CSCI 585 DATABASE SYSTEMS
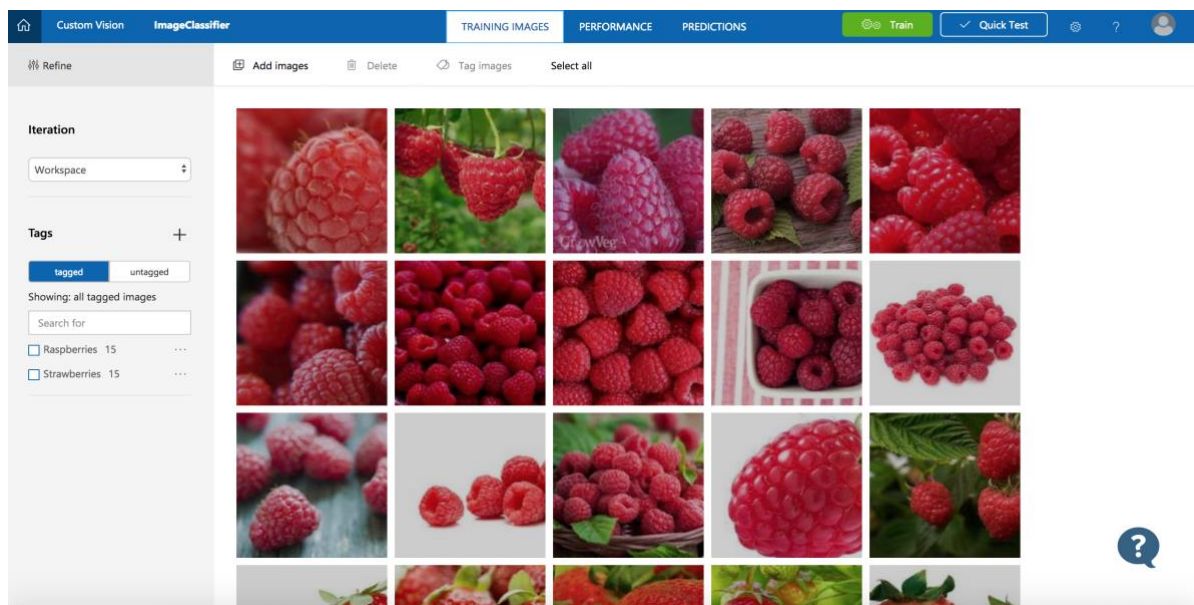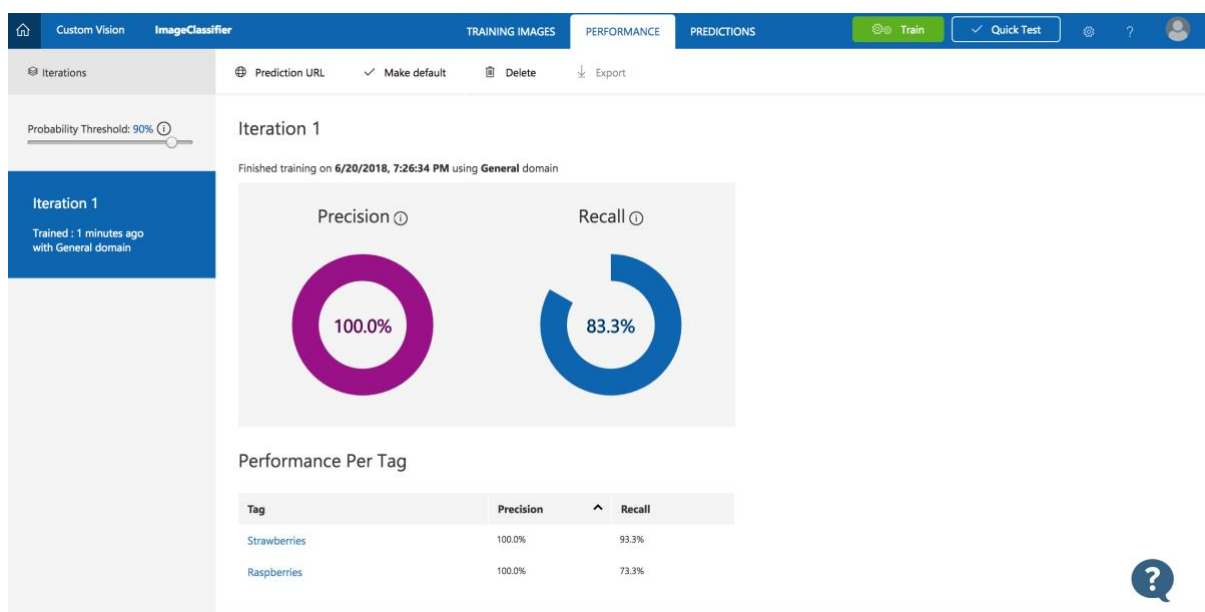# HOMEWORK 4

IMAGE CLASSIFIER

ITERATION 1:

PERFORMANCE FOR ITERATION 1:

PREDICTIONS AFTER FIRST ITERATION:

ITERATION 2:

PERFORMANCE FOR ITERATION 2:
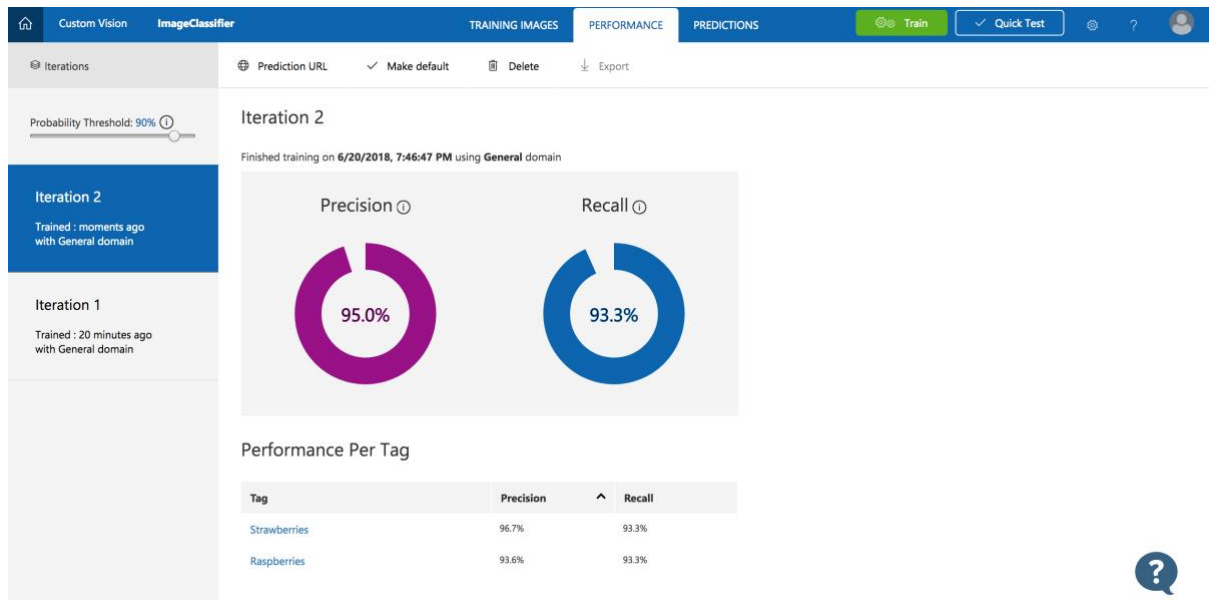
PREDICTIONS AFTER SECOND ITERATION:
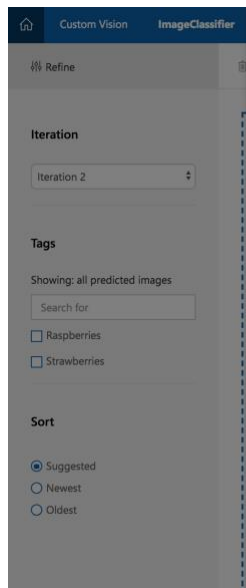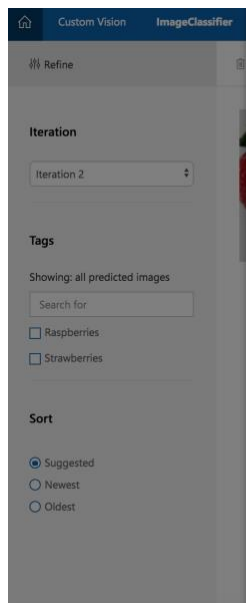
USING THE COGNITIVE API

ITERATION 1

Custom Vision Prediction 2.0

PredictImageUrl
Predict an image url and saves the result

Query parameters
projectId   a74eb557-fa16-4d5c-9422-bba
iterationId   9a7e1dc1-d668-45b0-8417-bd: ✗ Remove parameter
+ Add parameter

Headers
Prediction-Key   e0467ad4307349f2be93bec2ff:
Content-Type   application/json   ✗ Remove header
+ Add header

Request body
An that contains the url of the image to be evaluated
1 {
2   "Url": "https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQODkpL6u7Q8LIYIzWUN7o0RL51Z4wmnci7tqSorFVytjzllDVr6w"
3 }
4
5

Request URL
https://southcentralus.api.cognitive.microsoft.com/customvision/v2.0/Prediction/a74eb557-fa16-4d5c-9422-bbacbbd01d88/url?iterationId=9a7e1dc1-d668-45b0-8417-bd30b55658b1

HTTP request
POST https://southcentralus.api.cognitive.microsoft.com/customvision/v2.0/Prediction/a74eb557-fa16-4d5c-9422-bbacbbd01d88/url?iterationId=9a7e1dc1-d668-45b0-8417-bd30b556
58b1 HTTP/1.1
Host: southcentralus.api.cognitive.microsoft.com
Prediction-Key: e0467ad4307349f2be93bec2ff544928
Content-Type: application/json

{
  "Url": "https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQODkpL6u7Q8LIYIzWUN7o
0RL51Z4wmnci7tqSorFVytjzllDVr6w"

HTTP request
POST https://southcentralus.api.cognitive.microsoft.com/customvision/v2.0/Prediction/a74eb557-fa16-4d5c-9422-bbacbbd01d88/url?iterationId=9a7e1dc1-d668-45b0-8417-bd30b556
58b1 HTTP/1.1
Host: southcentralus.api.cognitive.microsoft.com
Prediction-Key: e0467ad4307349f2be93bec2ff544928
Content-Type: application/json

{
  "Url": "https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcQODkpL6u7Q8LIYIzWUN7o
0RL51Z4wmnci7tqSorFVytjzllDVr6w"
}

Send

Response status
200 OK
Response latency
460 ms
Response content

apim-request-id: 1cb80d0b-2d93-4589-b305-9f2026db8e71
Strict-Transport-Security: max-age=31536000; includeSubDomains; preload
x-content-type-options: nosniff
Date: Wed, 27 Jun 2018 02:17:29 GMT
Content-Length: 402
Content-Type: application/json; charset=utf-8

{
  "id": "1cb80d0b-2d93-4589-b305-9f2026db8e71",
  "project": "a74eb557-fa16-4d5c-9422-bbacbbd01d88",
  "iteration": "9a7e1dc1-d668-45b0-8417-bd30b55658b1",
  "created": "2018-06-27T02:17:29.9864325Z",
  "predictions": [{
    "probability": 0.9992489,
    "tagId": "7466496f-540f-47a8-b32e-d2a8c2a10c2a",
    "tagName": "Strawberries"
  }, {
    "probability": 0.000103381914,
    "tagId": "1dc49b07-a87a-480a-85b4-47393acc0c2d",
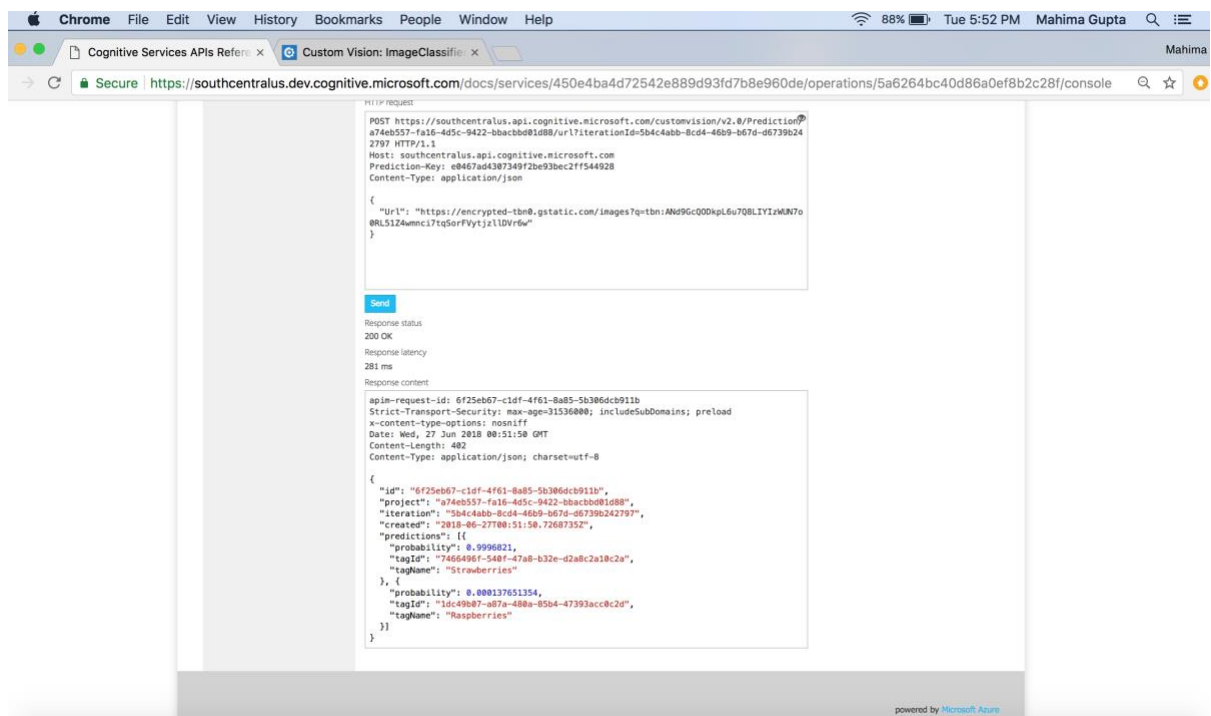   "tagName": "Raspberries"
  }]
}

For image 1 (Strawberries) –> P(S) = 99.9% and P(R) = 0%
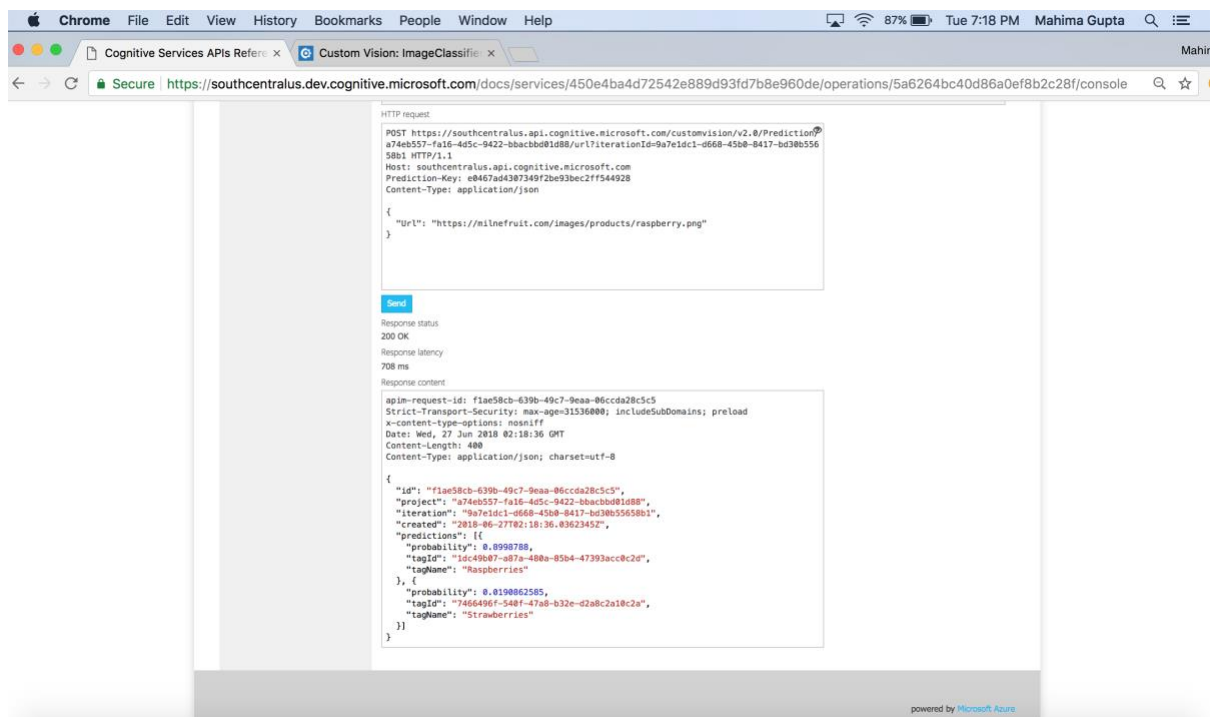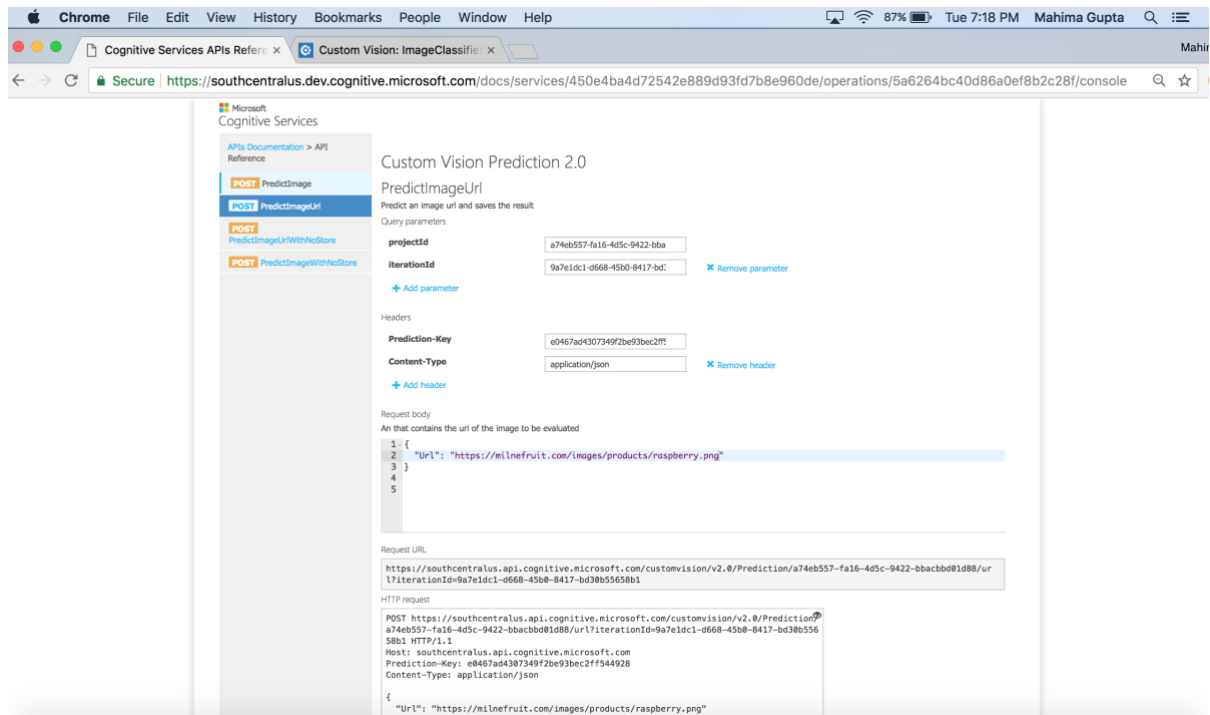
For image 2 (Raspberries) –> P(R) = 89.9% and P(S) = 1.9%

ITERATION 2
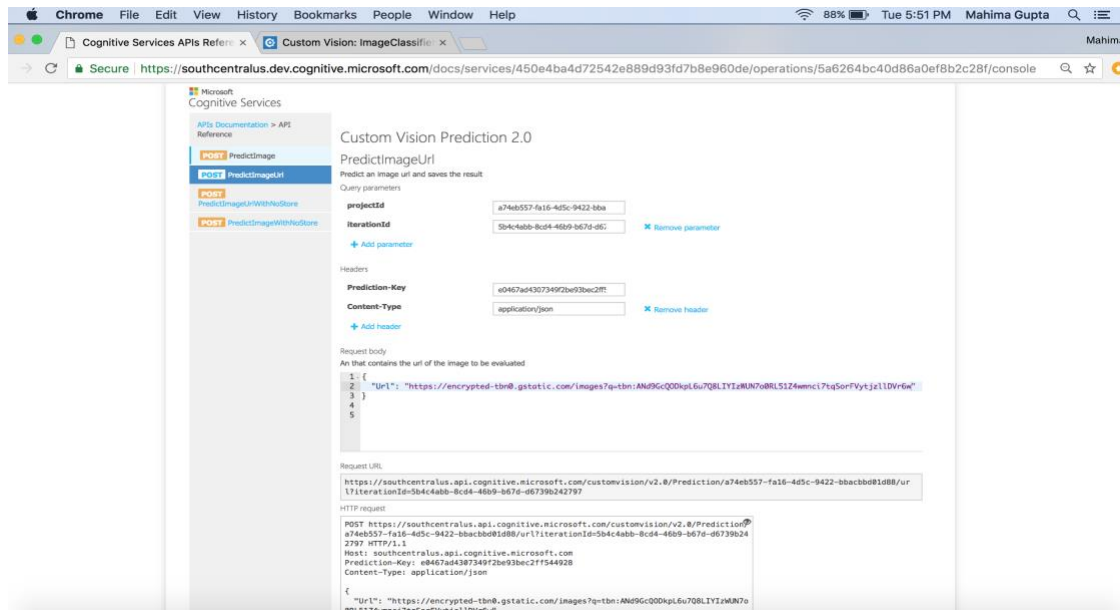
For image 1 (Strawberries) –> P(S) = 99.9% and P(R) = 0%
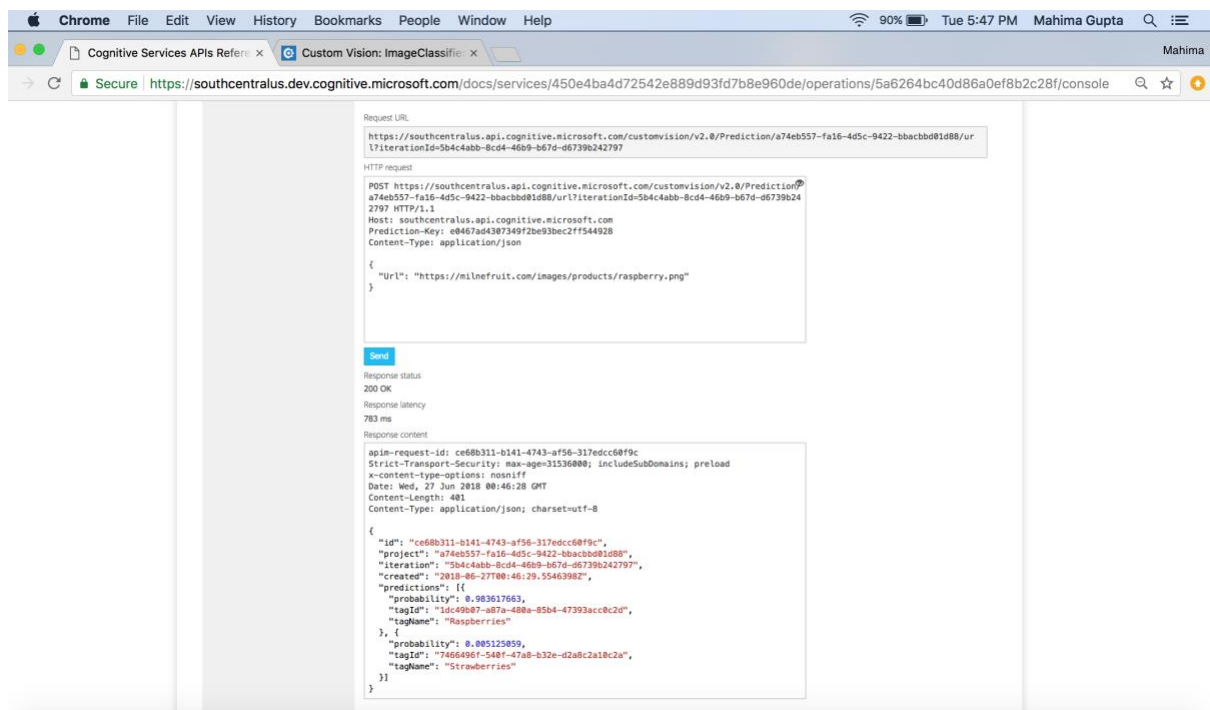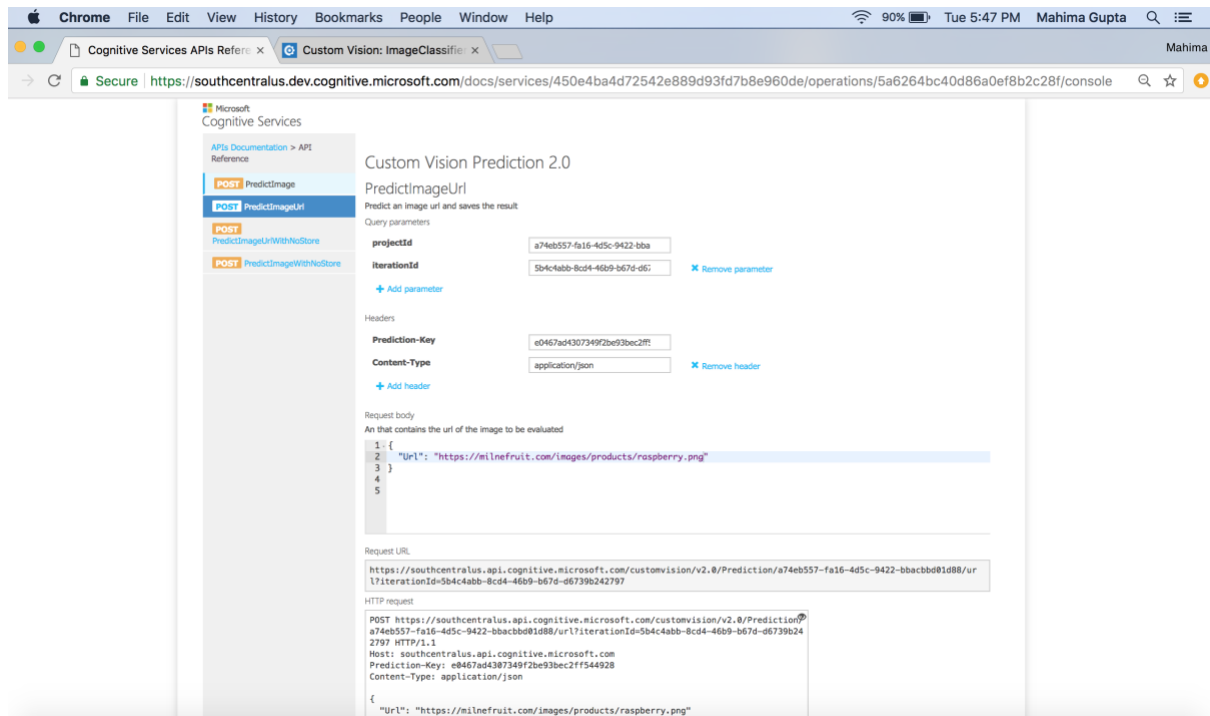
For image 2 (Raspberries) –> P(R) = 98.3% and P(S) = 0.5%

The result returned by the cognitive API matches with the values returned from the Custom Vision App webpage. So, it is consistent with both the iterations 1 and 2.

Iterations 1 and 2 are definitely different as the number of images trained for both are different. For the first iteration, only 15 images of each were uploaded and trained while for the second one, another 15 images of each were uploaded and trained again. So, the first iteration had 15 images of Strawberries and 15 images of Raspberries while the second iteration had 30 images of Strawberries and 30 images of Raspberries.

First Iteration:
Precision – 100%
Recall – 83.3%

Predictions:
For image 1 (Strawberries) –> P(S) = 99.9% and P(R) = 0%
For image 2 (Raspberries) –> P(R) = 89.9% and P(S) = 1.9%

Second Iteration:
Precision – 95%
Recall – 93.3%

Predictions:
For image 1 (Strawberries) –> P(S) = 99.9% and P(R) = 0%
For image 2 (Raspberries) –> P(R) = 98.3% and P(S) = 0.5%

This classifier gives correct predictions in both the iterations however after the second iteration of training, the probability of the Raspberries seems to have improved quite a lot as compared to the first one. We can clearly see that the predictions for the Raspberries improved greatly from the first iteration (89.9%) to (98.3%) in the second iteration. Second iteration is better than the first one in terms of the probabilities for Raspberries. It solely depends on the features extracted from the images during both the iterations. There might be a possibility that there were less features for the raspberries during the first iteration and after adding more training data in second iteration, more features of raspberries are extracted and hence the performance improved.

This homework was pretty straightforward and I didn't really meet any difficulties except for the Step 11. I faced a few errors (assembly reference missing, namespace not found) while executing the program for the cognitive API on Visual Studio. I finally used the online version for the Cognitive API Testing using the Prediction Link and Image URL (The link mentioned in the HW PDF) since Visual Studio didn't work on my mac till the very end.