BREAST CANCER PREDICTION USING AWS SAGEMAKER

Name : Tijo Thomas

INTRODUCTION

1.1 Overview

Breast cancer is the second most leading cancer in women compared to all other cancers . Around 1.1 million cases were recorded in 2004.Obeserved rates of this cancer increased with industrialization and urbanization and also with facilities for early detection. It remains much more common in high-income countries but now is increasing rapidly in middle and low income countries as well. Breast cancer is fatal in under half of all cases and is the leading cause of death from cancer in women , accounting to 16% of the total world population

1.2 Purpose

The purpose of this project is to predict whether the patient has breast cancer or not using ml algorithm and give maximum accuracy for the same. For this we have taken the dataset from the Wisconsin breast cancer database (kaggle) which is the benchmark for comparing the results.

LITERATURE SURVEY

2.1 Existing problem

To identify which machine learning classifier gives the best accuracy . To count the number of patients having benign and malignant diseases for identifying the tumor.Breast cancer is one of the main causes of cancer death worldwide. Early diagnostics significantly increases the chances of correct treatment and survival, but this process is tedious and often leads to

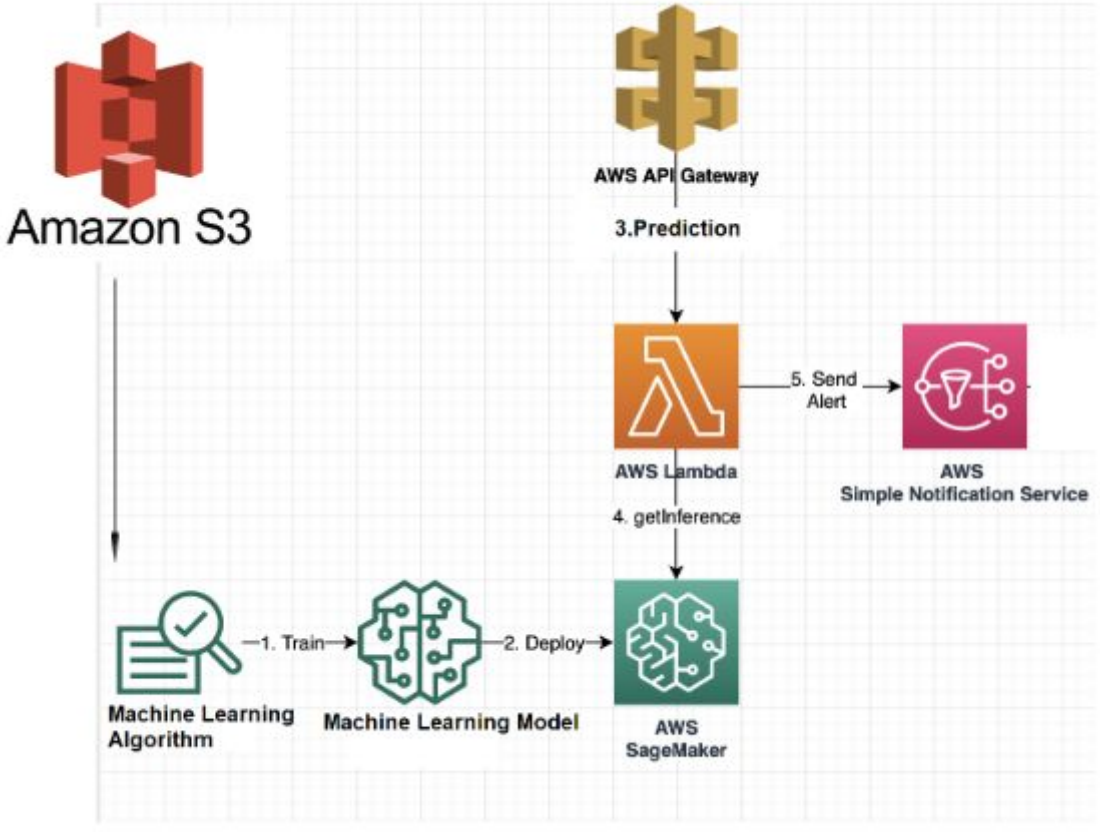
a disagreement between pathologists. Computer-aided diagnosis systems showed the potential for improving diagnostic accuracy. But early detection and prevention can significantly reduce the chances of death. It is important to detect breast cancer as early as possible.

2.2 Proposed solution

We acquired the breast cancer dataset from kaggle dataset and used amazon sagemaker's jupyter notebook for the purpose of coding . The method uses Xgboost classifier and amazon web services like Amazon S3,AWS API Gateway,AWS Lambda,AWS SNS,Amazon SageMaker for completing the project. We will be building and deploying the ml model in aws sagemaker and use sns service to generate alert about the risk

THEORETICAL ANALYSIS

3.1 Block diagram



3.2 Hardware/Software designing ;

Amazon S3,AWS API Gateway,AWS Lambda,AWS SNS,Amazon SageMaker

EXPERIMENTAL INVESTIGATIONS

Attribute Information:

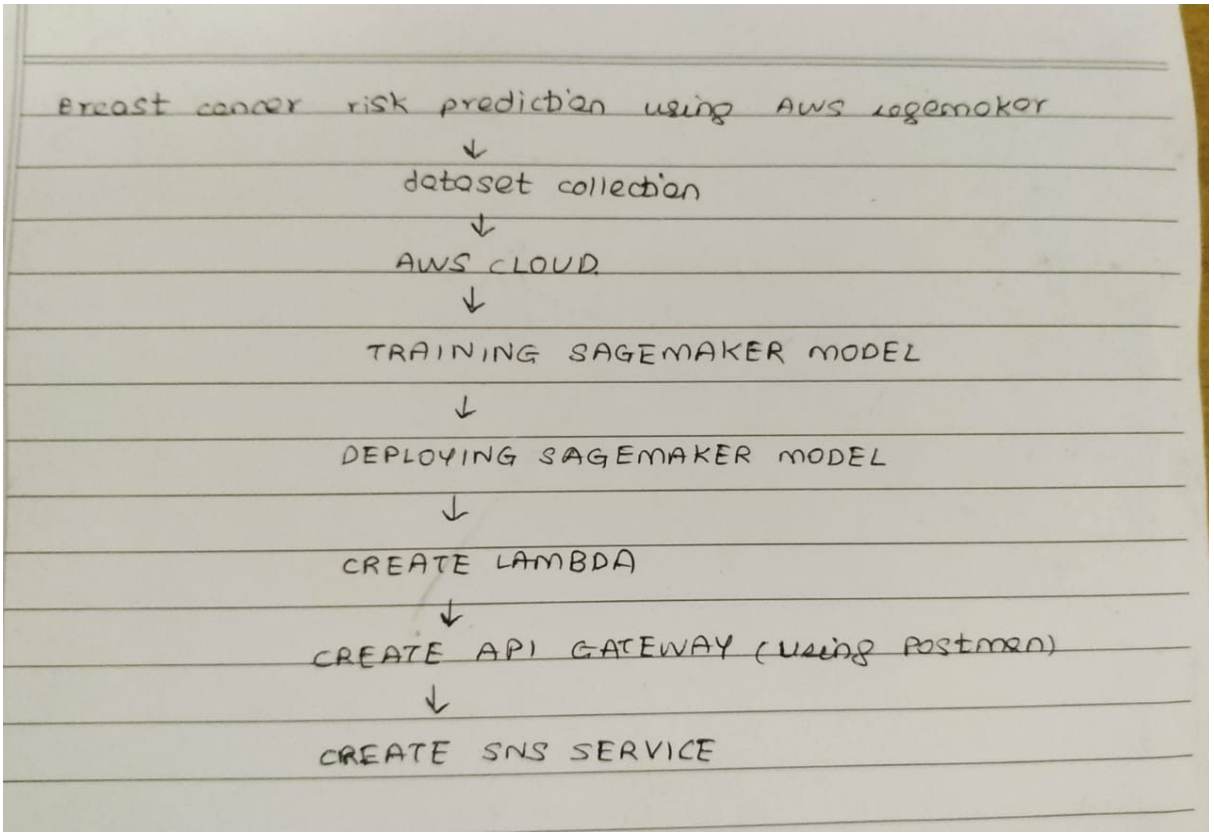
1. ID number 2) Diagnosis (M = malignant, B = benign) 3-32)

Ten real-valued features are computed for each cell nucleus:

a. radius (mean of distances from center to points on the perimeter)
b. texture (standard deviation of gray-scale values)
c. perimeter
d. area
e. smoothness (local variation in radius lengths)
f. compactness (perimeter^2 / area - 1.0)
g. concavity (severity of concave portions of the contour)
h. concave points (number of concave portions of the contour)
i. symmetry
j. fractal dimension (“coastline approximation” - 1)

The mean, standard error and “worst” or largest (mean of the three largest values) of these features were computed for each image, resulting in 30 features. For instance, field 3 is Mean Radius, field 13 is Radius SE, field 23 is Worst Radius.

FLOWCHART



RESULT

We used the Xgboost classifier and it gave an accuracy of approximately 98 %.

APPLICATIONS :

This model can be used for public use for the benefit of health care in the society after integrating it with a UI(Flask/Django) application.

CONCLUSION

The study has shown that thel machine learning algorithm achieved better discriminatory accuracy on identifying women at high risk of breast cancer using the Wisconsin dataset and XGBoost is the best choice for developing a breast cancer prediction model using breast cancer risk factors. We have successfully developed and validated a breast cancer prediction model using aws sagemaker.

FUTURE SCOPE

AI is set to change the medical industry in the coming decades - it wouldn't make sense for pathology to not be disrupted too. Currently ML model and still in testing and experimentation phase for cancer prognosis. As datasets are getting larger and of higher quality, researchers are building accurate models. You perform clinical tests , either at home or clinic . Data is inputted into a pathological ML system. A few minutes later , you receive an email with a detailed report that has an accurate prediction about the development of your cancer. ML is the next step of pathology , and it will disrupt the industry.

BIBLIOGRAPHY

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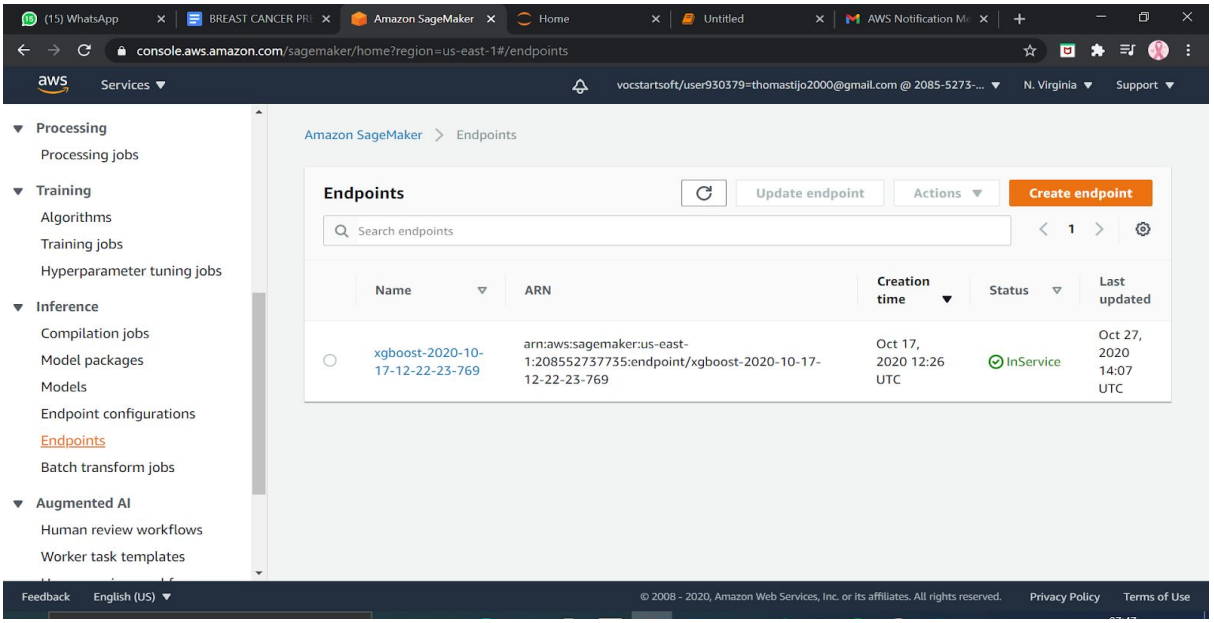
2) https://www.kaggle.com/lbronchal/breast-cancer-dataset-analysis

3) https://rstudio-pubs-static.s3.amazonaws.com/344010_1f4d6691092d4544bfbddb092e7223d2.html

4) https://www.researchgate.net/publication/341508593_BREAST_CANCER_PREDICTION_USING_MACHINE_LEARNING

SCREENSHOTS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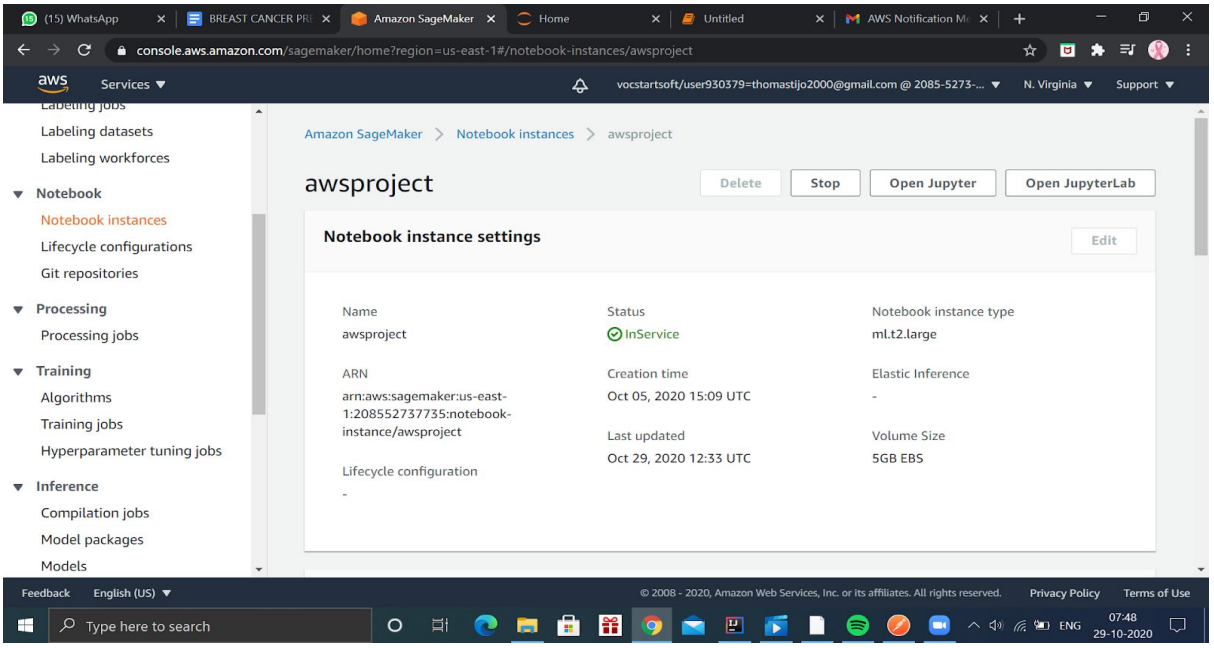
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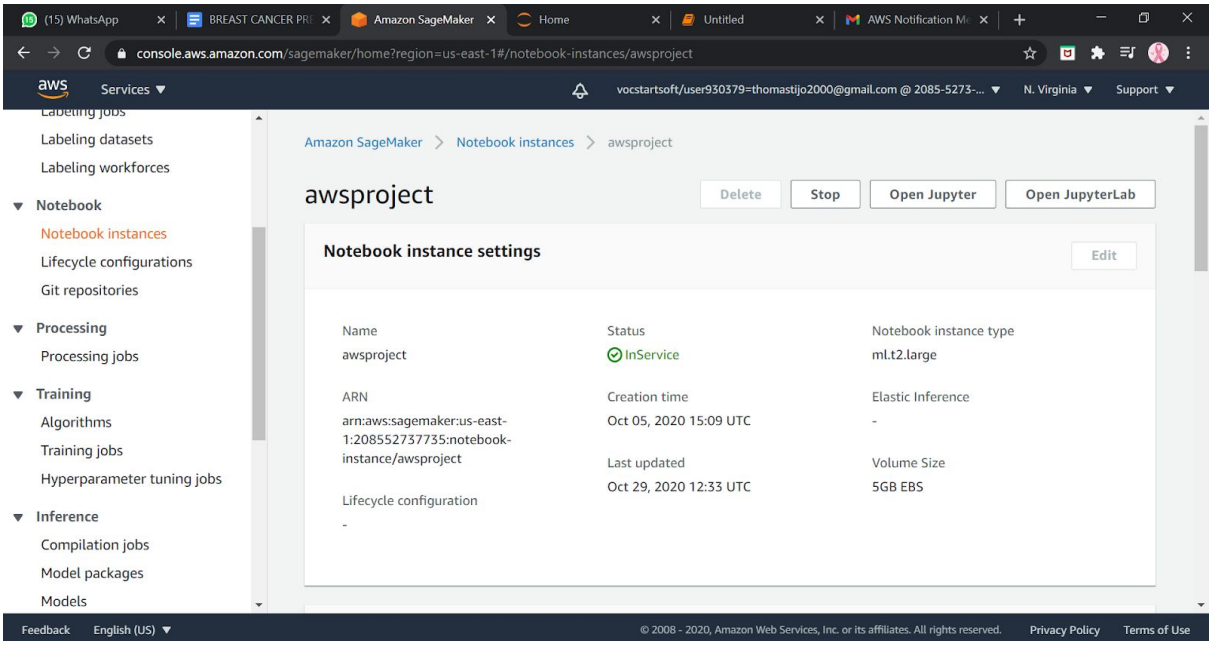
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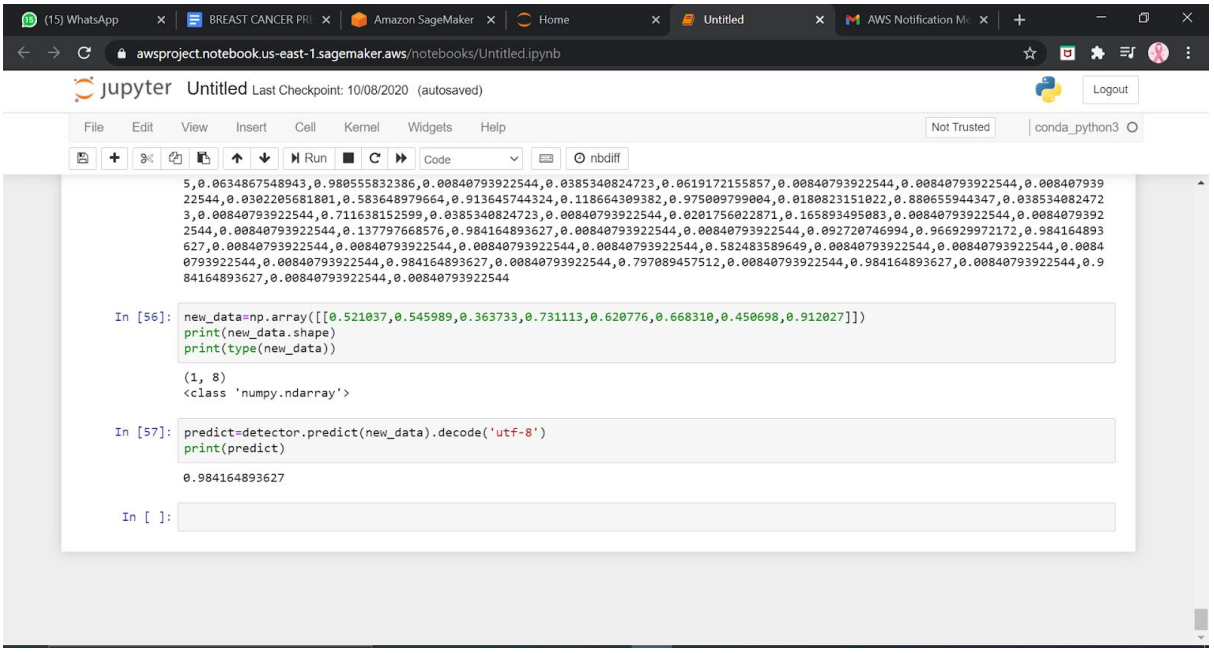
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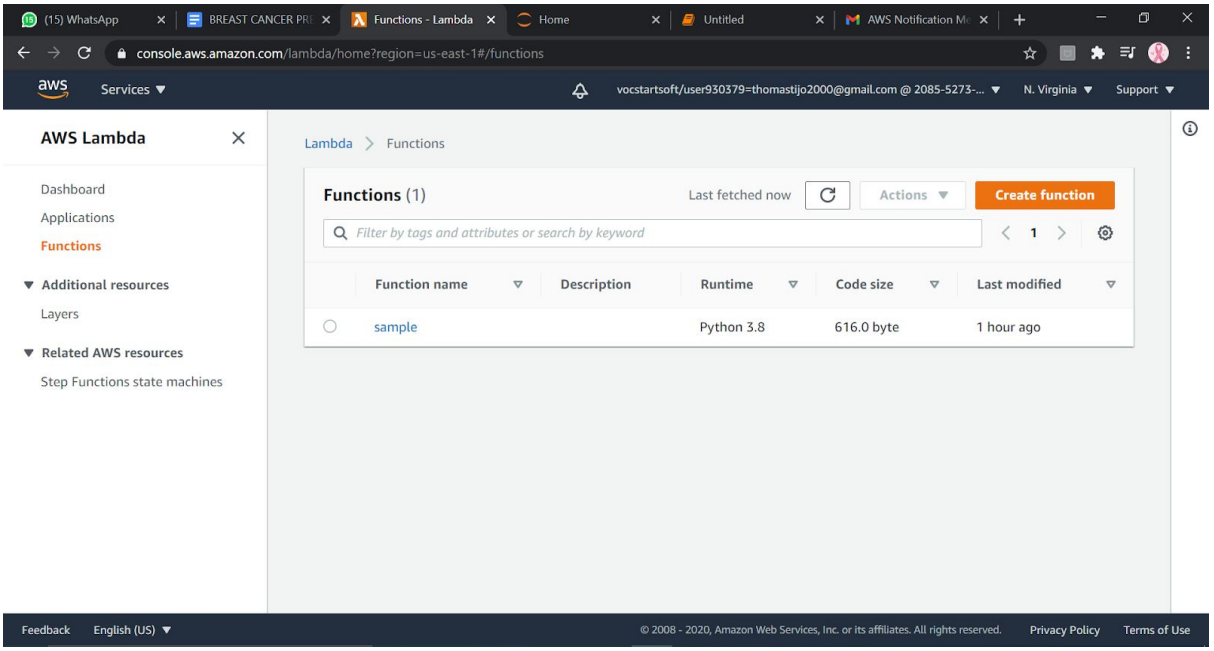
In [56]:
new_data=np.array([[0.521037,0.545989,0.363733,0.731113,0.620776,0.668310,0.450698,0.912027]])
print(new_data.shape)
print(type(new_data))
(1, 8)
<class 'numpy.ndarray'>
In [57]:
predict=detector.predict(new_data).decode('utf-8')
print(predict)
0.984164893627
In [ ]: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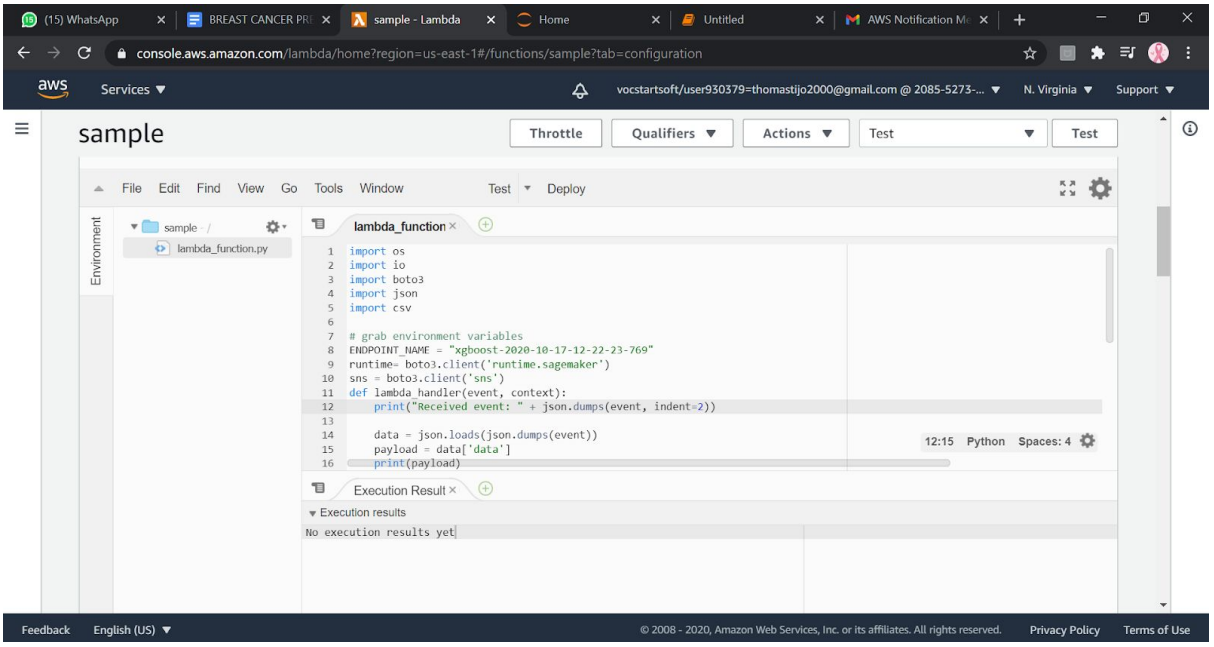
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lambda_function
import os
import io
import boto3
import json
import csv
# grab environment variables
ENDPOINT_NAME = "xgboost-2020-10-17-12-22-23-769"
runtime= boto3.client('runtime.sagemaker')
sns = boto3.client('sns')
def lambda_handler(event, context):
print("Received event: " + json.dumps(event, indent=2))
data = json.loads(json.dumps(event))
payload = data['data']
print(payload)
12:15 Python Spaces: 4
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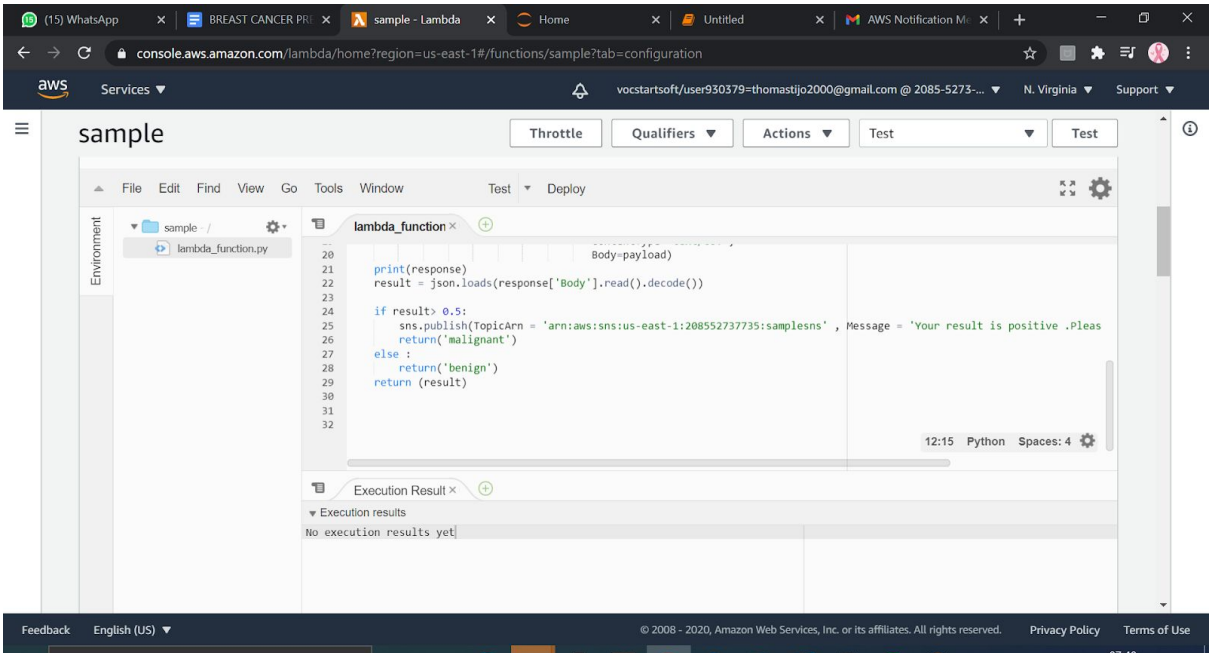
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Body=payload)
print(response)
result = json.loads(response['Body'].read().decode())
if result> 0.5:
sns.publish(TopicArn = 'arn:aws:sns:us-east-1:208552737735:samplesns' , Message = 'Your result is positive .Pleas
return('malignant')
else :
return('benign')
return (result)
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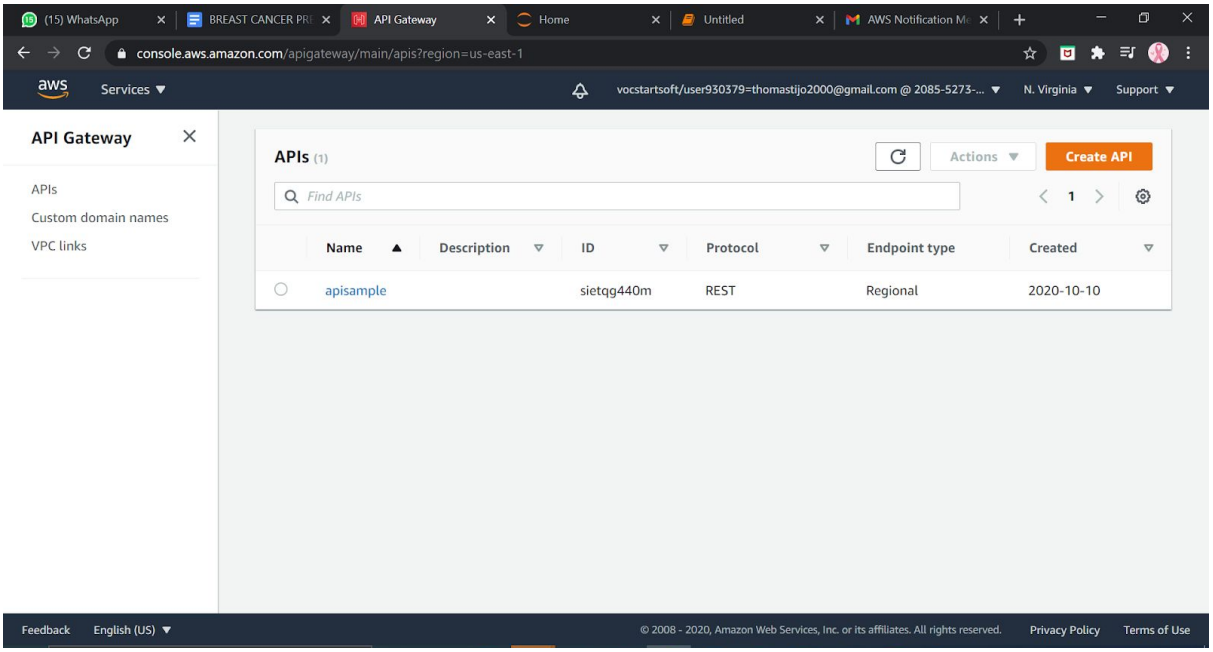
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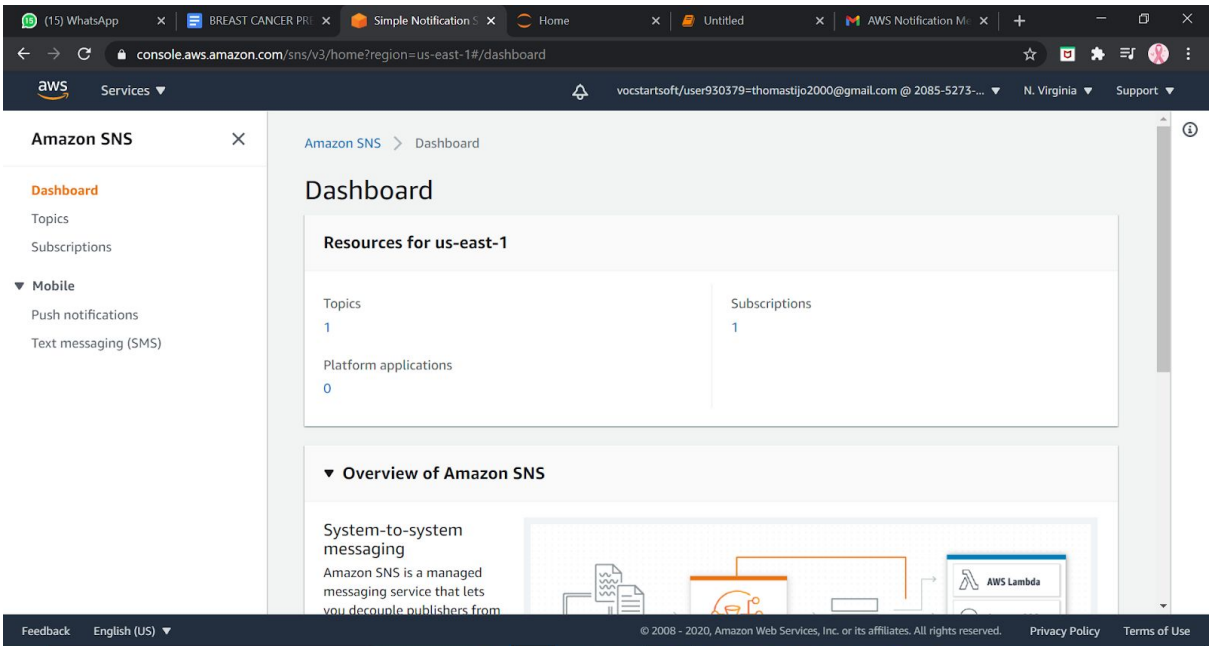
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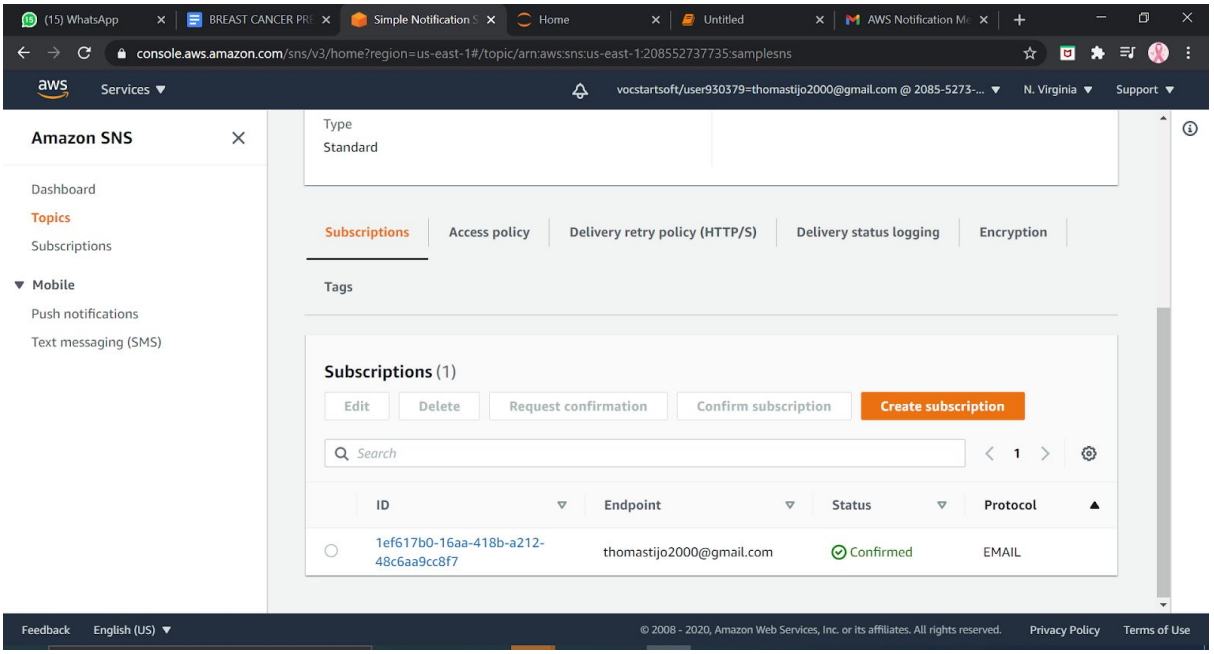
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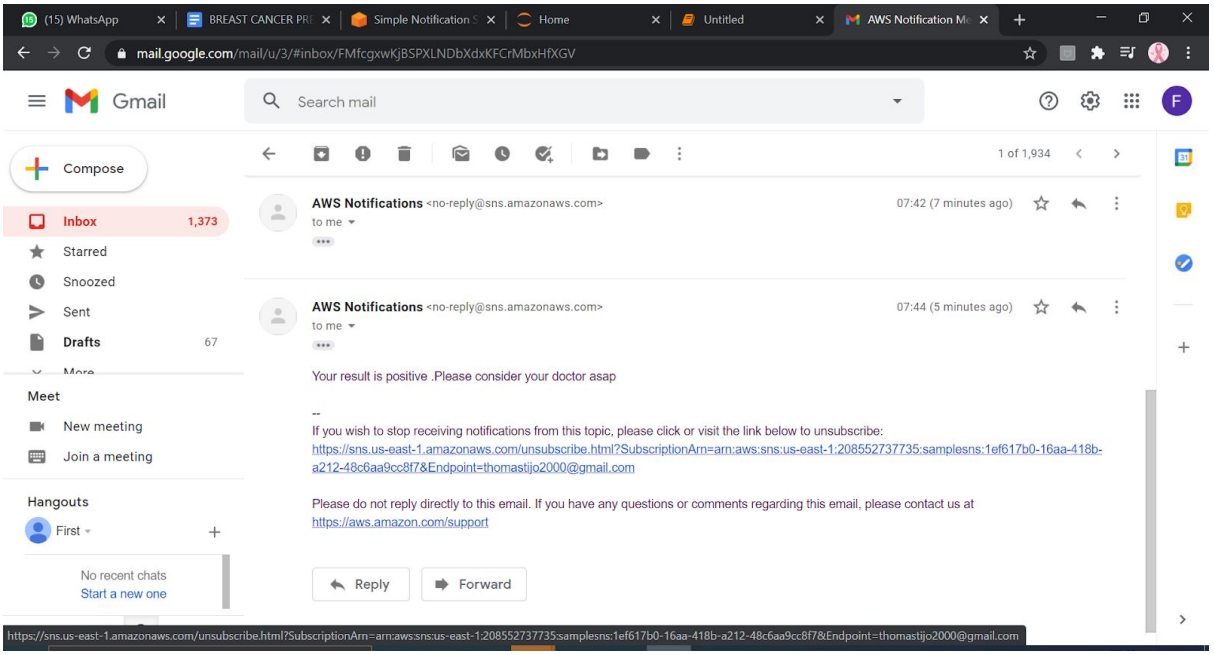
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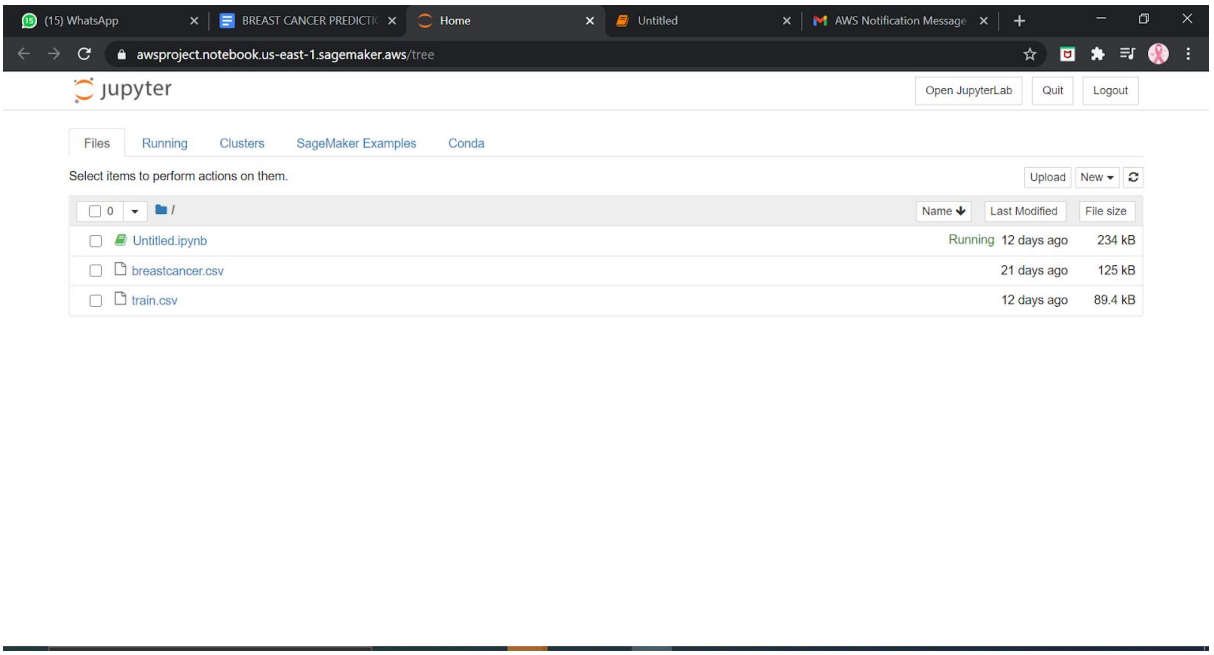
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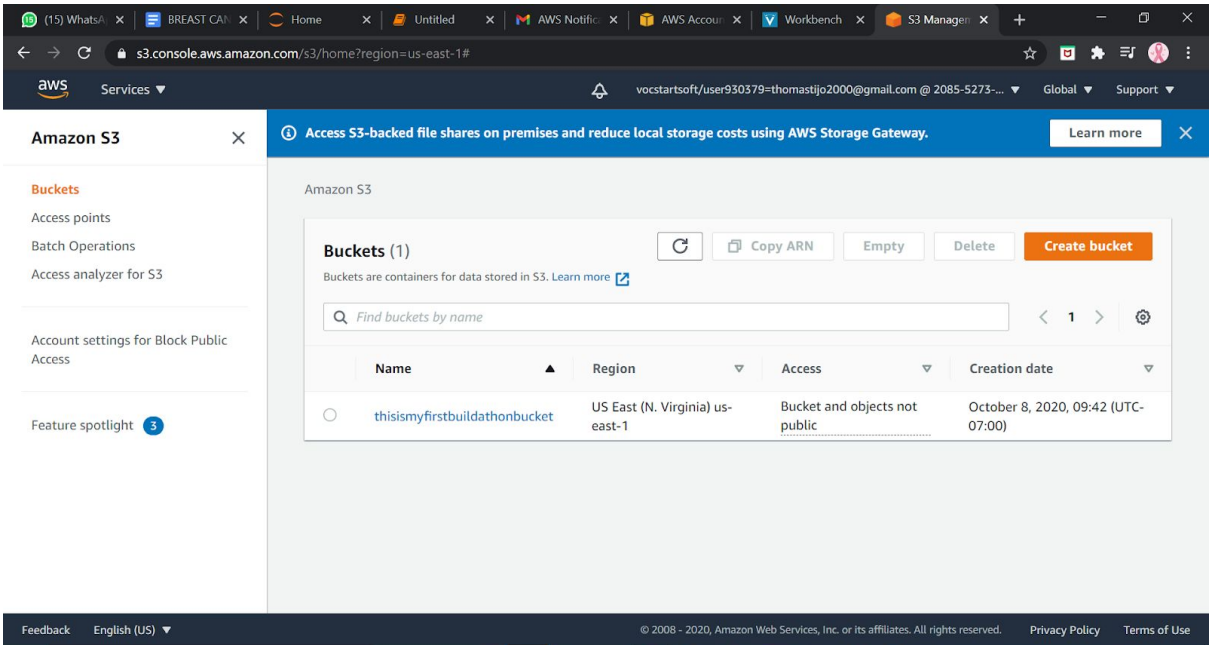
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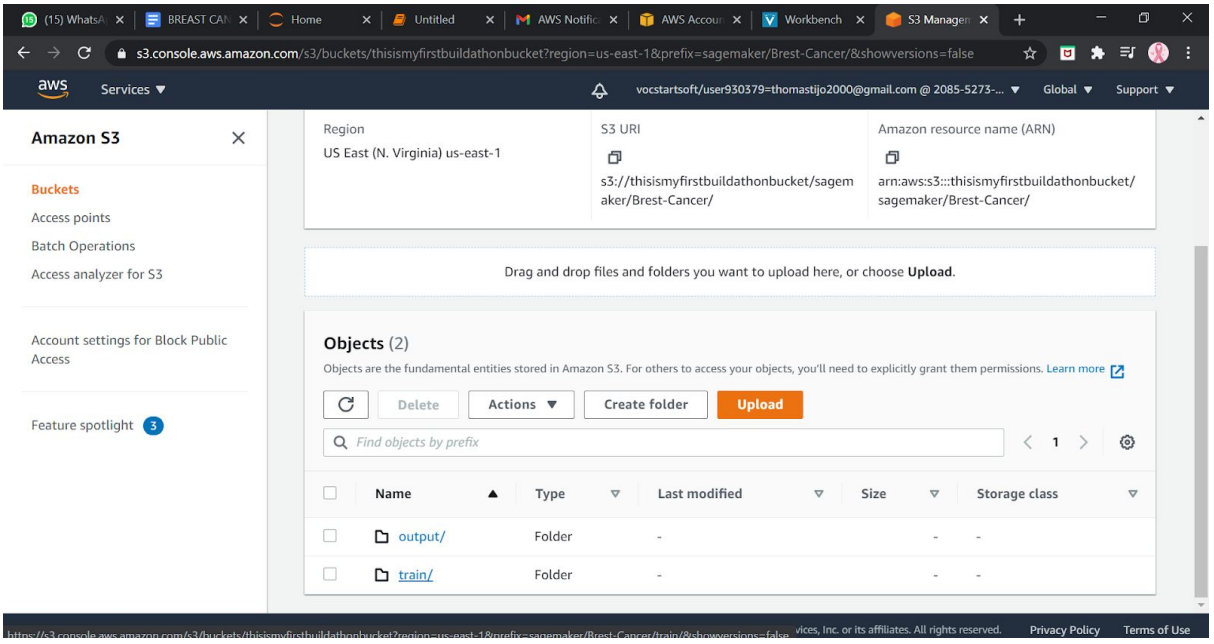
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Objects (2)
Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions. Learn more
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Actions
Create folder
Upload
Find objects by prefix
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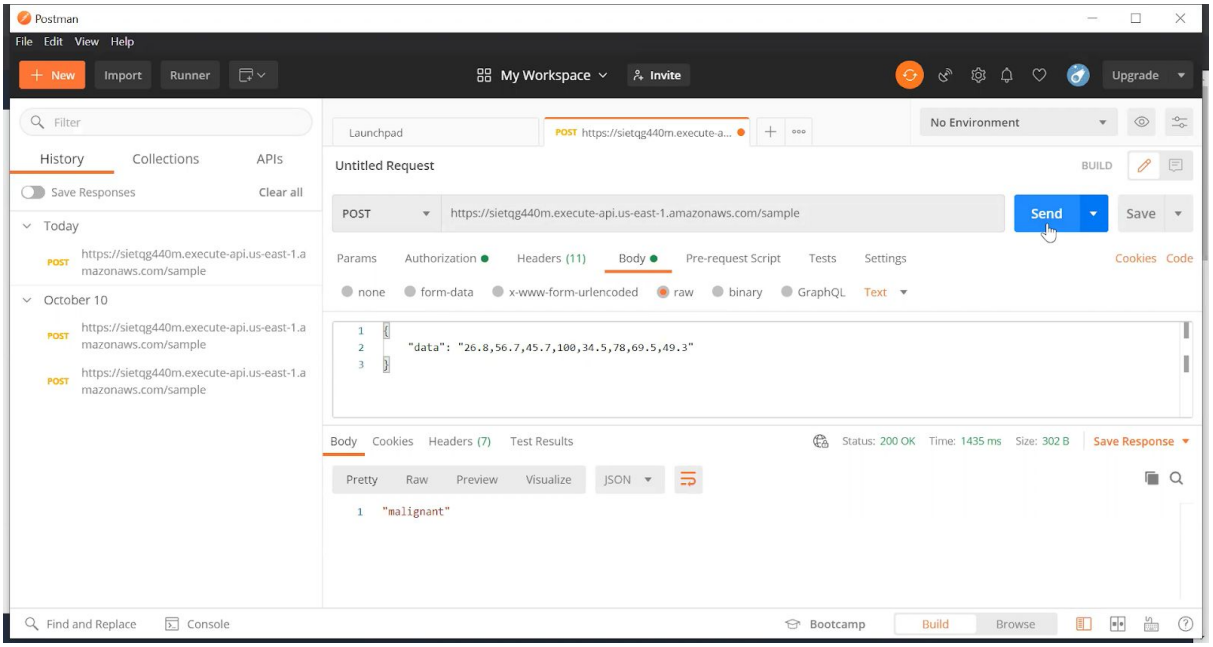

APPENDIX

Source code
https://drive.google.com/drive/folders/11SbTSg9YWS22QGVMbyJOR-c8iuM2iHnv?usp=sharing

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