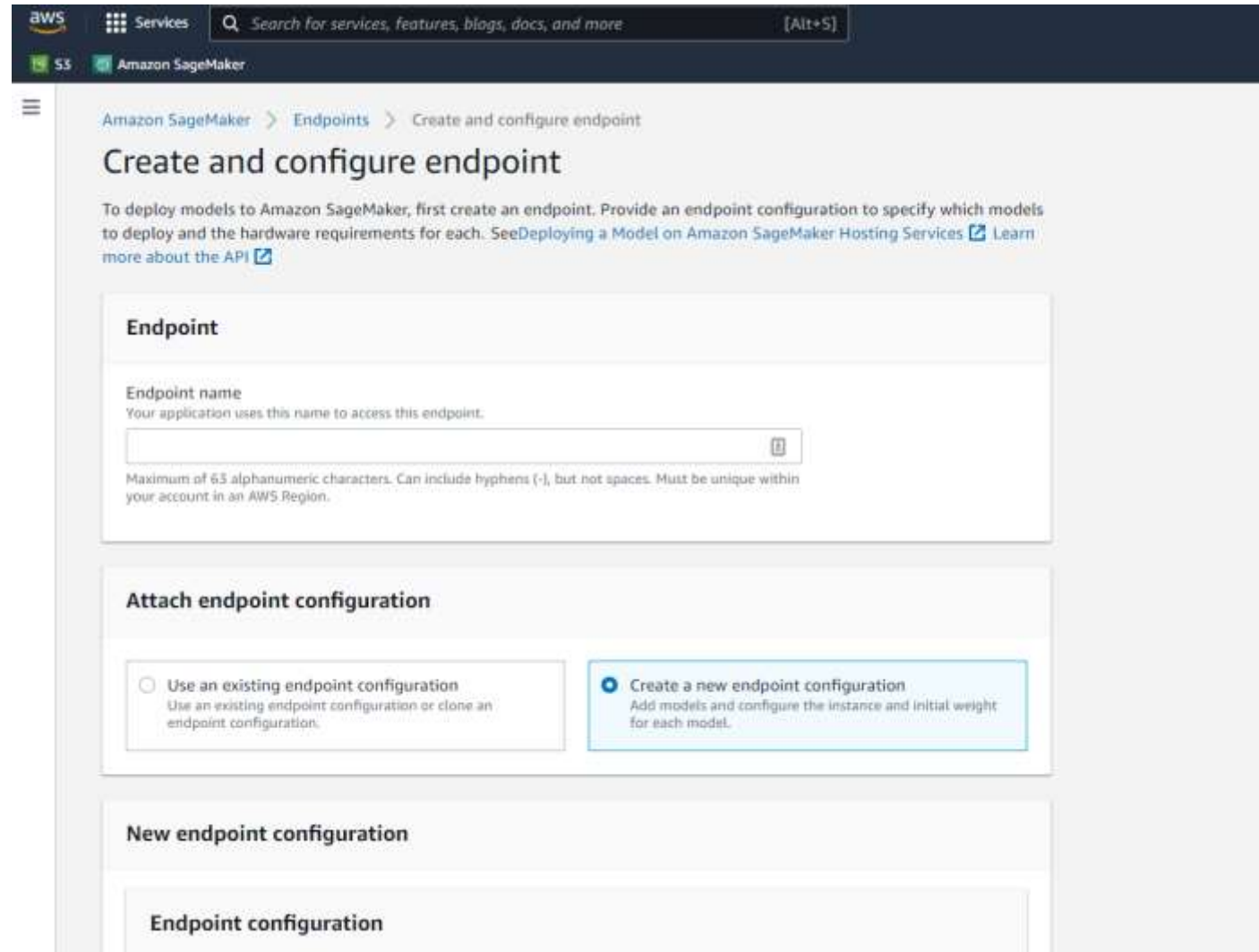
DEMO: AWS SAGEMAKER

AFTER THE MODEL IS TRAINED, YOU WILL NEED TO DEPLOY AN ENDPOINT AND MAKE INFERENCE ON THE DEPLOYED MODEL. YOU CAN CREATE AN ENDPOINT BY CLICKING ON CREATE ENDPOINT FROM THE INFERENCE PANEL.



DEMO: AWS SAGEMAKER

AFTER YOU CLICK ON CREATE ENDPOINT, YOU
CAN CONFIGURE THE ENDPOINT HERE!



The screenshot shows the AWS SageMaker console interface. At the top, there's a navigation bar with the AWS logo, 'Services' menu, a search bar, and a keyboard shortcut '[Alt+S]'. Below this, a breadcrumb trail reads 'Amazon SageMaker > Endpoints > Create and configure endpoint'. The main heading is 'Create and configure endpoint'. A descriptive paragraph explains that to deploy models, one must first create an endpoint and provide a configuration, with links to documentation and the API. The form is divided into sections: 'Endpoint' with a text input for 'Endpoint name' (with a character limit and uniqueness note), 'Attach endpoint configuration' with two radio button options ('Use an existing endpoint configuration' and 'Create a new endpoint configuration'), and 'New endpoint configuration' which contains a sub-section for 'Endpoint configuration'.

aws Services Search for services, features, blogs, docs, and more [Alt+S]

S3 Amazon SageMaker

Amazon SageMaker > Endpoints > Create and configure endpoint

Create and configure endpoint

To deploy models to Amazon SageMaker, first create an endpoint. Provide an endpoint configuration to specify which models to deploy and the hardware requirements for each. See [Deploying a Model on Amazon SageMaker Hosting Services](#) [Learn more about the API](#)

Endpoint

Endpoint name
Your application uses this name to access this endpoint.

Maximum of 63 alphanumeric characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.

Attach endpoint configuration

☐ Use an existing endpoint configuration
Use an existing endpoint configuration or clone an endpoint configuration.

☒ Create a new endpoint configuration
Add models and configure the instance and initial weight for each model.

New endpoint configuration

Endpoint configuration

DEMO: AWS SAGEMAKER

CLICK ON AUGEMENTED AI WHICH PROVIDES BUILT-IN HUMAN REVIEWS FOR ML WORKFLOWS.

aws

Services

Search for services, features, blogs, docs, and more

[Alt+S]

S3

Amazon SageMaker

Amazon SageMaker

Dashboard

Search

SageMaker Domain

- Studio
- RStudio
- Canvas


Images

- Ground Truth
- Notebook
- Processing
- Training
- Inference
- Edge Manager
- Augmented AI
- AWS Marketplace

Amazon SageMaker > Human review workflows


▼ How it works

Amazon A2I provides built-in human review workflows for common machine learning use cases, such as content moderation and text extraction from documents, which enables you to review predictions from Amazon Rekognition and Amazon Textract. You can also create your own human review workflows for ML models built using Amazon SageMaker or other tools. [Learn more](#)



Step 1: Create human review workflow

You can use a human review workflow, or flow definition, to configure the conditions that trigger a human review (such as confidence thresholds or random sampling), specify the worker task UI, and choose your workforce. After this step you will have a workflow ARN to be used in Step 2. [Learn more](#)



Step 2: Create and start a human loop

A human loop starts your human review workflow and sends data review tasks to human workers. To start a human loop, copy the workflow ARN value and use it as the FlowDefinitionArn in your API call when you create a human loop. [Learn more](#)

Human review workflows (0)

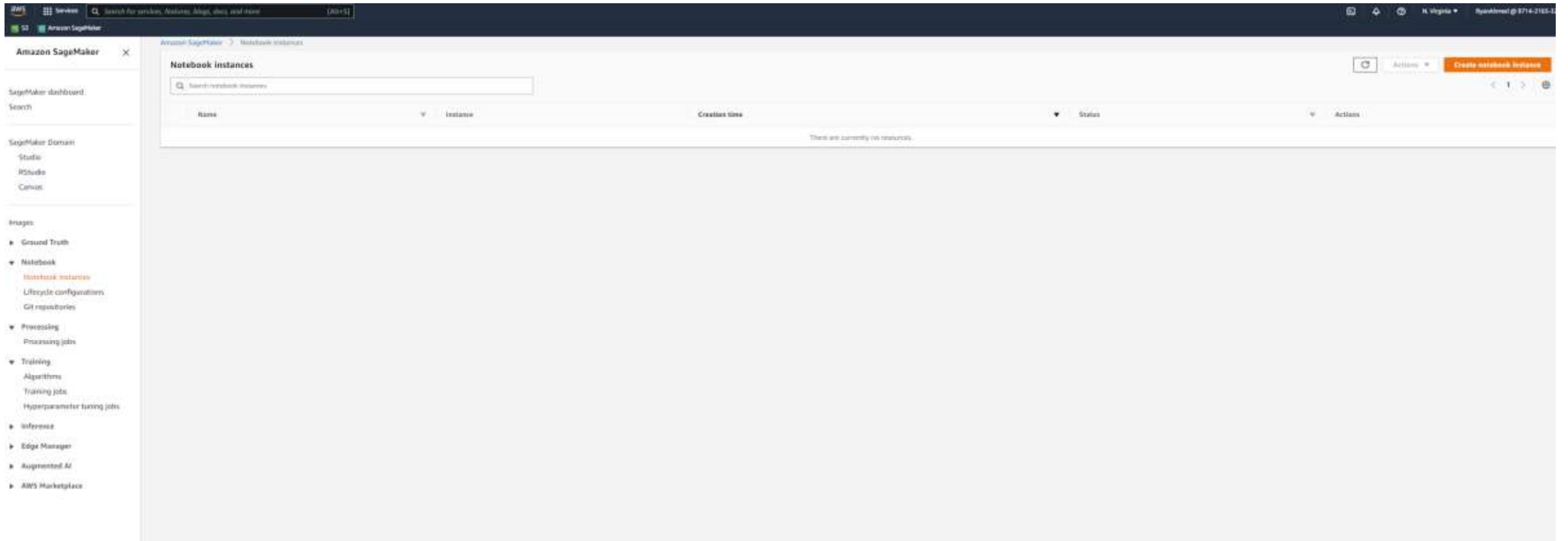
Create human review workflow

< 1 >

Name	Workflow ARN	Status	Created
There are currently no human review workflows.			
<div>Create human review workflow</div>			

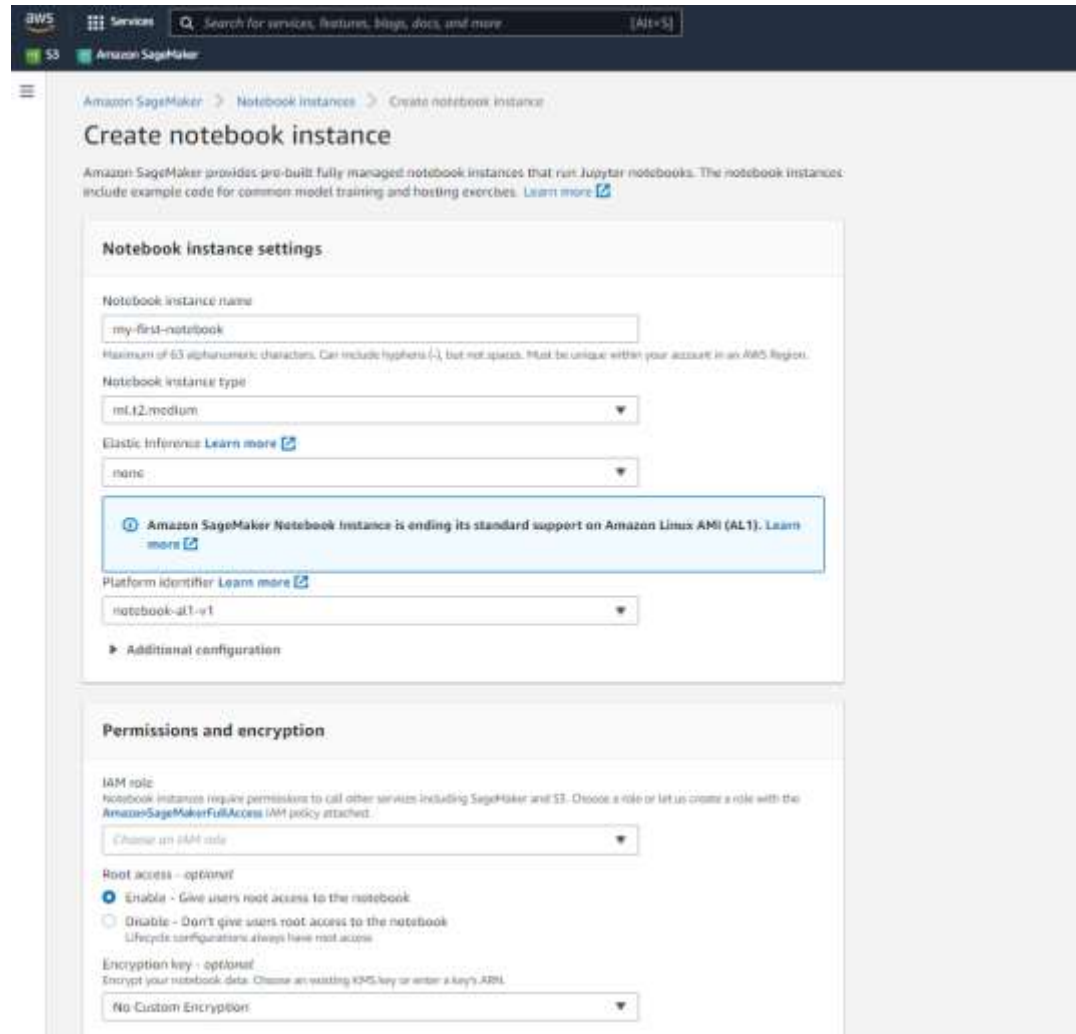
DEMO: AWS SAGEMAKER

CLICK ON NOTEBOOK INSTANCES AND CLICK ON CREATE
NOTEBOOK INSTANCE



DEMO: AWS SAGEMAKER

PROVIDE A NAME AND SELECT INSTANCE TYPE. NOTE THAT YOU CAN ENABLE ELASTIC INFERENCE. ELASTIC INFERENCE (EI) CAN SPEED UP THE THROUGHPUT AND DECREASE THE LATENCY AT A FRACTION OF THE COST OF USING A DEDICATED GPU INSTANCE.



The screenshot shows the AWS SageMaker console interface for creating a new notebook instance. The top navigation bar includes the AWS logo, 'Services', a search bar, and the user's account name '[AL1+S]'. The breadcrumb trail indicates the path: Amazon SageMaker > Notebook instances > Create notebook instance. The main heading is 'Create notebook instance', followed by a descriptive paragraph about SageMaker's managed notebooks and a 'Learn more' link. The 'Notebook instance settings' section contains several fields: 'Notebook instance name' (text input with 'my-first-notebook'), 'Notebook instance type' (dropdown menu with 'ml.t2.medium' selected), 'Elastic Inference' (dropdown menu with 'none' selected, accompanied by a 'Learn more' link), and 'Platform identifier' (dropdown menu with 'notebook-ai1-v1' selected, also with a 'Learn more' link). A blue informational banner states: 'Amazon SageMaker Notebook Instance is ending its standard support on Amazon Linux AMI (AL1). Learn more'. Below this is an 'Additional configuration' section. The 'Permissions and encryption' section includes an 'IAM role' dropdown (set to 'Change an IAM role'), a 'Root access - optional' section with radio buttons for 'Enable' (selected) and 'Disable', and an 'Encryption key - optional' dropdown set to 'No Custom Encryption'.

Amazon SageMaker > Notebook instances > Create notebook instance

Create notebook instance

Amazon SageMaker provides pre-built fully managed notebook instances that run Jupyter notebooks. The notebook instances include example code for common model training and hosting exercises. [Learn more](#)

Notebook instance settings

Notebook instance name
my-first-notebook
Maximum of 63 alphanumeric characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.

Notebook instance type
ml.t2.medium

Elastic Inference [Learn more](#)
none

Amazon SageMaker Notebook Instance is ending its standard support on Amazon Linux AMI (AL1). [Learn more](#)

Platform identifier [Learn more](#)
notebook-ai1-v1

► Additional configuration

Permissions and encryption

IAM role
Notebook instances require permissions to call other services including SageMaker and S3. Choose a role or let us create a role with the [AmazonSageMakerFullAccess](#) IAM policy attached.
Change an IAM role

Root access - optional
☒ Enable - Give users root access to the notebook
☐ Disable - Don't give users root access to the notebook
Lifecycle configurations always have root access

Encryption key - optional
Encrypt your notebook data. Choose an existing KMS key or enter a key's ARN.
No Custom Encryption

DEMO: AWS SAGEMAKER

CREATE A NEW IAM ROLE THAT CAN ACCESS ANY S3 BUCKET. CLICK ON CREATE ROLE.

Create an IAM role [X]

Passing an IAM role gives Amazon SageMaker permission to perform actions in other AWS services on your behalf. Creating a role here will grant permissions described by the [AmazonSageMakerFullAccess](#) IAM policy to the role you create.

The IAM role you create will provide access to:

- ☒ **S3 buckets you specify - optional**
 - ☒ **Any S3 bucket**
Allow users that have access to your notebook instance access to any bucket and its contents in your account.
 - ☐ **Specific S3 buckets**

Comma delimited. ARNs, "*" and "/" are not supported.
 - ☐ **None**
- ☒ **Any S3 bucket with "sagemaker" in the name**
- ☒ **Any S3 object with "sagemaker" in the name**
- ☒ **Any S3 object with the tag "sagemaker" and value "true"** [See Object tagging](#)
- ☒ **S3 bucket with a Bucket Policy allowing access to SageMaker** [See S3 bucket policies](#)



DEMO: AWS SAGEMAKER

NOW THE ROLE IS CREATED! CLICK ON CREATE NOTEBOOK INSTANCE.

Permissions and encryption

IAM role
Notebook instances require permissions to call other services including SageMaker and S3. Choose a role or let us create a role with the [AmazonSageMakerFullAccess](#) IAM policy attached.

AmazonSageMaker-ExecutionRole-20220323T130903 ▼

 **Success! You created an IAM role.**
[AmazonSageMaker-ExecutionRole-20220323T130903](#) 

Root access - optional

☒ Enable - Give users root access to the notebook

☐ Disable - Don't give users root access to the notebook
Lifecycle configurations always have root access

Encryption key - optional
Encrypt your notebook data. Choose an existing KMS key or enter a key's ARN.

No Custom Encryption ▼

► **Network** - optional

► **Git repositories** - optional

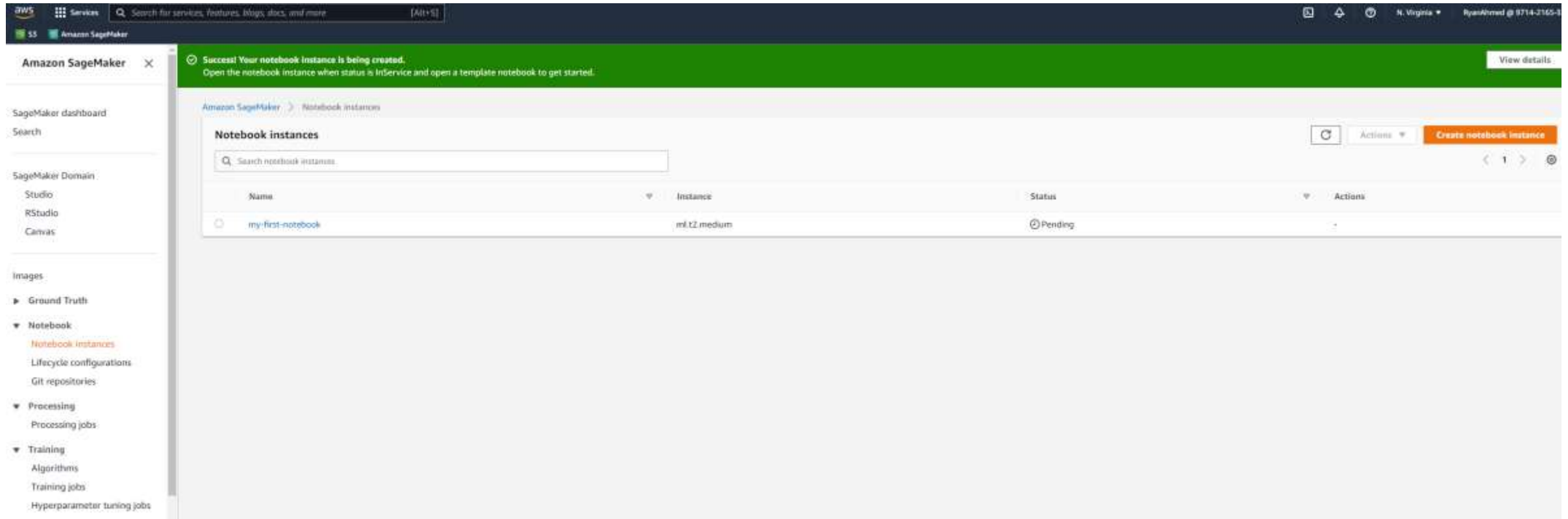
► **Tags** - optional

Cancel

Create notebook instance

DEMO: AWS SAGEMAKER

THE NOTEBOOK INSTANCE IS NOW BEING CREATED. NOTE THAT YOU MUST TERMINATE THE INSTANCE TO AVOID INCURRING ANY CHARGES IN THE FUTURE.



The screenshot displays the AWS SageMaker console interface. At the top, a green banner indicates: "Success! Your notebook instance is being created. Open the notebook instance when status is InService and open a template notebook to get started." Below this, the "Notebook instances" section is active, showing a table with one instance: "my-first-notebook" with a status of "Pending". The left sidebar contains navigation links for SageMaker dashboard, SageMaker Domain, and various SageMaker services like Ground Truth, Notebook, Processing, and Training.

Amazon SageMaker

Success! Your notebook instance is being created.
Open the notebook instance when status is InService and open a template notebook to get started.

Amazon SageMaker > Notebook instances

Notebook instances

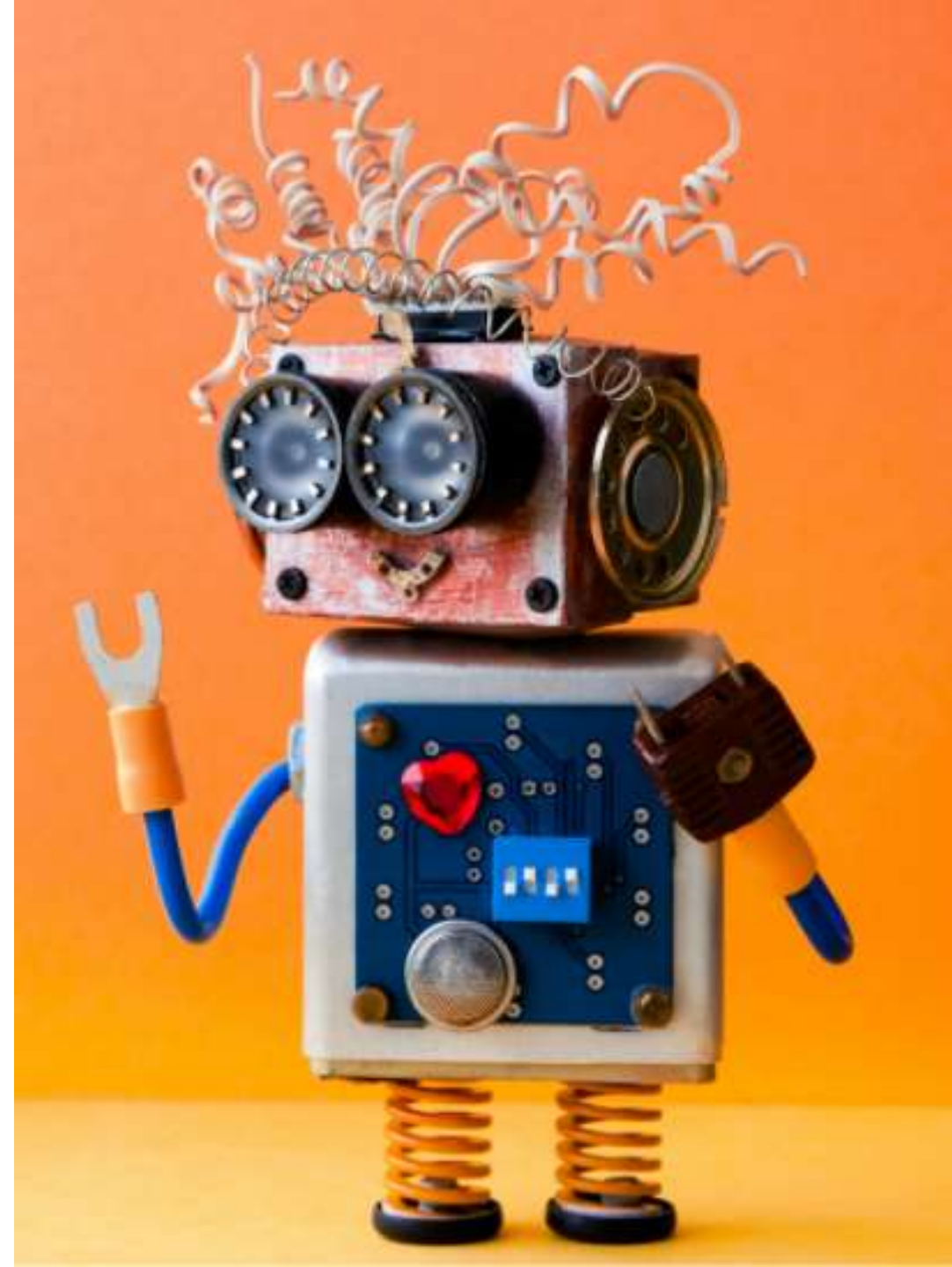
Search notebook instances

Name	Instance	Status	Actions
my-first-notebook	ml.t2.medium	Pending	

Navigation sidebar:

- SageMaker dashboard
- SageMaker Domain
 - Studio
 - RStudio
 - Canvas
- Images
 - Ground Truth
 - Notebook
 - Notebook instances
 - Lifecycle configurations
 - Git repositories
 - Processing
 - Processing jobs
 - Training
 - Algorithms
 - Training jobs
 - Hyperparameter tuning jobs

AWS SAGEMAKER DEMO – PART #2 (WRITE YOUR FIRST CODE & TERMINATE INSTANCE)



DEMO: AWS SAGEMAKER

NOW THE INSTANCE SHOWS IN-SERVICE,
CLICK ON OPEN JUPYTER

The screenshot displays the AWS SageMaker console interface. At the top, a green banner indicates a successful creation of a notebook instance. The left sidebar contains a navigation menu with categories like Labeling, Notebook, Processing, Training, Inference, Edge Manager, and Augmented AI. The main content area shows the 'Notebook instances' page with a table listing the instance 'my-first-notebook' in an 'InService' state. The 'Actions' column for this instance provides links to 'Open Jupyter' and 'Open JupyterLab'.

Success! Your notebook instance is being created.
Open the notebook instance when status is InService and open a template notebook to get started. [View details.](#)

Amazon SageMaker > Notebook instances

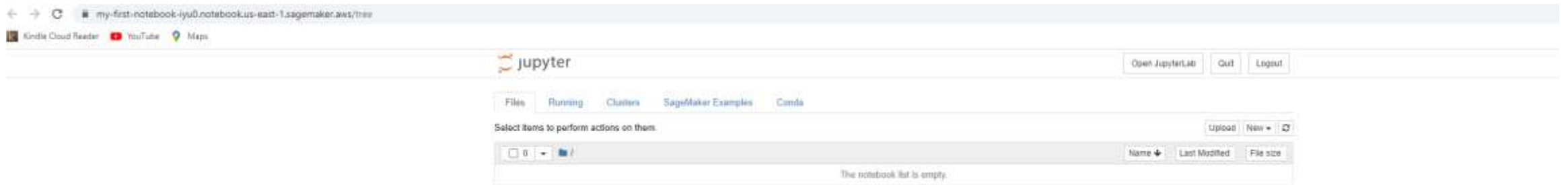
Notebook instances [Refresh](#) [Actions](#) [Create notebook instance](#)

Search notebook instances

	Name	Instance	Status	Actions
<input type="checkbox"/>	my-first-notebook	ml.t2.medium	InService	Open Jupyter Open JupyterLab

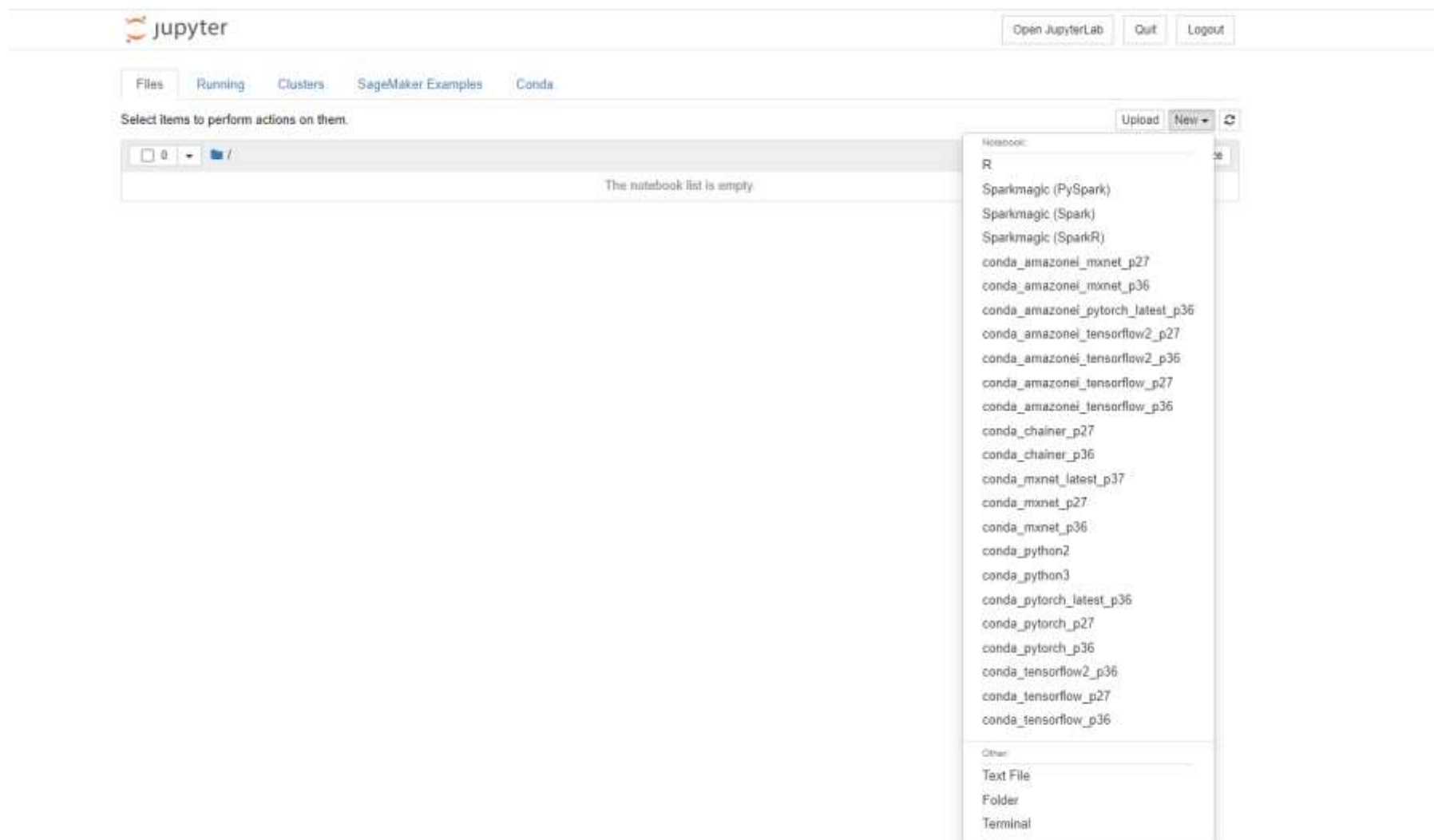
DEMO: AWS SAGEMAKER

NOW YOU CAN CLICK ON NEW TO CREATE A
NEW NOTEBOOK



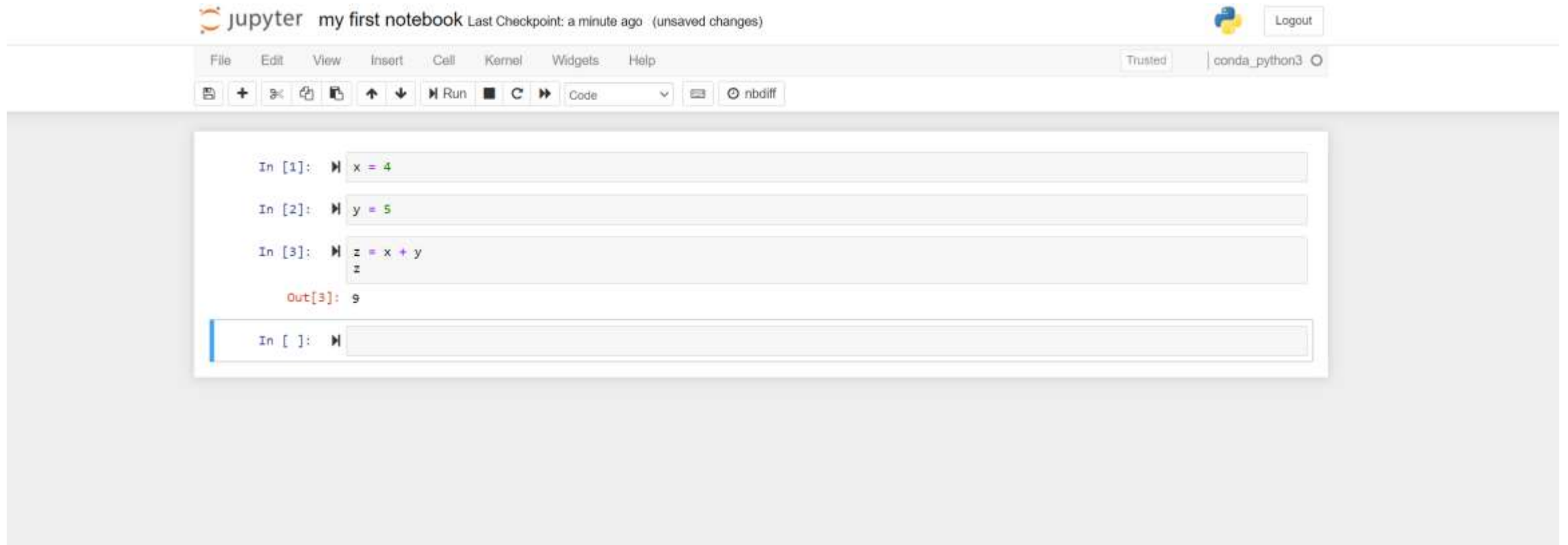
DEMO: AWS SAGEMAKER

SELECT CONDA_PYTHON3



DEMO: AWS SAGEMAKER

WRITE YOUR FIRST CODE



The screenshot displays a Jupyter Notebook interface. At the top, the header shows the Jupyter logo, the text "jupyter my first notebook", and a status message "Last Checkpoint: a minute ago (unsaved changes)". On the right side of the header, there is a Python logo and a "Logout" button. Below the header is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu bar, there are buttons for "Trusted" and "conda_python3". Below the menu bar is a toolbar with various icons for file operations (save, new, open, close), navigation (up, down), execution (run, stop, restart), and other functions (Code, nbdiff). The main area of the notebook contains three code cells. The first cell has the code `x = 4`. The second cell has the code `y = 5`. The third cell has the code `z = x + y` followed by `z` on a new line. Below the third cell, the output is displayed as `Out[3]: 9`. At the bottom, there is an empty code cell with the prompt `In []:`.

DEMO: AWS SAGEMAKER

TERMINATE THE INSTANCE BY SELECTING
ACTIONS THEN STOP **[IMPORTANT]**

The screenshot displays the AWS SageMaker console interface. At the top, a green banner indicates a successful notebook instance creation. Below this, the 'Notebook instances' section is active, showing a table with one instance named 'my-first-notebook' in the 'InService' state. The 'Actions' dropdown menu is open for this instance, listing options such as 'Open Jupyter', 'Open JupyterLab', 'Stop', 'Start', 'Update settings', 'Add/Edit tags', and 'Delete'. The 'Stop' option is highlighted, indicating the next step in the process.

Success! Your notebook instance is being created.
Open the notebook instance when status is InService and open a template notebook to get started.

Amazon SageMaker > Notebook instances

Notebook instances

Search notebook instances

Name	Instance	Status	Actions
my-first-notebook	ml.t2.medium	InService	Open Jupyter Open JupyterLab

Actions

- Open Jupyter
- Open JupyterLab
- Stop
- Start
- Update settings
- Add/Edit tags
- Delete

Create notebook instance

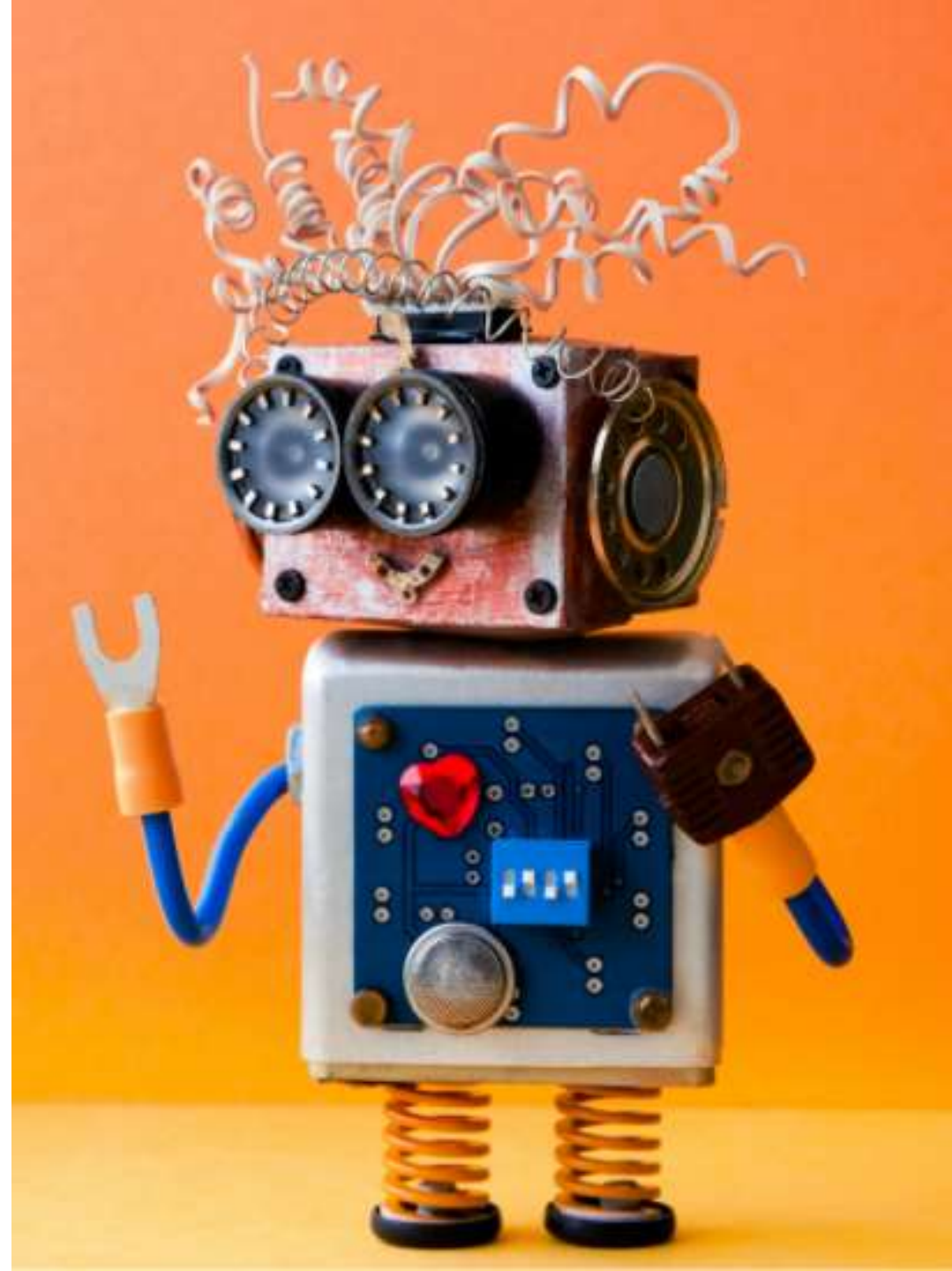
DEMO: AWS SAGEMAKER

NOW IT SHOWS STOPPED. YOU THEN CLICK ON ACTIONS AND DELETE THE INSTANCE.

The screenshot displays the AWS SageMaker console interface. At the top, a green banner indicates a successful creation of a notebook instance, with instructions to open it when in the 'InService' state. The left sidebar contains navigation links for the SageMaker dashboard, search, domain (Studio, RStudio, Canvas), and images (Ground Truth, Labeling jobs, Labeling datasets, Labeling workforces, and a 'New' button). The main content area is titled 'Notebook instances' and features a search bar and a 'Create notebook instance' button. Below this is a table with the following columns: Name, Instance, Status, and Actions. A single instance, 'my-first-notebook', is listed with an 'ml.t2.medium' instance type and a 'Stopped' status. The 'Actions' column for this instance includes a 'Start' button.

Name	Instance	Status	Actions
my-first-notebook	ml.t2.medium	Stopped	Start

AWS SAGEMAKER DEMO – PART #3 (MARKETPLACE TUTORIAL)



DEMO: AWS SAGEMAKER

NAVIGATE TO AWS MARKETPLACE AND SELECT MODEL PACKAGES.
THESE ARE PRETRAINED MODELS THAT ARE READY TO USE!

The screenshot displays the AWS SageMaker console interface. On the left, a navigation sidebar lists various SageMaker components: SageMaker dashboard, Search, SageMaker Domain (Studio, RStudio, Canvas), Images (Ground Truth, Notebook, Processing, Training, Inference, Edge Manager, Augmented AI), and AWS Marketplace (Model packages, Algorithms, AWS Data Exchange, All products). The main content area is titled 'Search AWS Marketplace' and includes a search bar. Below the search bar, a blue banner offers assistance with creating a custom machine learning solution. The 'Featured model packages' section is prominently displayed, featuring six model cards, each with a 'View product' button. The models are:

- GluonCV YOLOv3 Object Detector** (By Amazon Web Services | Ver 1.1): A powerful network for fast and accurate object detection, powered by GluonCV. (2 stars)
- License Plate Detection and Recognition** (By Quantiphi | Ver 3.0): Automatic Detection & Recognition of Vehicle License Plate from an image using Deep Learning ML Models.
- GPT-2 - Text generation** (By Extrapolations | Ver 2.1.0): Generate text using the largest GPT-2 algorithm. (1 star)
- Face and License Plate Anonymizer** (By NaviInfo Europei S.V. | Ver 4.0.0): Detection and blurring of faces and license plates. (Free Trial)
- Vehicle Damage Inspection** (By Persistent Systems | Ver 0.3): Classifies vehicle damage images in multiple types.
- Passport Data Page Detection** (By Grip | Ver 1.0.1): Passport Data Page Detection allows you to detect if a passport data page photo is a valid photo for identity use. (Free Trial)

DEMO: AWS SAGEMAKER

LET'S TRY A SAMPLE MODEL FROM THE AWS
MARKETPLACE

aws marketplace

mxnet GluonCV YOLOv3 Object Detector


Product demo

Try a product demo of the object detection capabilities of GluonCV YOLOv3 Object Detector by uploading your own image below.

Object detection

Use your own image
Image must be in .jpg, .png or .bmp format and be no larger than 5 MB.

We will upload any confidential or sensitive information, use of this feature is for demonstration purposes only and is in a public environment.



Object details
Click on a row below or an object in the image to view details about the object.

[Continue to subscribe](#)

[Return to detail page](#)

DEMO: AWS SAGEMAKER

LET'S TRY A SAMPLE MODEL FROM THE AWS
MARKETPLACE



[About](#) [Categories](#) [Delivery Methods](#) [Solutions](#) [AWS IQ](#) [Resources](#) [Your Saved List](#)

[Partners](#) 5

Upload an image

Do not upload any confidential or sensitive information. Use of this feature is for demonstration purposes only and is in a public environment.

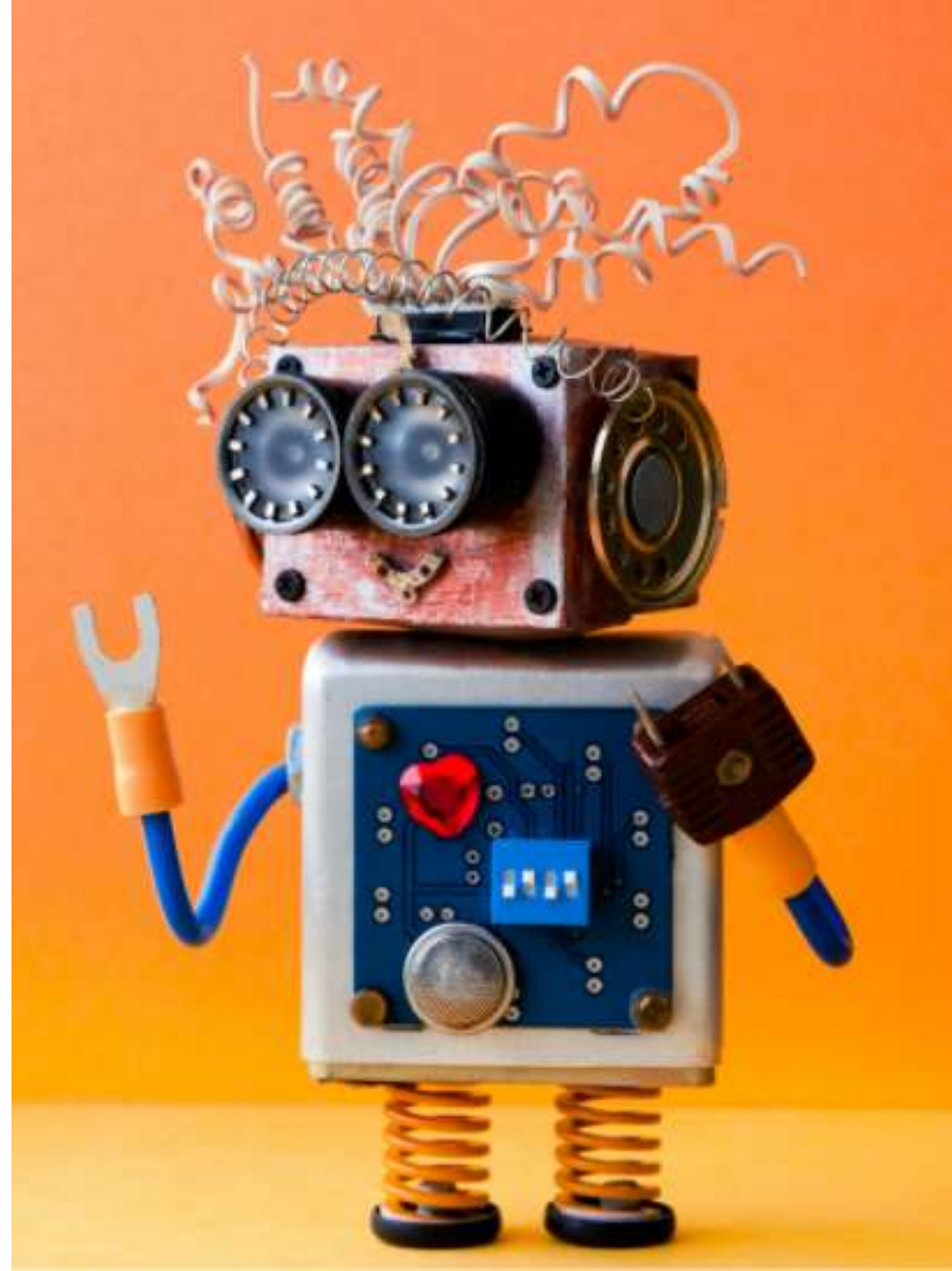


Objects identified in image

Object details

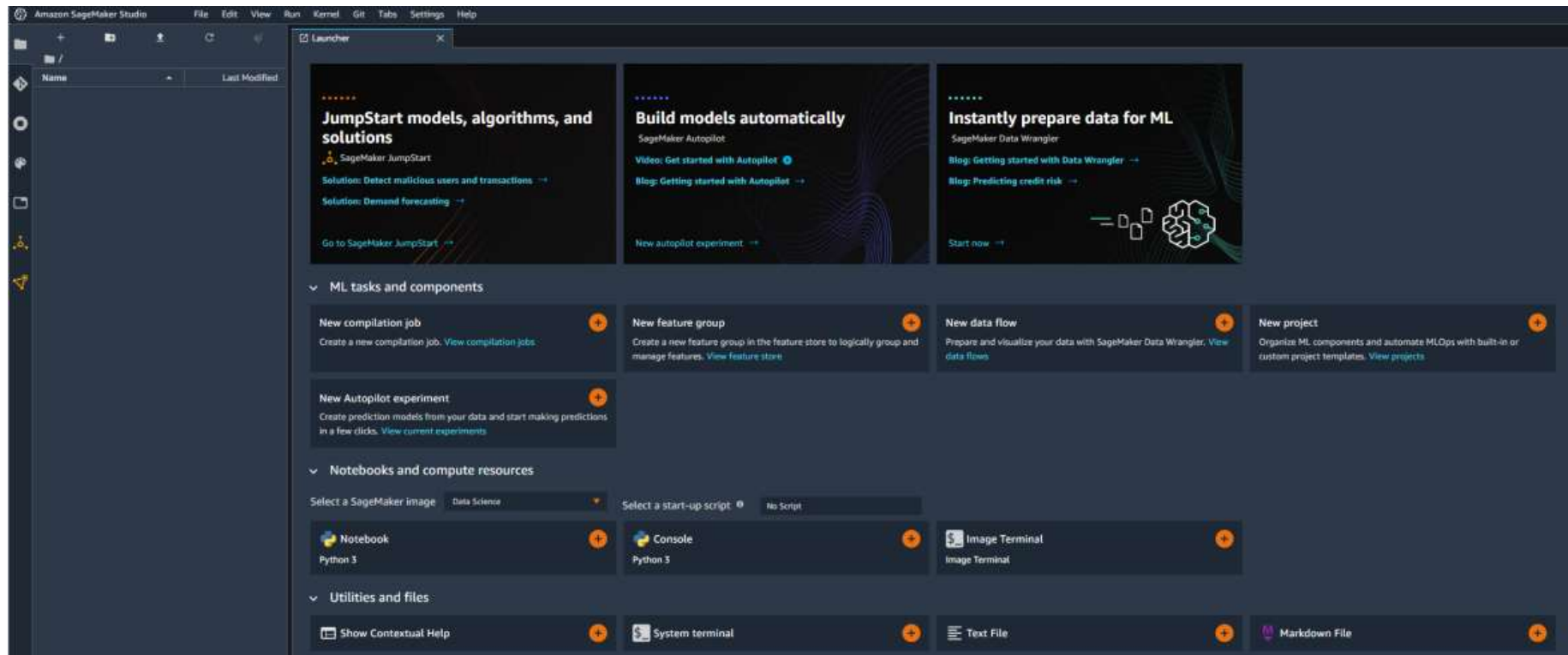
Click on a row below or an object in the image to view details about the object.

AWS SAGEMAKER DEMO – PART #4 (SAGEMAKER STUDIO)



DEMO: AWS SAGEMAKER

- Amazon SageMaker Studio is a web-based visual interface where developers can build, train and deploy AI/ML models in one place!
- SageMaker Studio enhances productivity by 10x since it offers much higher visibility and control compared to regular notebook instances.
- Developers can manage experiments, debug ML models, monitor models for bias and drift in SageMaker Studio.



DEMO: AWS SAGEMAKER

CLICK ON SAGEMAKER STUDIO

The screenshot displays the AWS SageMaker console interface. At the top, the AWS logo and 'Services' menu are visible, along with a search bar and a notification bell. The left sidebar contains navigation links for 'SageMaker dashboard', 'Search', 'SageMaker Domain' (with sub-links for 'Studio', 'RStudio', and 'Canvas'), 'Images', and a list of SageMaker components: 'Ground Truth', 'Notebook', 'Processing', 'Training', 'Inference', and 'Edge Manager'. The main content area features the 'MACHINE LEARNING' header and the 'Amazon SageMaker' title, followed by the subtitle 'Build, train, and deploy machine learning models at scale' and the tagline 'The quickest and easiest way to get ML models from idea to production.' Below this, the 'How it works' section is partially visible, showing three icons representing different stages of the machine learning process. On the right side, the 'Get started' section provides an overview of SageMaker Studio and includes a 'SageMaker Studio' button. The 'Pricing (US)' section explains the pay-as-you-go pricing model and includes a 'Learn more' link.

Amazon SageMaker

MACHINE LEARNING

Amazon SageMaker

Build, train, and deploy machine learning models at scale

The quickest and easiest way to get ML models from idea to production.

Get started

Explore SageMaker Studio, a machine learning Integrated Development Environment (IDE) for building, training, and debugging models, tracking experiments, deploying models, and monitoring their performance.

[SageMaker Studio](#)

Pricing (US)

With Amazon SageMaker, you pay only for what you use. Authoring, training and hosting is billed by the second, with no minimum fees and no upfront commitments.

[Learn more](#)

DEMO: AWS SAGEMAKER

YOU WILL NEED TO SETUP A SAGEMAKER DOMAIN. KEEP EVERYTHING AS DEFAULT AND CLICK SUBMIT.

Setup SageMaker Domain

Use SageMaker Domain as the central store to manage the configuration of SageMaker for your organization.

Quick setup

Let Amazon SageMaker configure your account, and set up permissions for your SageMaker Domain.

- Public internet access, and standard encryption
- SageMaker Studio integration
- Shareable SageMaker Studio Notebooks
- IAM Authentication

Standard setup

Control all aspects of account configuration, including permissions, integrations, and encryption.

- Advanced network security, and data encryption
- SageMaker Studio, and JupyterLab integration
- SageMaker Studio Projects, and JupyterLab configurable
- IAM, or SSO authentication

User profile

Name

default-1648074619296

The name can have up to 63 characters. Valid characters: A-Z, a-z, 0-9, and - (hyphen)

Default execution role

SageMaker Domain requires permissions for its users to access other AWS services, such as Amazon SageMaker and Amazon S3. For a broad range of capabilities, you may attach the [AmazonSageMakerFullAccess](#) policy to the execution role. If you don't have a role with this policy, we can create one for you.

AmazonSageMaker-ExecutionRole-20220323T130903

Cancel Submit

DEMO: AWS SAGEMAKER

SAGEMAKER DOMAIN IS NOW CREATED AND READY. CLICK ON LAUNCH APP AND THEN STUDIO.

The screenshot shows the AWS SageMaker console interface. At the top, a green banner states "The SageMaker Domain is ready" and instructs the user to "Choose your user name, then choose Launch app to get started." Below this, the "SageMaker Domain" page is displayed, showing a list of users and a "Launch app" button. The "Domain" section provides details about the domain's status, ID, execution role, and authentication method.

Users

Name
default-1648074619296

Domain

Status	Domain ID	Execution role	Authentication method
Ready The status of the SageMaker Domain, and is not the status of the compute resources such as EC2 instances to execute notebook.	d-1o3tuwuacvrd Use the SageMaker Domain ID for troubleshooting and tracking usage.	arn:aws:iam::971421653261:role/service-role/AmazonSageMaker-ExecutionRole-20220323T130903	AWS Identity and Access Management (IAM)

DEMO: AWS SAGEMAKER

YOU SHOULD SEE THE SAGEMAKER STUDIO
JUPYTER SERVER STARTING UP

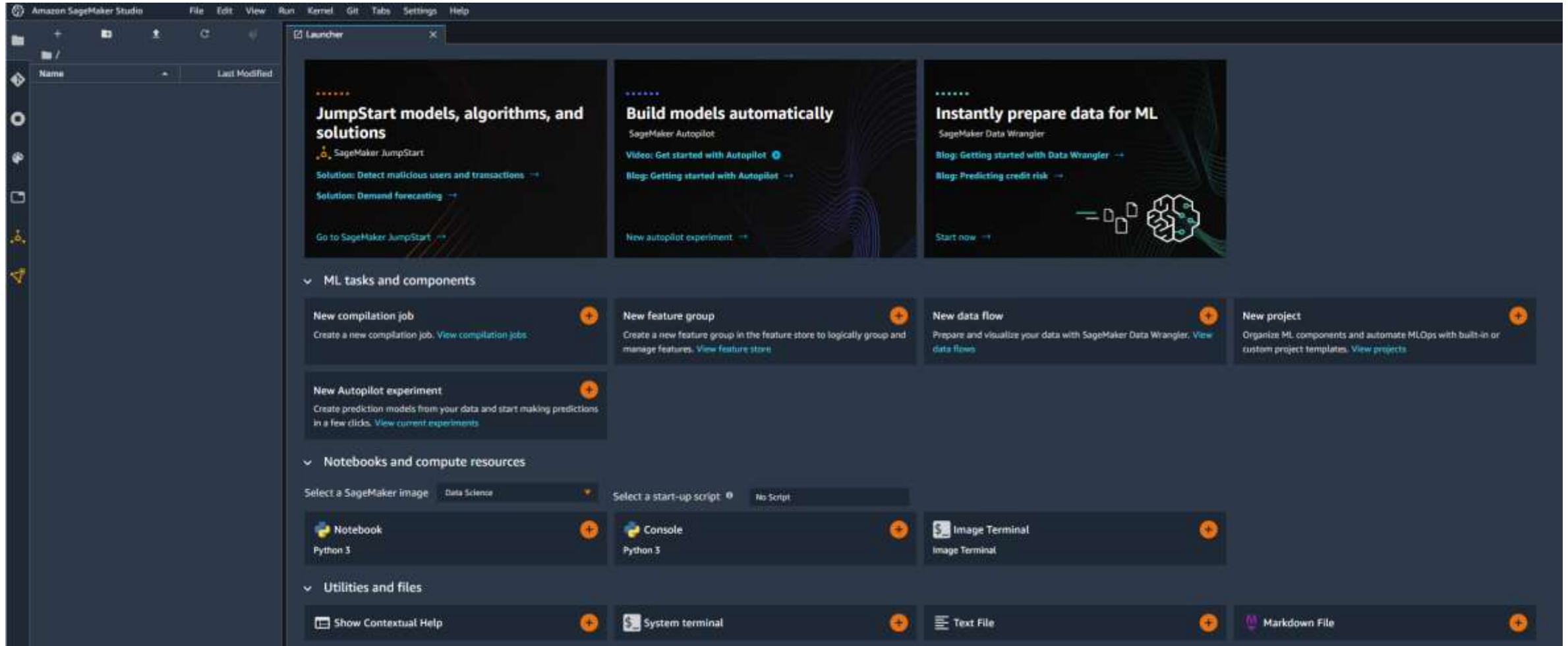


Amazon SageMaker Studio

Creating the JupyterServer application default...

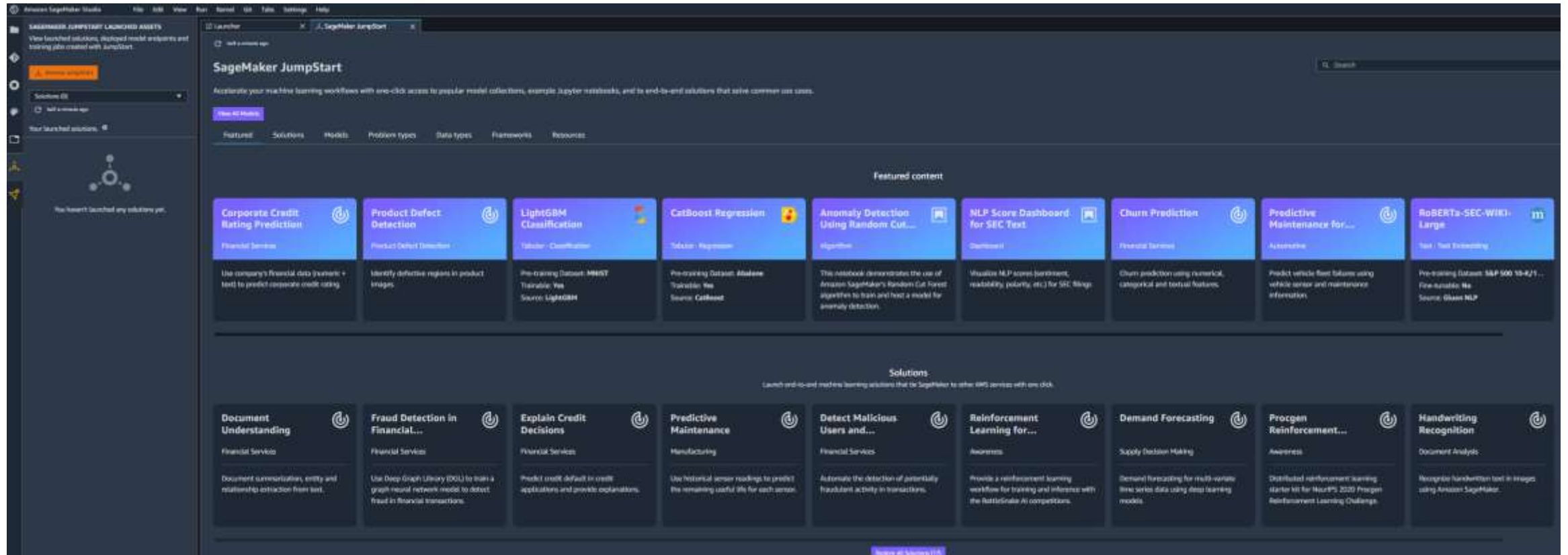
DEMO: AWS SAGEMAKER

WELCOME TO SAGEMAKER STUDIO



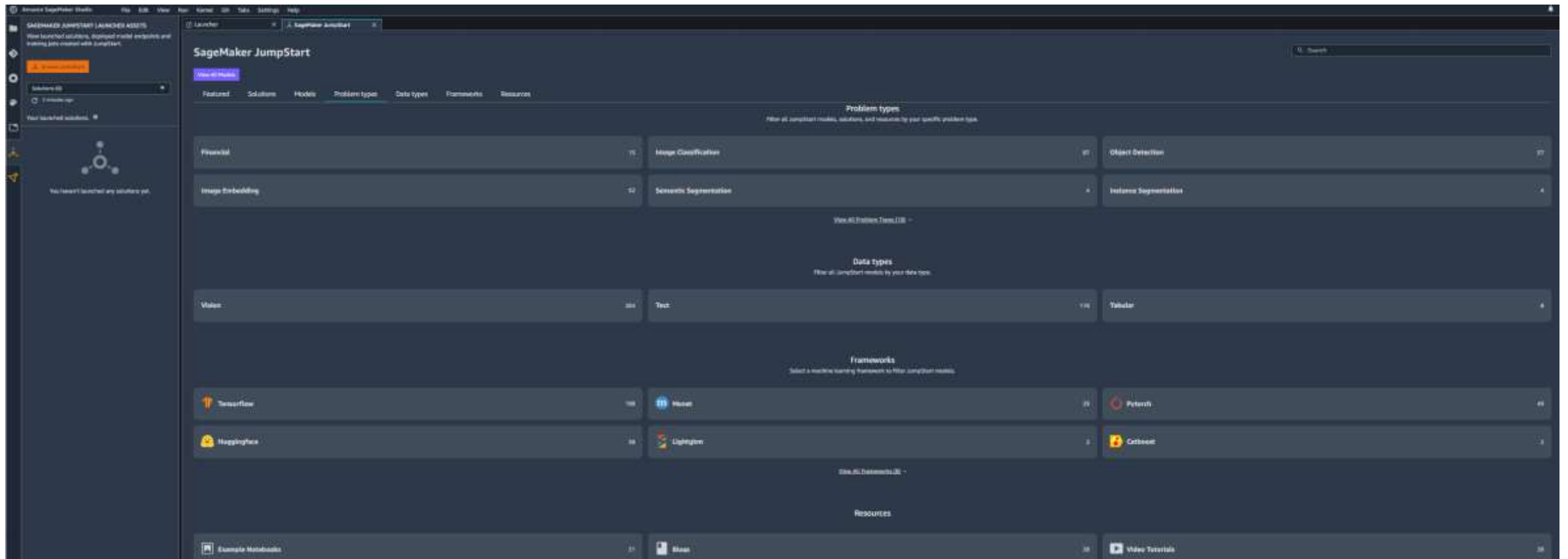
DEMO: AWS SAGEMAKER

CLICK ON JUMSTART



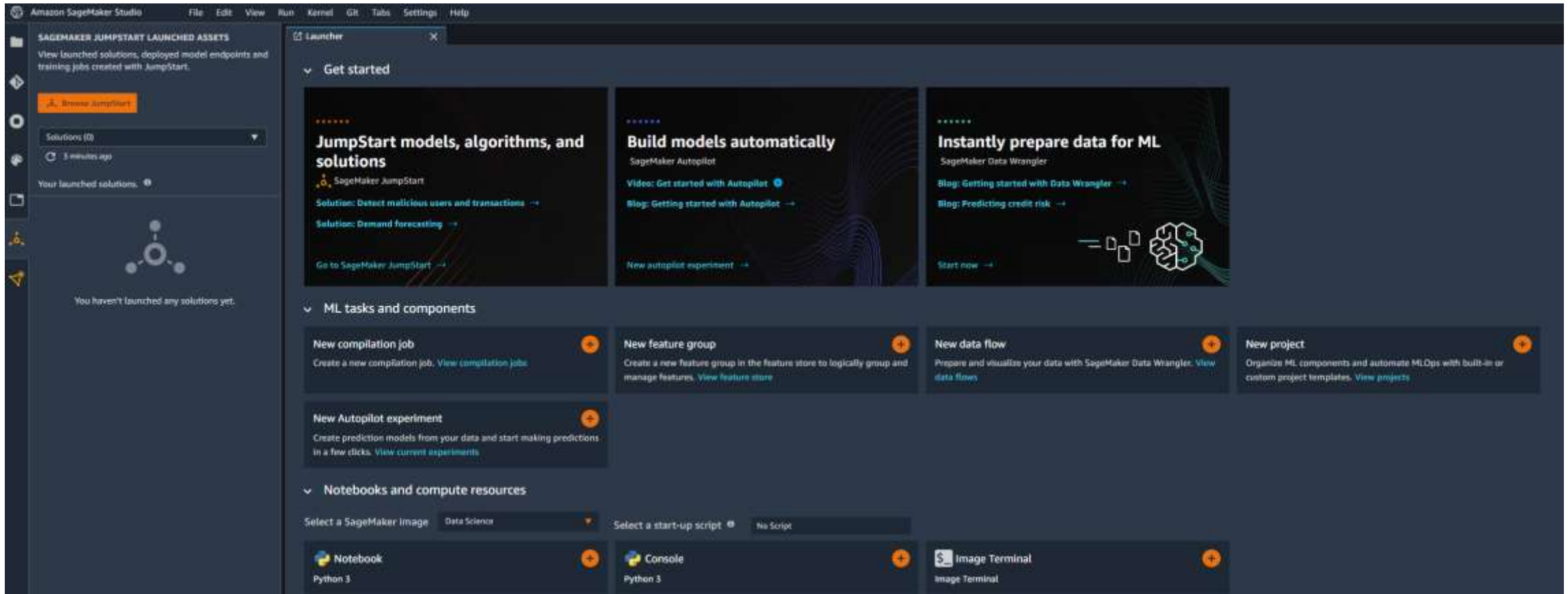
DEMO: AWS SAGEMAKER

YOU WILL FIND MANY MODELS GROUPED
BASED ON DATA TYPES, PROBLEM TYPES, AND
FRAMEWORKS



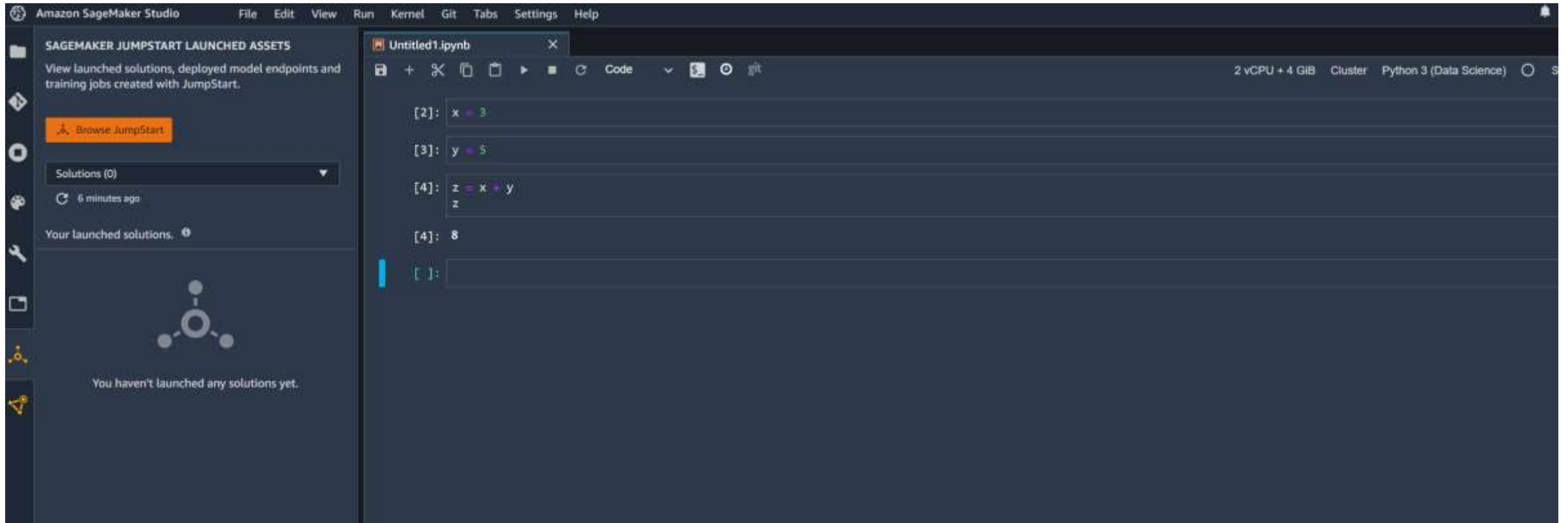
DEMO: AWS SAGEMAKER

CLICK ON NOTEBOOK TO LAUNCH A JUPYTER
NOTEBOOK



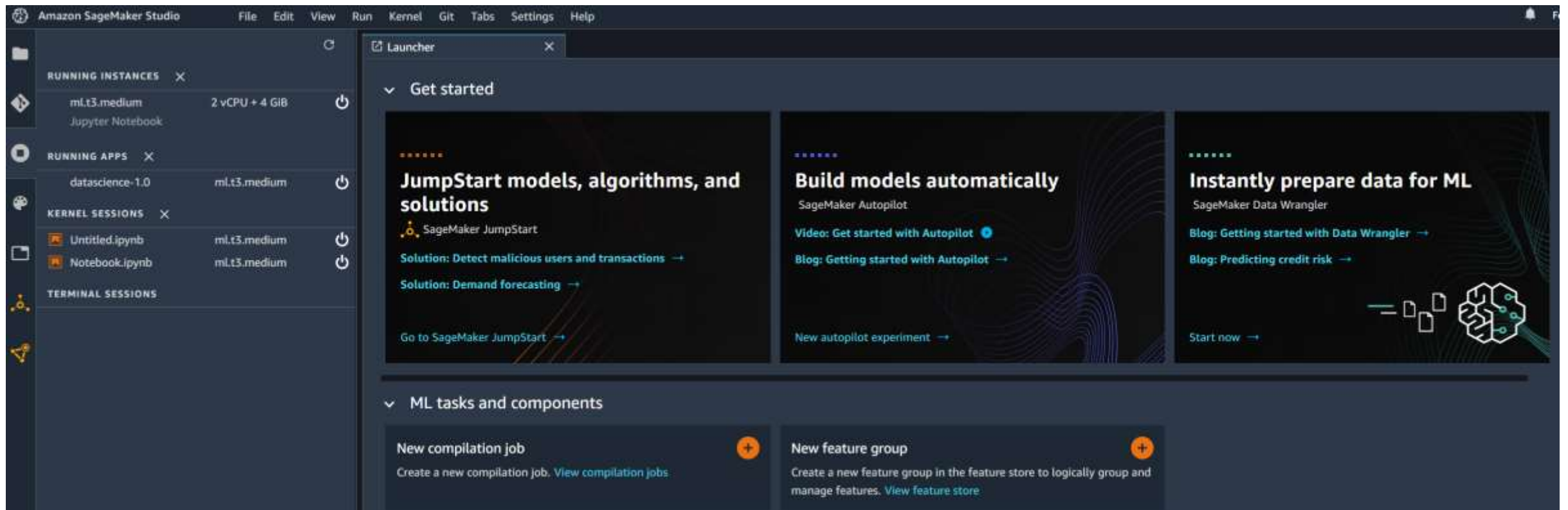
DEMO: AWS SAGEMAKER

RUN YOUR FIRST CODE IN SAGEMAKER STUDIO



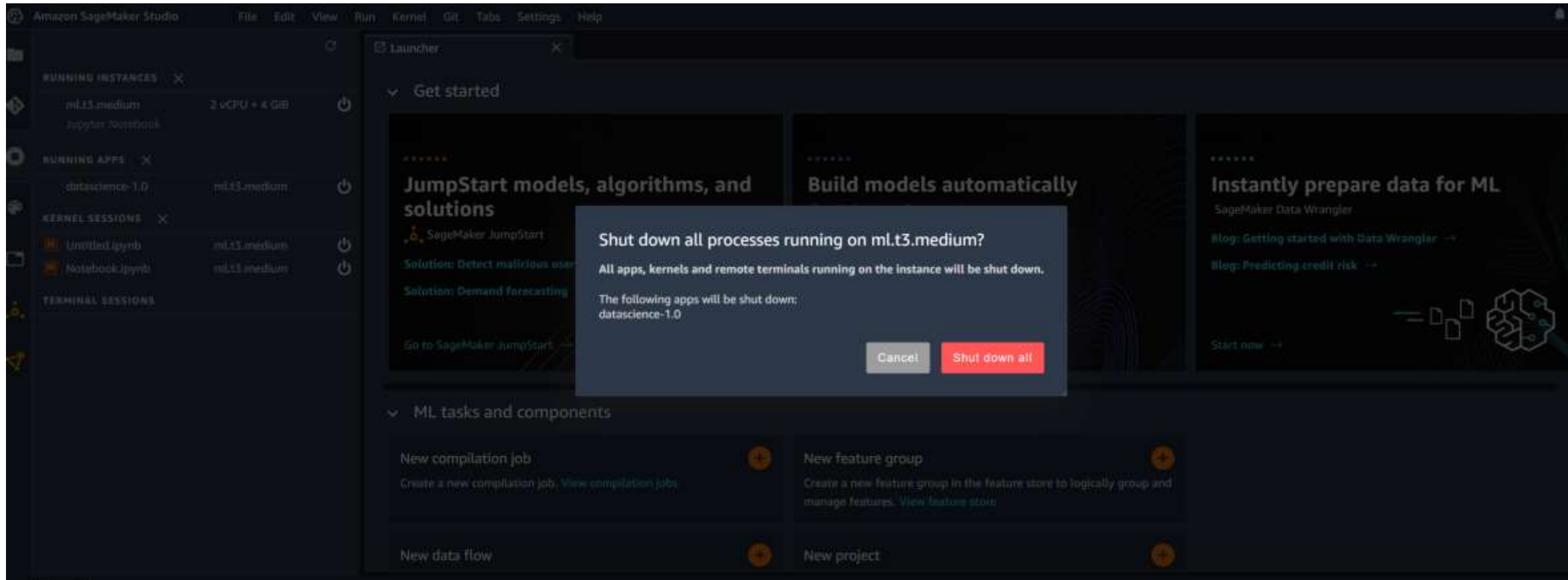
DEMO: AWS SAGEMAKER

TERMINATION OF SAGEMAKER STUDIO IS DIFFERENT COMPARED TO A REGULAR SAGEMAKER INSTANCE. YOU WILL NEED TO CLIK ON POWER OFF BUTTON **[IMPORTANT]**.



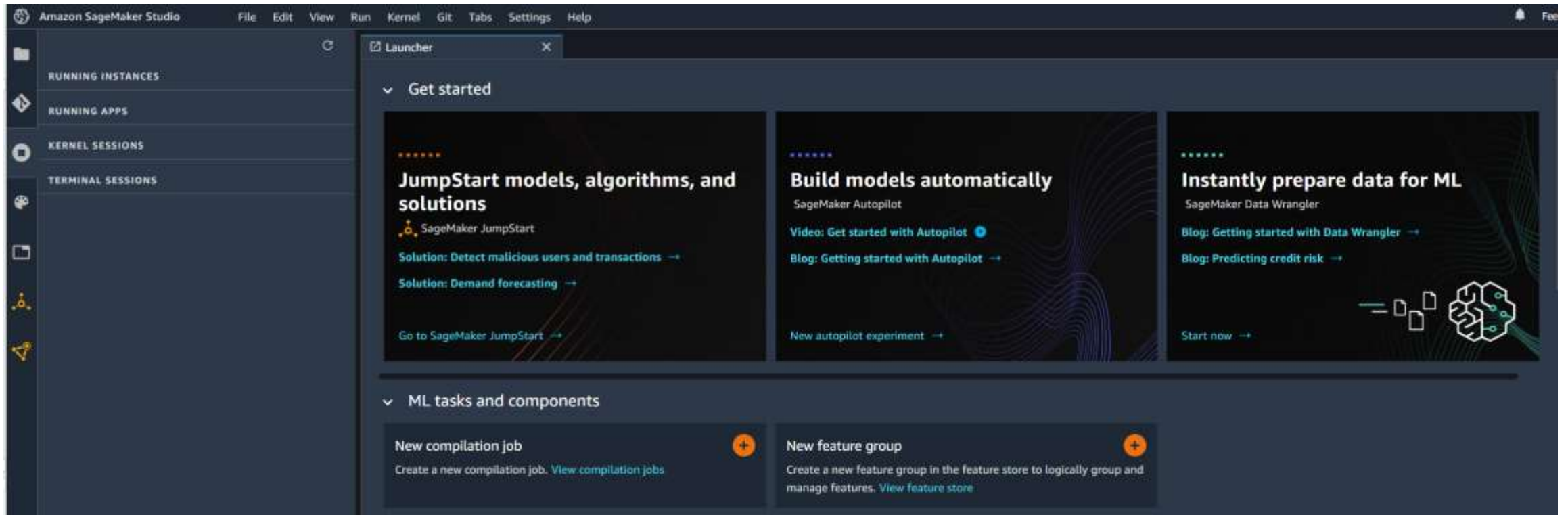
DEMO: AWS SAGEMAKER

CLICK ON SHUTDOWN ALL

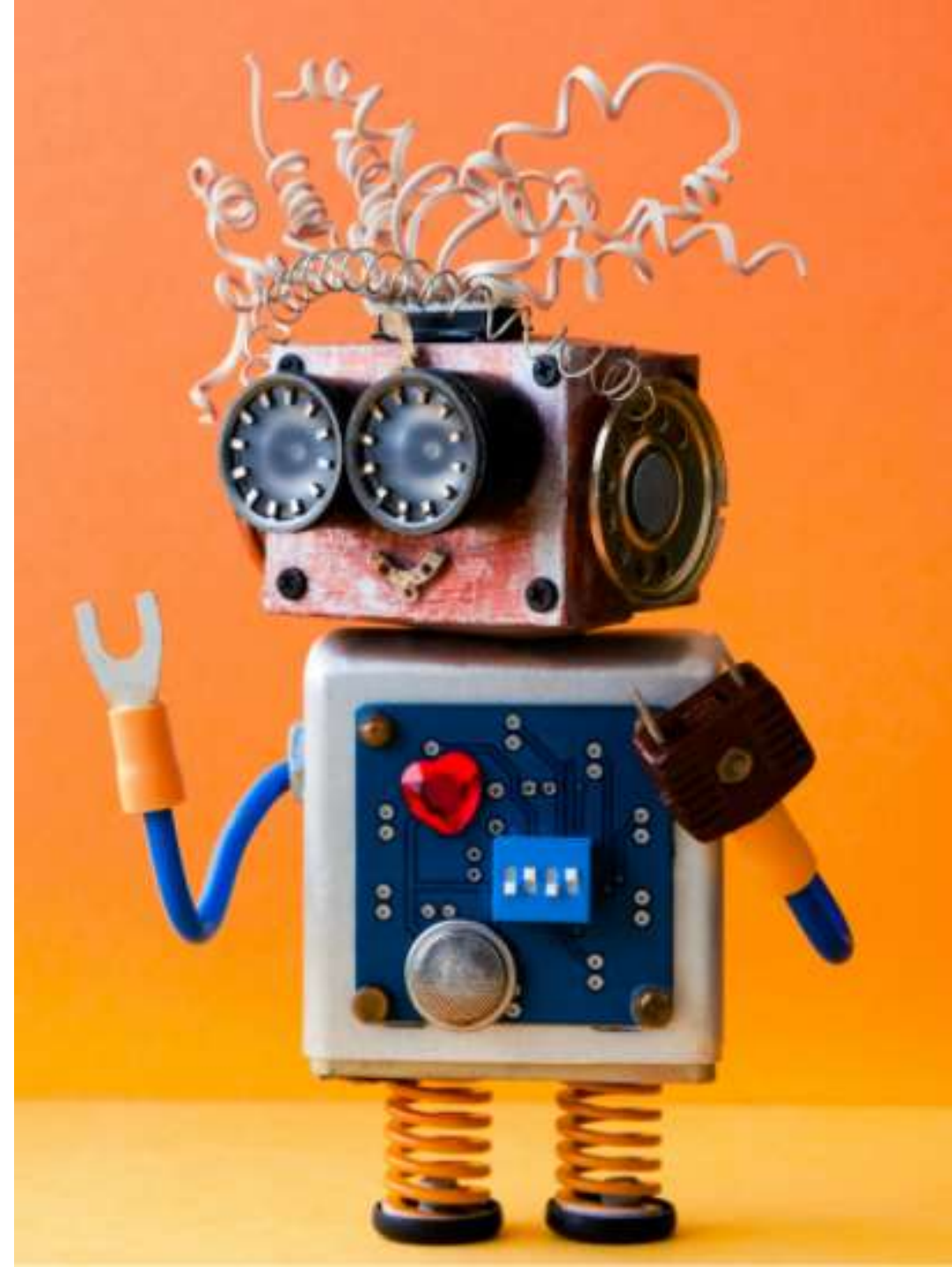


DEMO: AWS SAGEMAKER

NOW YOU'RE GOOD TO GO! NO ADDITIONAL
CHARGES WILL BE INCURRED!



AWS SAGEMAKER DEMO – PART #5 (SAGEMAKER CANVAS OVERVIEW)



WHAT IS AWS SAGEMAKER CANVAS?

- AWS SageMaker Canvas empowers anyone to build, train and test a machine learning model without writing a single line of code!
- With AWS Canvas, anyone can:
 - Import data from S3 or any other source
 - Build an AI/ML model
 - Assess model performance
 - Perform inference and generate predictions
 - Export model to SageMaker Studio

- AWS SageMaker Canvas Documentation:
<https://aws.amazon.com/sagemaker/canvas/>

PROJECT OVERVIEW: CONVERT °C TO °F

- In this project, we will train a simple machine learning model to convert temperatures from Celsius to Fahrenheit using Amazon SageMaker Canvas.
- SageMaker Canvas allows anyone to build powerful ML models without writing any code or having any prior knowledge with AI/ML.
- The equation is as follows:

$$T(^{\circ}\text{F}) = T(^{\circ}\text{C}) \times 9/5 + 32$$

- For Example, let's convert 0°C Celsius temperature to Fahrenheit:

$$T(^{\circ}\text{F}) = (0^{\circ}\text{C} \times 9/5) + 32 = 32^{\circ}\text{F}$$

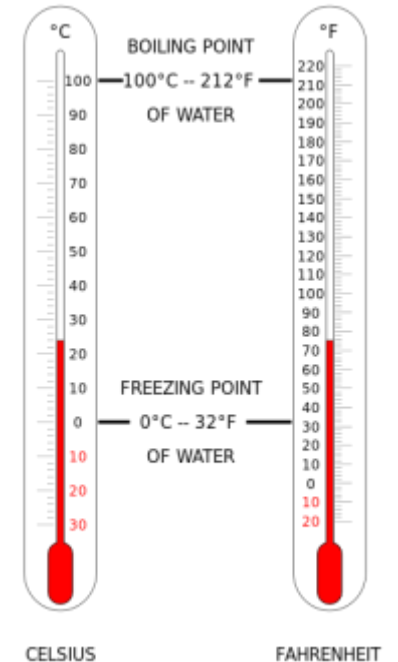
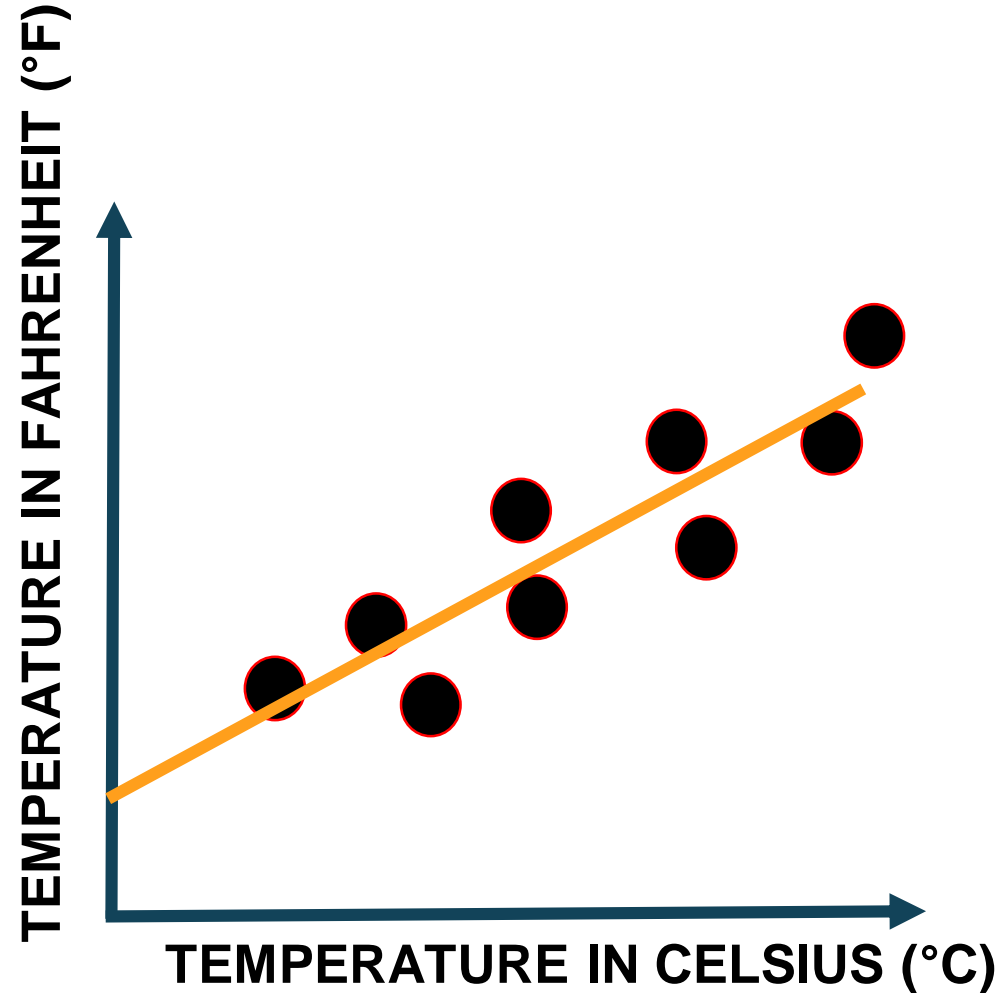


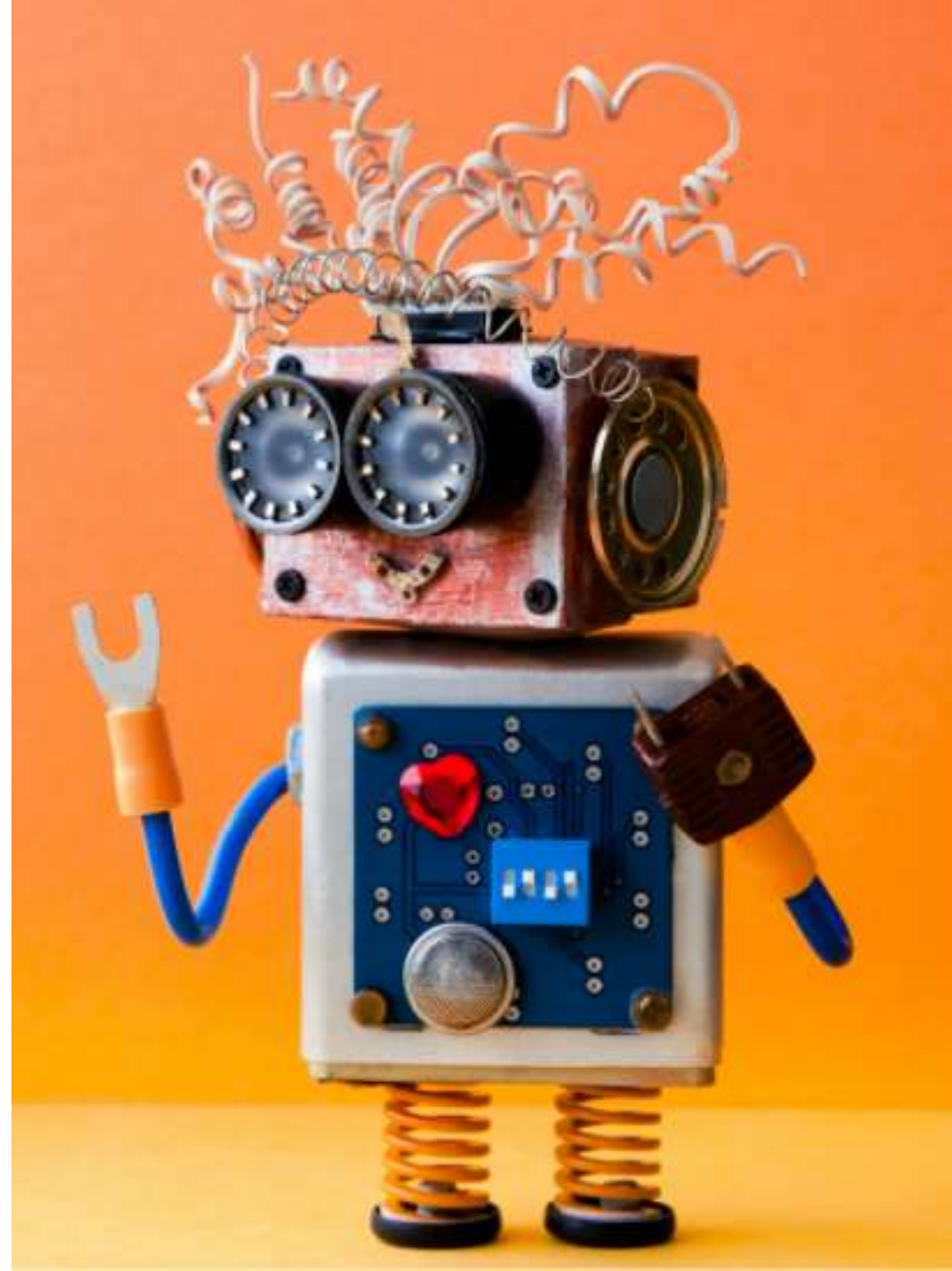
Image Source: https://commons.wikimedia.org/wiki/File:Thermometer_CF.svg

PROJECT OVERVIEW: CONVERT °C TO °F

- The objective is to predict the value of one variable Y based on another variable X.
- X is called the independent variable and Y is called the dependant variable.
- This is called “Regression” and it will be covered in much more detail in later sections of the course.



AWS SAGEMAKER DEMO – PART #6 (SAGEMAKER CANVAS DATA UPLOAD)



DEMO: AWS SAGEMAKER

OPEN SAGEMAKER AND CLICK ON LAUNCH
APP AND THEN CANVAS

The screenshot displays the Amazon SageMaker console interface. On the left, a navigation sidebar lists various SageMaker components: SageMaker dashboard, Search, SageMaker Domain (highlighted), Studio, RStudio, Canvas, Images, Ground Truth, Notebook, Processing, Training, Inference, Edge Manager, Augmented AI, and AWS Marketplace. The main content area is titled 'SageMaker Domain' and includes a sub-header 'SageMaker Domain' and a description: 'Assign users in your organization's directory to your SageMaker Studio account.' Below this, there is a 'Users' section with a search bar and a table listing users. The table has a header 'Name' and one entry: 'default-1648074619296'. To the right of the table is a 'Launch app' button with a dropdown menu showing 'Studio' and 'Canvas'. Below the 'Users' section is a 'Domain' section with a table of domain details. The table has four columns: Status, Domain ID, Execution role, and Authentication method. The 'Status' column shows 'Ready' with a green checkmark. The 'Domain ID' column shows 'd-1o3tunwacwld' and a note: 'Use the SageMaker Domain ID for troubleshooting and tracking usage.' The 'Execution role' column shows 'arn:aws:iam::971421653261:role/service-role/AmazonSageMaker-ExecutionRole-20220323T130903'. The 'Authentication method' column shows 'AWS identity and Access Management (IAM)'. Below the table, there is a 'Projects' section with a table of project details. The table has two columns: Project name and Launch constraint role. The 'Project name' column shows 'Amazon SageMaker project templates enabled for this account'. The 'Launch constraint role' column shows 'arn:aws:iam::971421653261:role/service-role/AmazonSageMakerServiceCatalogProductsLaunchRole'. The 'Product use role' column shows 'arn:aws:iam::971421653261:role/service-role/AmazonSageMakerServiceCatalogProductsUseRole'.

Amazon SageMaker

SageMaker dashboard
Search

SageMaker Domain

Studio
RStudio
Canvas

Images

► Ground Truth
► Notebook
► Processing
► Training
► Inference
► Edge Manager
► Augmented AI
► AWS Marketplace

Amazon SageMaker > SageMaker Domain

SageMaker Domain

Assign users in your organization's directory to your SageMaker Studio account.

Users

Search users

Add user

< 1 > ⚙

Name
default-1648074619296

Launch app

Studio
Canvas

Domain

How to delete the domain Delete Domain

Status 🟢 Ready The status of the SageMaker Domain, and is not the status of the compute resources such as EC2 instances to execute notebook. Use Domain for troubleshooting and tracking usage. The status shown is for the SageMaker Studio service, and is not the status of compute resources such as EC2 instances to execute notebooks.	Domain ID d-1o3tunwacwld Use the SageMaker Domain ID for troubleshooting and tracking usage.	Execution role arn:aws:iam::971421653261:role/service-role/AmazonSageMaker-ExecutionRole-20220323T130903	Authentication method AWS identity and Access Management (IAM)
---	---	--	--

Projects

🟢 Amazon SageMaker project templates enabled for this account

Launch constraint role: arn:aws:iam::971421653261:role/service-role/AmazonSageMakerServiceCatalogProductsLaunchRole
Product use role: arn:aws:iam::971421653261:role/service-role/AmazonSageMakerServiceCatalogProductsUseRole

DEMO: AWS SAGEMAKER

IT MIGHT TAKE COUPLE OF MINUTES FOR SAGEMAKER CANVAS TO START. BE PATIENT IT'S WORTH IT!

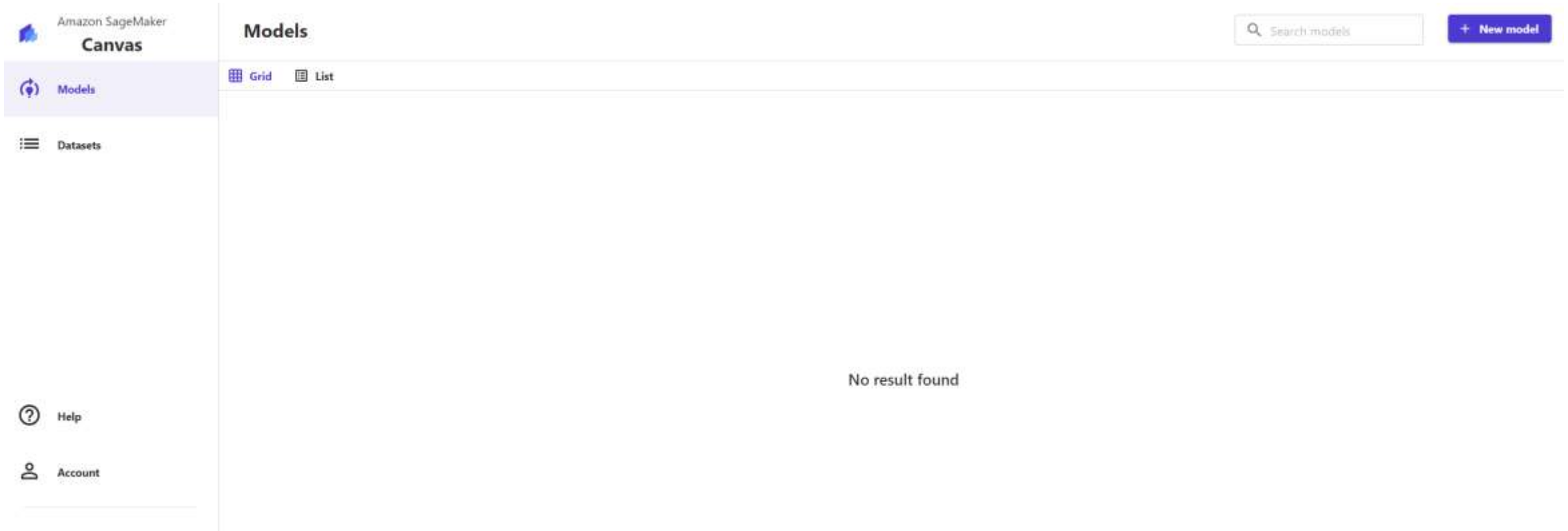


Amazon SageMaker Canvas

Creating application... 

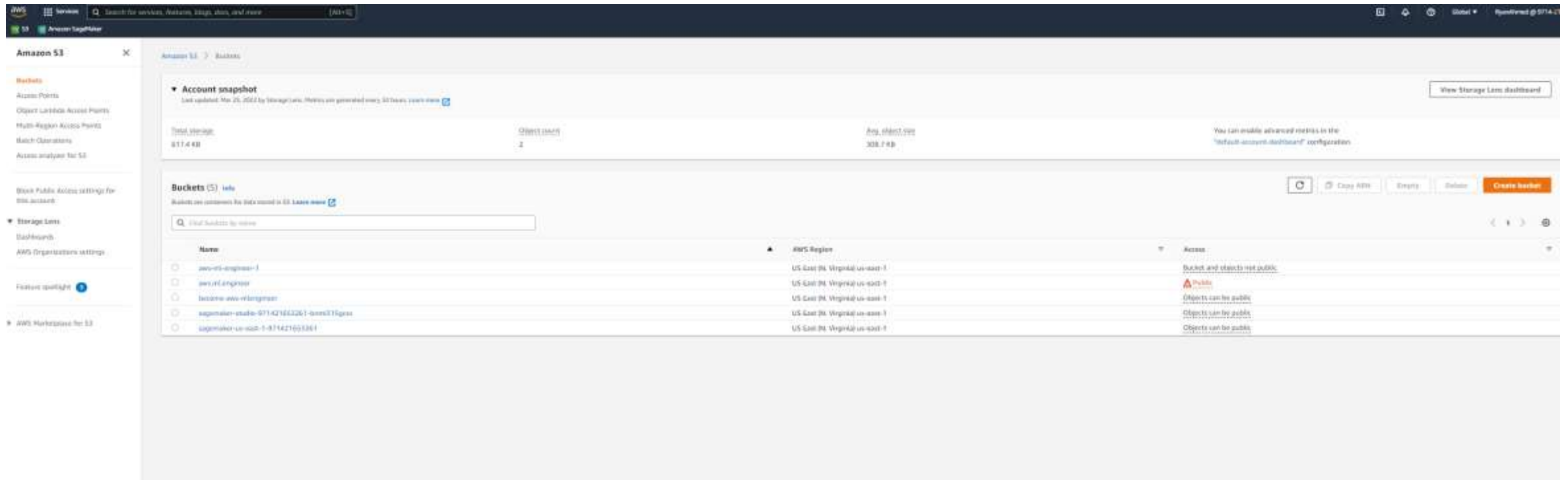
DEMO: AWS SAGEMAKER

HERE'S AMAZON SAGEMAKER CANVAS
HOMEPAGE! LET'S UPLOAD THE DATA INTO S3
FIRST.



DEMO: AWS SAGEMAKER

GO TO S3 AND CLICK ON CREATE BUCKET



The screenshot shows the AWS Management Console interface for Amazon S3. The left sidebar contains navigation links for Buckets, Access Points, and Storage Lens. The main content area displays an 'Account snapshot' and a 'Buckets' section with a table of existing buckets. The 'Create bucket' button is highlighted in orange.

Account snapshot
Last updated: Mar 25, 2022 by StorageLens. Metrics are generated every 30 days. [Learn more](#)

Buckets (5) [Info](#)
Buckets are containers for data stored in S3. [Learn more](#)

Search buckets by name

Name	Region	Access
<input type="checkbox"/> aws-rl-engine-1	US East (N. Virginia) us-east-1	Bucket and objects not public
<input type="checkbox"/> aws-rl-engine-2	US East (N. Virginia) us-east-1	Bucket and objects not public
<input type="checkbox"/> aws-rl-engine-3	US East (N. Virginia) us-east-1	Bucket and objects not public
<input type="checkbox"/> sagemaker-eval-07142162261-us-east-1	US East (N. Virginia) us-east-1	Objects can be public
<input type="checkbox"/> sagemaker-us-east-1-87142162261	US East (N. Virginia) us-east-1	Objects can be public

[Refresh](#) [Copy ARN](#) [Empty](#) [Delete](#) [Create bucket](#)

DEMO: AWS SAGEMAKER

PROVIDE A NAME TO THE BUCKET AND CLICK ON CREATE BUCKET

The screenshot shows the AWS Management Console interface for creating a new S3 bucket. The top navigation bar includes the AWS logo, 'Services' menu, a search bar, and a keyboard shortcut '[Alt+S]'. Below the navigation bar, the breadcrumb trail reads 'Amazon S3 > Buckets > Create bucket'. The main heading is 'Create bucket' with an 'info' link. A subtext explains that buckets are containers for data stored in S3, with a 'Learn more' link. The 'General configuration' section contains a 'Bucket name' text input field with the value 'awsmlengineer', a note that the name must be unique and cannot contain spaces or uppercase letters, and a link to 'See rules for bucket naming'. Below this is an 'AWS Region' dropdown menu set to 'US East (N. Virginia) us-east-1'. A section for 'Copy settings from existing bucket - optional' includes a 'Choose bucket' button. The 'Object Ownership' section, with an 'info' link, explains that it controls ownership of objects written to the bucket. It features two radio button options: 'ACLs disabled (recommended)' (selected) and 'ACLs enabled'. The 'ACLs disabled' option states that all objects are owned by the account and access is specified using only policies. The 'ACLs enabled' option states that objects can be owned by other AWS accounts and access can be specified using ACLs. Below these options, the 'Object Ownership' is set to 'Bucket owner enforced'. The 'Block Public Access settings for this bucket' section explains that public access is granted through ACLs, bucket policies, access point policies, or all. It includes a 'Learn more' link. At the bottom, the 'Block all public access' checkbox is checked, with a note that turning this on is the same as turning on all four settings below.

aws Services Search for services, features, blogs, docs, and more [Alt+S]

S3 Amazon SageMaker

Amazon S3 > Buckets > Create bucket

Create bucket [info](#)

Buckets are containers for data stored in S3. [Learn more](#)

General configuration

Bucket name

awsmlengineer

Bucket name must be unique and must not contain spaces or uppercase letters. [See rules for bucket naming](#)

AWS Region

US East (N. Virginia) us-east-1

Copy settings from existing bucket - optional

Only the bucket settings in the following configuration are copied.

Choose bucket

Object Ownership [info](#)

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

☒ ACLs disabled (recommended)

All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.

☐ ACLs enabled

Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

Object Ownership

Bucket owner enforced

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. [Learn more](#)

☒ Block all public access

Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.

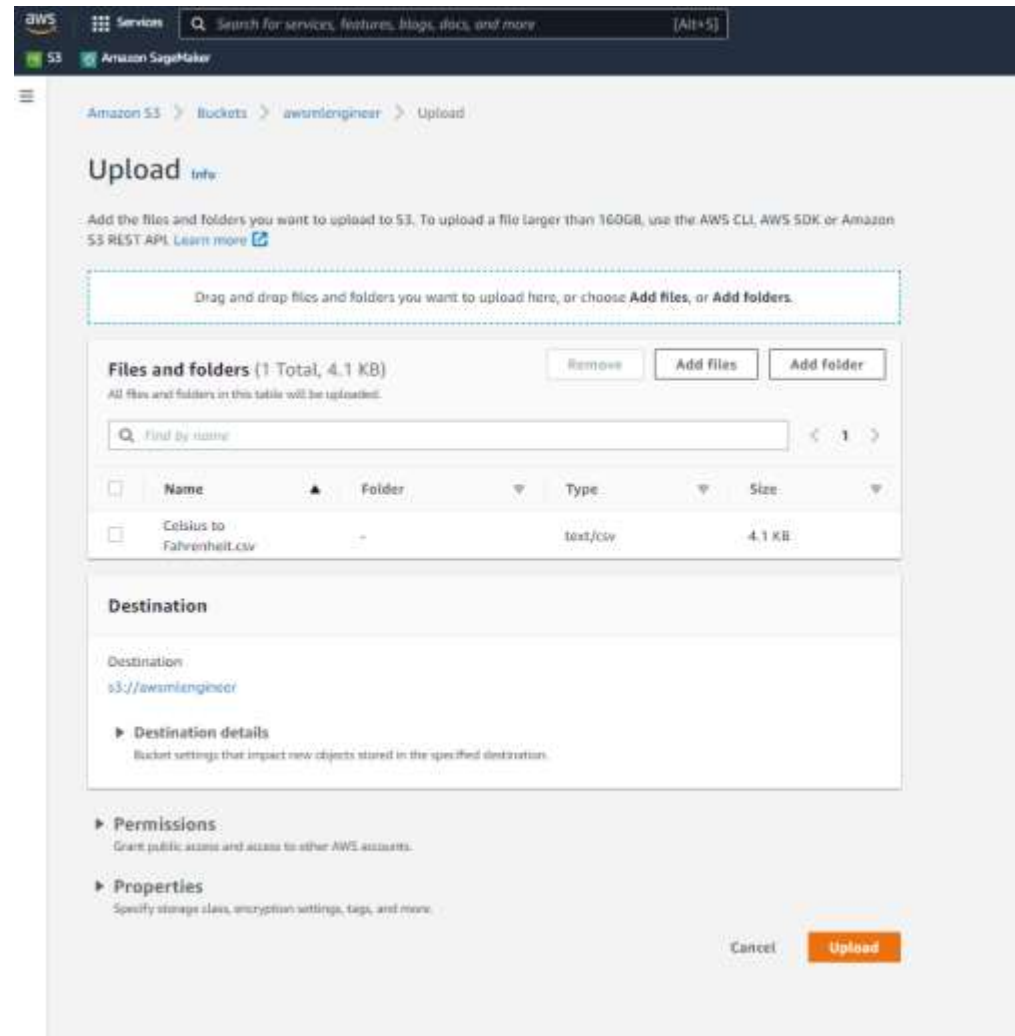
DEMO: AWS SAGEMAKER

LET'S UPLOAD THIS DATA TO S3. THE FILE "*CELICIUS TO FAHRENHEIT.CSV*" IS INCLUDED IN THE COUTSE PACKAGE

Celsius	Fahrenheit
-50	-58
-40	-40
-30	-22
-20	-4
-10	14
-9	15.8
-8	17.6
-7	19.4
-6	21.2
-5	23
-4	24.8
-3	26.6
-2	28.4
-1	30.2
0	32
1	33.8
2	35.6
3	37.4
4	39.2

DEMO: AWS SAGEMAKER

DRAG AND DROP THE FILE AND CLICK
UPLOAD



DEMO: AWS SAGEMAKER

NOW THE DATA IS UPLOADED TO S3. YOU SHOULD BE ABLE TO SEE IT IN CANVAS NOW.

The screenshot displays the AWS S3 console interface. At the top, a green banner indicates "Upload succeeded" with a link to "View details below." Below this, the "Upload: status" section is active, showing a summary of the upload process. The summary table indicates that the destination is "s3://awslogs-knox", and the upload was successful, with 1 file (4.1 KB) uploaded at 100.00% completion. The "Failed" section shows 0 files (0 B) at 0% completion. Below the summary, the "Files and folders" tab is selected, showing a list of files. The list contains one file named "Celcius to Fahrenheit.csv", which is a text/csv file, 4.1 KB in size, and has a status of "Succeeded".

Upload: status

The information below will no longer be available after you navigate away from this page.

Summary

Destination s3://awslogs-knox	Succeeded 1 file, 4.1 KB (100.00%)	Failed 0 files, 0 B (0%)
----------------------------------	---------------------------------------	-----------------------------

Files and folders | Configuration

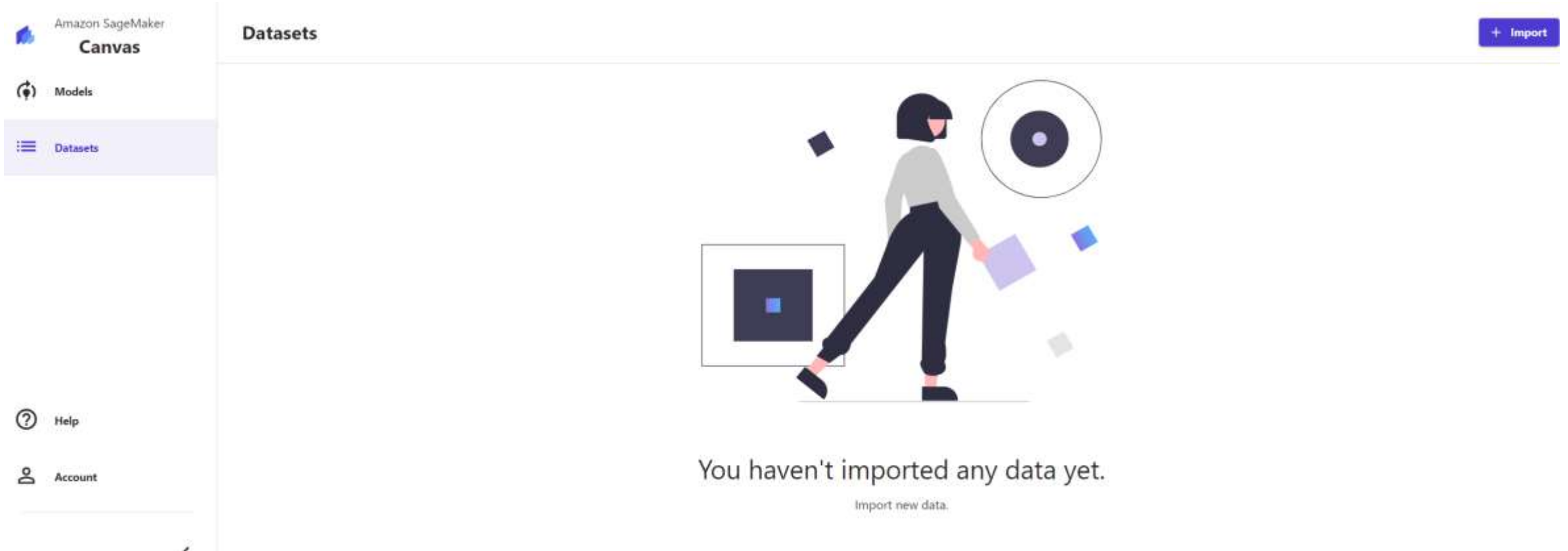
Files and folders (1 Total, 4.1 KB)

Find by name

Name	Folder	Type	Size	Status	Error
Celcius to Fahrenheit.csv	-	text/csv	4.1 KB	Succeeded	-

DEMO: AWS SAGEMAKER

CLICK ON IMPORT



DEMO: AWS SAGEMAKER

SELECT THE BUCKET

Import

 Upload

 S3

[Add connecti...](#)

Choose files to import

Amazon S3


 Search Amazon S3


<input type="checkbox"/>	Name	Created on ↓
<input type="checkbox"/>	awsmlengineer	
<input type="checkbox"/>	aws-ml-engineer-1	
<input type="checkbox"/>	sagemaker-us-east-1-971421653261	
<input type="checkbox"/>	sagemaker-studio-971421653261-bnmi315gcsv	
<input type="checkbox"/>	aws-ml-engineer	

DEMO: AWS SAGEMAKER

SELECT THE FILE AND CLICK IMPORT

Import


 Upload

 S3

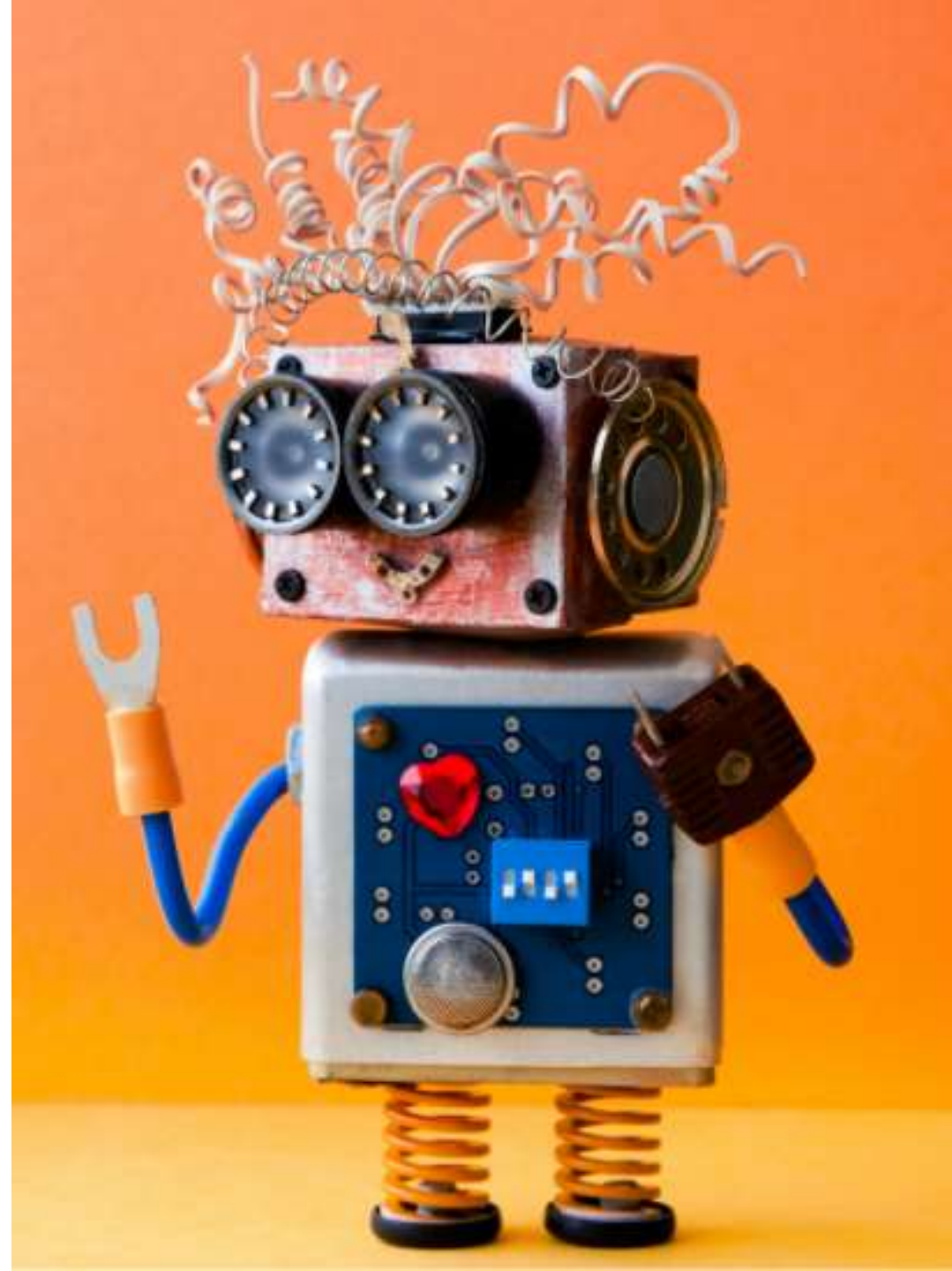
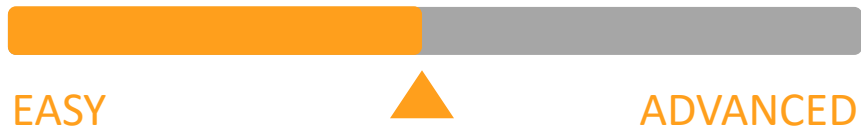
Add connection

Choose files to import

Amazon S3 / awsmengineer

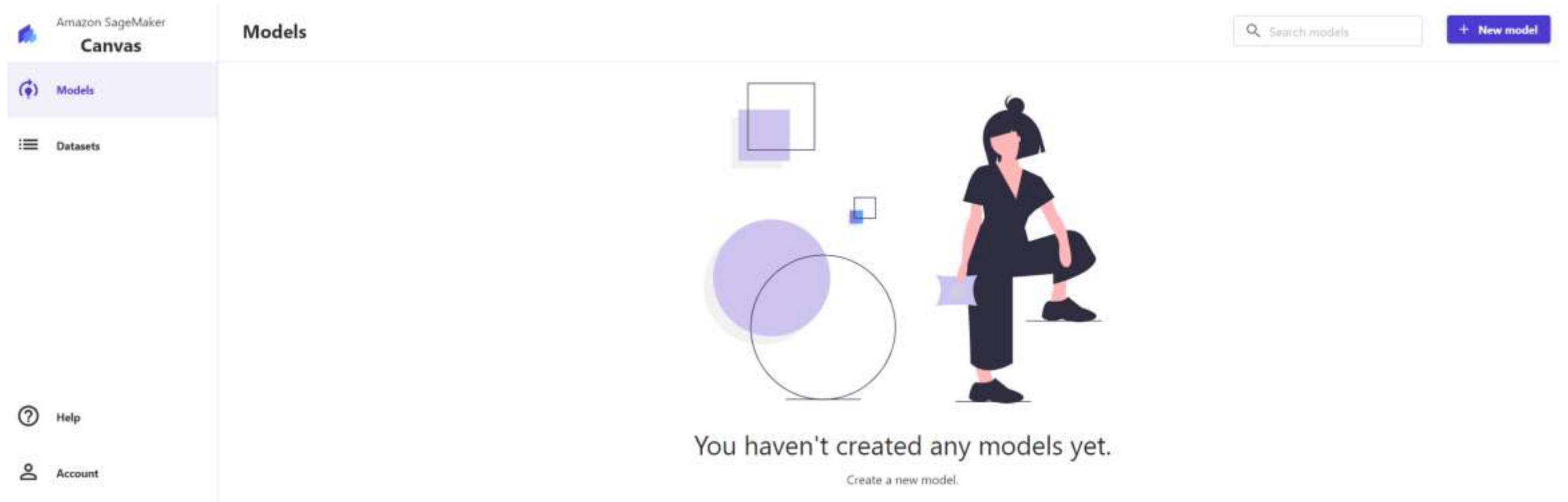
<input type="checkbox"/>	Name	Last updated ↓
<input type="checkbox"/>	 Celsius to Fahrenheit.csv	03/24/2022 5:01 AM

AWS SAGEMAKER DEMO – PART #7 (SAGEMAKER CANVAS MODEL TRAINING/EVAL)



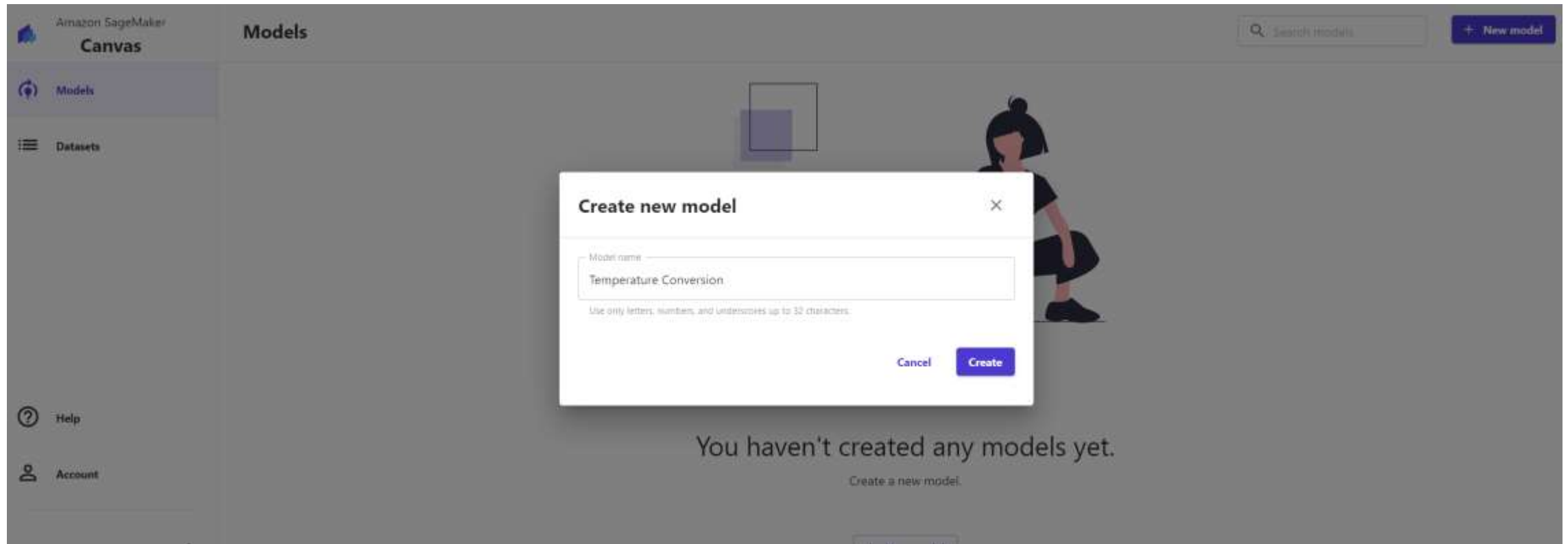
DEMO: AWS SAGEMAKER

CLICK ON MODELS AND CLICK ON CREATE
NEW MODEL




DEMO: AWS SAGEMAKER

PROVIDE A NAME TO THE MODEL AND CLICK
CREATE








DEMO: AWS SAGEMAKER

SELECT THE DATASET



Temperature Conversion


V1 Draft Add version Share




Select Build Analyze Predict

Select dataset

You can import a tabular dataset or choose one that has already been imported. Your dataset must contain at least one input column and a target column.

 Search datasets in Canvas

All Joined

Name	Source	Columns	Rows	Cells	Created	Status
 Celsius to Fahrenheit(2).csv	S3	2	510	1,020	03/24/2022 5:05 AM	Ready

Close Select dataset

DEMO: AWS SAGEMAKER

YOU CAN VIEW THE FIRST 100 ROWS

Celsius to Fahrenheit(2).csv Previewing first 100 rows

Celsius	Fahrenheit	
-50	-58	
-40	-40	
-30	-22	
-20	-4	
-10	14	
-9	15.8	
-8	17.6	
-7	19.4	
-6	21.2	

Select dataset

DEMO: AWS SAGEMAKER

I WANT TO CONVERT FROM CELCIUS TO FAHRENHEIT SO SELECT FAHRENHEIT AS THE TARGET. CLICK ON QUICK BUILD.

Temperature Conversion

V1 • Draft • Add version • Share

SelectBuildAnalyzePredict


Select a column to predict

Choose the target column. The model that you build predicts values for the column that you select.

Target column

Fahrenheit

Value distribution



Model type

SageMaker Canvas automatically recommends the appropriate model type for your analysis.

Numeric prediction

For the Fahrenheit, your model predicts numeric values.

Change type

Quick build

Preview model







Celsius to Fahrenheit(2).csv

Search columns

Column name ↓	Data type	Missing ⓘ	Mismatched ⓘ	Unique ⓘ	Mean / Mode	Correlation to target ⓘ
Fahrenheit	Numeric	0.00% (0)	0.00% (0)	30	-22	--
Celsius	Numeric	0.00% (0)	0.00% (0)	30	-1	1

DEMO: AWS SAGEMAKER

MODEL IS NOW BEING BUILT!



Temperature Conversion

V1 Craft + Add version Share

Select Build Analyze Predict

Model overview

Your model is being created. Quick build usually takes 2–15 minutes. You can now leave this view.

Expected build time


2–15 minutes


Build type


Quick build


Detailed progress


Generating column impact





 Celsius to Fahrenheit(2).csv

 Total columns: 2

 Total rows: 510

 Total cells: 1,020

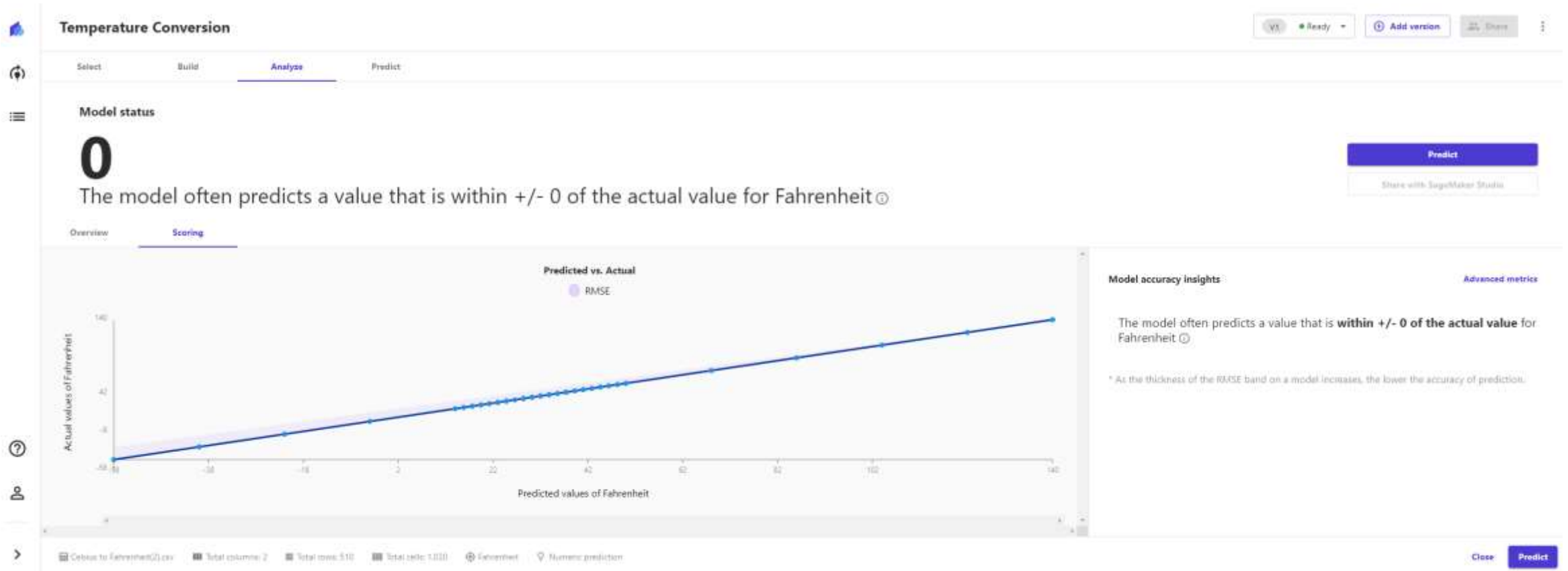
 Fahrenheit

 Numeric prediction

Close

DEMO: AWS SAGEMAKER

PREDICTED VS. ACTUAL! NOTE THAT THIS IS A SIMPLE STARTER MODEL AND WE DIDN'T REALLY NEED TO USE ML HERE! IN THE FUTURE WE WILL BUILD MUCH MORE ADVANCED MODELS!



DEMO: AWS SAGEMAKER

SELECT A TEMPERATURE IN CELCIUS AND
CLICK UPDATE TO GENERATE A PREDICTION IN
FAHRENHEIT

The screenshot shows the AWS SageMaker console interface for a model named "Temperature Conversion". The interface is in the "Predict" tab, which is highlighted in the top navigation bar. The main area is titled "Predict target values" and contains two buttons: "Batch prediction" and "Single prediction". Below these buttons is a text input field with the placeholder "Filter columns".

Below the input field is a table with three columns: "Column", "Feature importance", and "Value". The table has one row with the column name "Celsius". The "Feature importance" for "Celsius" is shown as a horizontal bar chart that is 100% full. The "Value" column has a text input field containing the number "0".

On the right side of the interface, there is a section titled "Fahrenheit Prediction" with a "Copy" button. It displays a large number "32" as the prediction. Below this, there is a legend with two items: "New prediction" (represented by a blue square) and "Average prediction" (represented by a grey square). A horizontal bar chart shows the "New prediction" as a blue line at the value 32 and the "Average prediction" as a grey line at the value 30.199. At the bottom right of the interface, there are "Close" and "Download" buttons.

Column	Feature importance	Value
Celsius	100%	0

Fahrenheit Prediction [Copy](#)

32

■ New prediction
■ Average prediction

32
30.199

[Close](#) [Download](#)

DEMO: AWS SAGEMAKER

SELECT ANOTHER NUMBER AND PERFORM A
SANITY CHECK!

Temperature Conversion

yt Ready Add version Share

Select Build Analyze **Predict**

Predict target values

Batch prediction **Single prediction**

Modify values to predict Fahrenheit in real time.

Q Filter columns

Column	Feature Importance	Value
Celsius	100%	25

Fahrenheit Prediction Copy

86

■ New prediction
■ Average prediction

86

30.199

Close Download

DEMO: AWS SAGEMAKER

NOW YOU CAN SEE THE MODEL

The screenshot displays the Amazon SageMaker Canvas interface. On the left is a navigation sidebar with 'Models' selected. The main area shows a list of models, with one model 'Temperature Conversion' expanded to show details. The model is in a 'Ready' state, indicated by a green checkmark. The details include a scatter plot with a regression line, an RMSE of 0, the dataset 'Celsius to Fahrenheit(2).csv', the target 'Fahrenheit', and the problem type 'Numeric prediction'. A 'View' button is at the bottom of the model card.

Amazon SageMaker
Canvas

Models

Grid List

Filter by: Ready

Search models

+ New model

↓ Last viewed

Ready

Temperature Conversion

RMSE 0

Dataset Celsius to Fahrenheit(2).csv

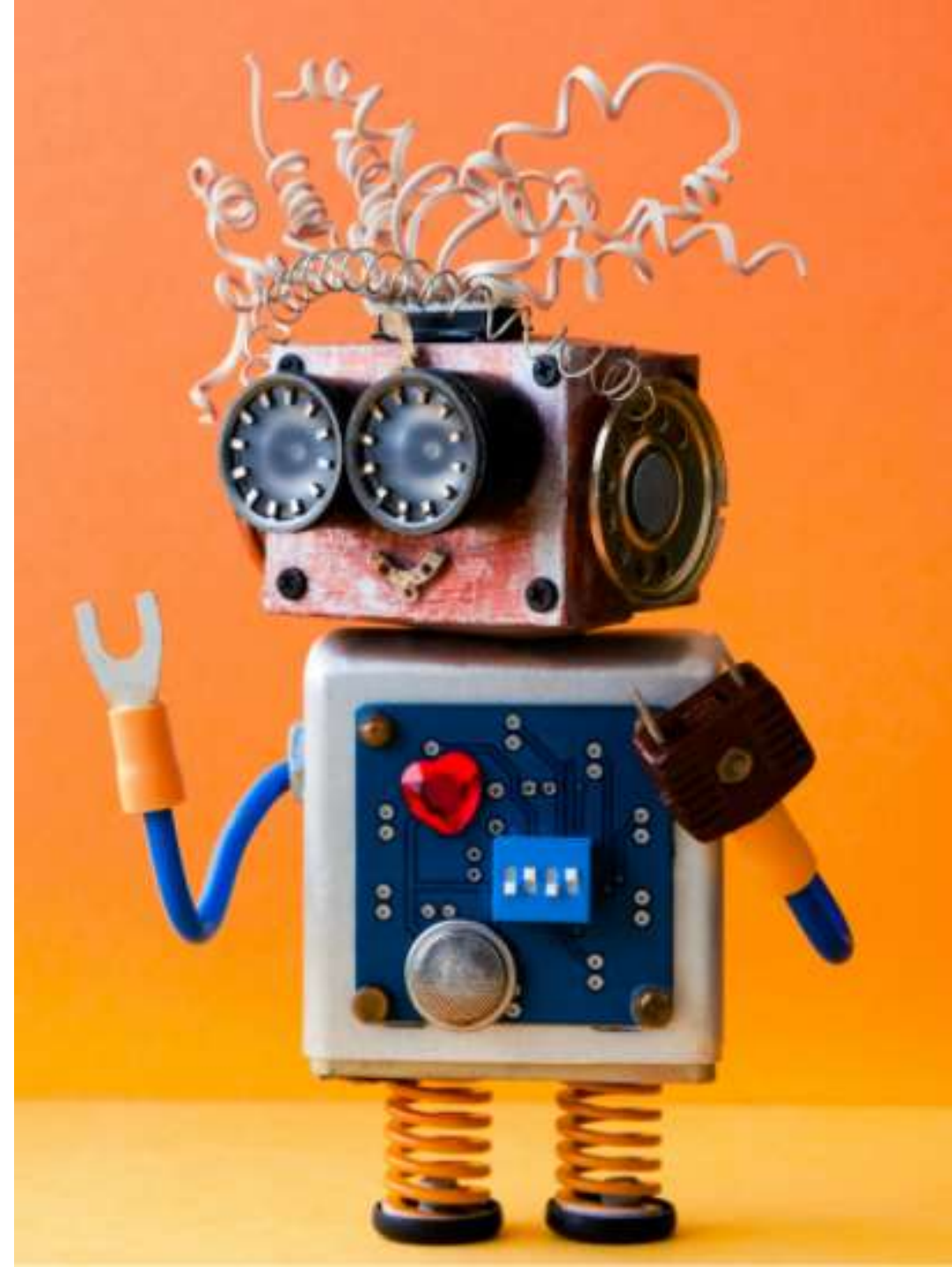
Target Fahrenheit

Problem type Numeric prediction

Updated

View

FINAL CAPSTONE PROJECT



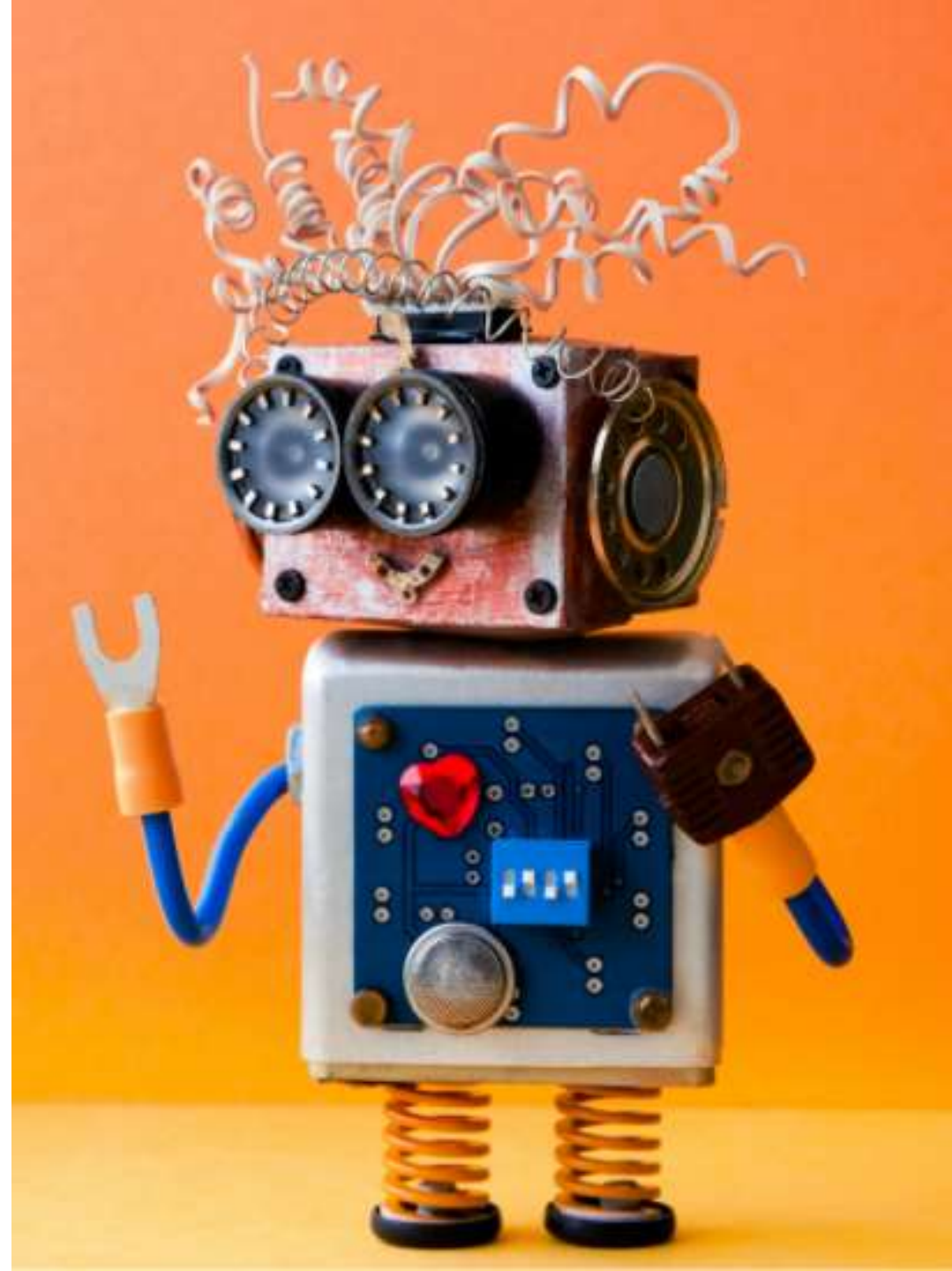
PROJECT OVERVIEW: EMPLOYEE SALARY PREDICTION

- In this project, we will train a simple machine learning model to predict employee salary based on the number of years of experience using Amazon SageMaker Canvas.
- 1. Upload the “salary.csv” data to S3
- 2. Select the target column and plot its distribution
- 3. Build a new Machine Learning model using Amazon SageMaker Canvas
- 4. Analyze the results, what’s the accuracy of the trained model?
- 5. Test the trained model performance using at least 3 sample years of experience.



Years of Experience	Salary
25	106959.8057
26	125038.0243
28	132126.4578
21	97541.39206
12	63248.03888
14	73588.14876
14	61778.90358
31	139343.328
1	11078.06765
32	147560.1648
11	65193.68168
4	14232.0306
19	93489.34132
14	57908.18682
40	181095.5209
18	93981.80664
26	129641.9995

FINAL CAPSTONE PROJECT SOLUTION



DEMO: AWS SAGEMAKER

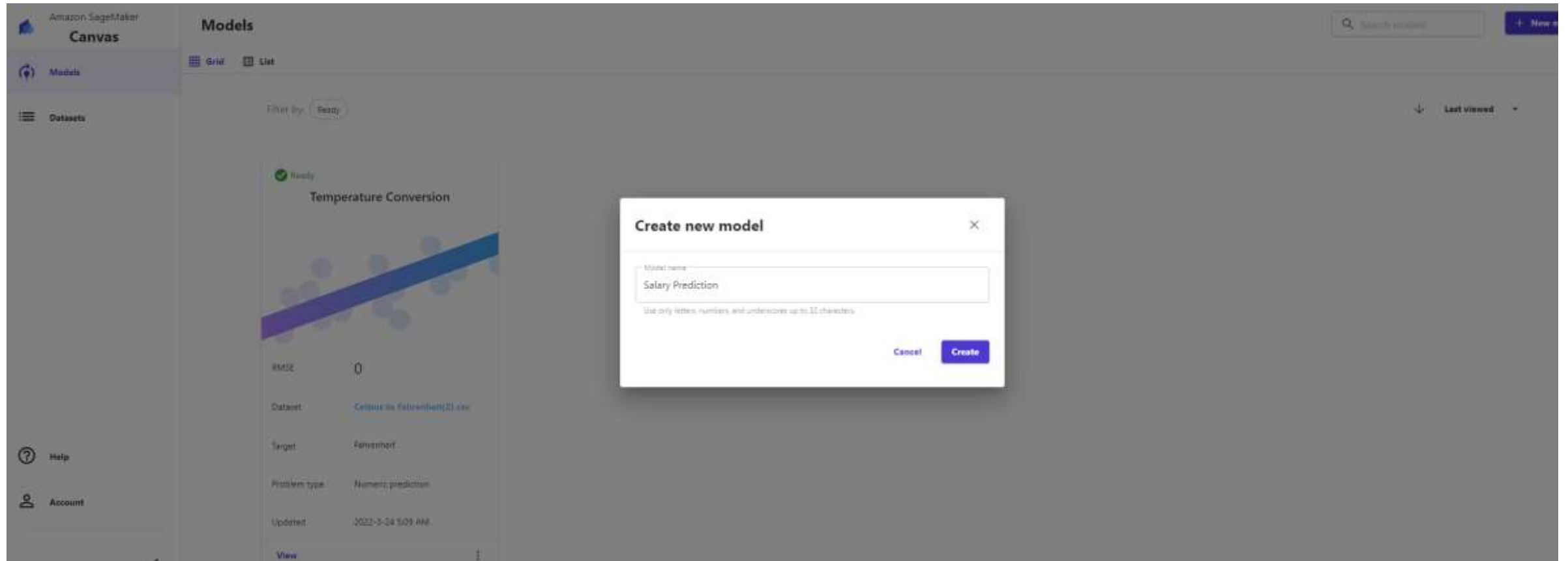
UPLOAD THE SALARY.CSV DATA TO S3

The screenshot shows the AWS Management Console interface for an Amazon S3 bucket named 'awsmlengineer'. The breadcrumb navigation at the top indicates the path: Amazon S3 > Buckets > awsmlengineer. Below the bucket name, there are tabs for 'Objects', 'Properties', 'Permissions', 'Metrics', 'Management', and 'Access Points'. The 'Objects' tab is selected, showing a list of objects in the bucket. Above the list, there are buttons for various actions: Refresh, Copy S3 URL, Copy URL, Download, Open, Delete, Actions (dropdown), Create folder, and Upload. A search bar labeled 'Find objects by prefix' is also present. The object list table has columns for Name, Type, Size, and Storage class. Two objects are listed: 'Celsius to Fahrenheit.csv' (4.1 KB, Standard) and 'salary.csv' (7.7 KB, Standard).

Name	Type	Size	Storage class
Celsius to Fahrenheit.csv	csv	4.1 KB	Standard
salary.csv	csv	7.7 KB	Standard


DEMO: AWS SAGEMAKER

CREATE A NEW MODEL AND NAME IT SALARY PREDICTION




DEMO: AWS SAGEMAKER

IMPORT SALARY DATA




Salary Prediction

V1 • Draft Add version Share



SelectBuildAnalyzePredict



Select dataset

You can import a tabular dataset or choose one that has already been imported. Your dataset must contain at least one input column and a target column.

Search datasets in Canvas

AllJoined

	Name	Source	Columns	Rows	Cells	Created	Status
<input type="radio"/>	salary.csv	S3	2	500	1,000		Ready
<input type="radio"/>	Celsius to Fahrenheit(2).csv	S3	2	510	1,020		Ready

?

DEMO: AWS SAGEMAKER

SELECT SALARY AS THE TARGET COLUMN AND
CLICK ON QUICK BUILD

Salary Prediction

VT Draft Add version Share

Select Build Analyze Predict


Select a column to predict

Choose the target column. The model that you build predicts values for the column that you select.

Target column

Salary

Value distribution



Model type

SageMaker Canvas automatically recommends the appropriate model type for your analysis.

Numeric prediction

For the Salary, your model predicts numeric values.

Change type

Quick build

Preview model

salary.csv

Columns

Visualize

Filter

Details

Search columns

Column name	Data type	Missing	Mismatched	Unique	Mean / Mode	Correlation to target
<input checked="" type="checkbox"/> Years of Experience	Numeric	0.00% (0)	0.00% (0)	42	25	0.989
<input checked="" type="checkbox"/> Salary	Numeric	0.00% (0)	0.00% (0)	500	100,013.16	—

Total columns: 2 Total rows: 500 Total cells: 1,000

Close

DEMO: AWS SAGEMAKER

MODEL PREDICTIONS VS. ACTUAL VALUES



DEMO: AWS SAGEMAKER

CLICK ON ADVANCED METRICS



DEMO: AWS SAGEMAKER

SELECT SINGLE PREDICTION AND CHOOSE A
NUMBER OF YEARS OF EXPERIENCE TO
PREDICT SALARY

Salary Prediction

VT Ready Add version Show

Select Build Analyse Predict

Predict target values

Batch prediction Single prediction

Modify values to predict Salary in real time.

Filter columns

Column	Feature importance	Value
Years of Experience	100%	5

Salary Prediction

Copy

37843.297

New prediction

Average prediction

37843.297

116015.625

Close Download