Custom vision using SDK

Object Detection

In [1]:

```
from azure.cognitiveservices.vision.customvision.training import CustomVisionTrainingClient
from azure.cognitiveservices.vision.customvision.prediction import CustomVisionPredictionClient
from azure.cognitiveservices.vision.customvision.training.models import ImageFileCreateBatch, ImageFileCreateEnt
from msrest.authentication import ApiKeyCredentials
import time
```

In [2]:

```
# Replace with valid values

ENDPOINT = "https://asdfasfasv.cognitiveservices.azure.com/"
training_key = "4d4a0c2f1ecf45edb26f822df3c3d67e"
prediction_key = "2d07822655d84e9889700511270b7a68"
prediction_resource_id = "/subscriptions/f468ceaa-a610-4b88-9742-2b3e8f4ef76c/resourceGroups/Day2/providers/Micr
```

In [3]:

```
credentials = ApiKeyCredentials(in_headers={"Training-key": training_key})
trainer = CustomVisionTrainingClient(ENDPOINT, credentials)
prediction_credentials = ApiKeyCredentials(in_headers={"Prediction-key": prediction_key})
predictor = CustomVisionPredictionClient(ENDPOINT, prediction_credentials)
```

In [ ]:

```
# Detect model
```

In [4]:

```
publish_iteration_name = "detectModel"

# Find the object detection domain
obj_detection_domain = next(domain for domain in trainer.get_domains() if domain.type == "ObjectDetection" and c

# Create a new project
print ("Creating project...")
project = trainer.create_project("My Detection Project", domain_id=obj_detection_domain.id)
```

```
Creating project...
```

In [5]:

```
# Make two tags in the new project
fruit_tag = trainer.create_tag(project.id, "fruit")
vegetable_tag = trainer.create_tag(project.id, "vegetable")
```

In [6]:

```
fruit_image_regions = {
    "fruit_1": [ 0.145833328, 0.3509314, 0.5894608, 0.238562092 ],
    "fruit_2": [ 0.294117659, 0.216944471, 0.534313738, 0.5980392 ],
    "fruit_3": [ 0.09191177, 0.0682516545, 0.757352948, 0.6143791 ],
    "fruit_4": [ 0.254901975, 0.185898721, 0.5232843, 0.594771266 ],
    "fruit_5": [ 0.2365196, 0.128709182, 0.5845588, 0.71405226 ],
    "fruit_6": [ 0.115196079, 0.133611143, 0.676470637, 0.6993464 ],
    "fruit_7": [ 0.164215669, 0.31008172, 0.767156839, 0.410130739 ],
    "fruit_8": [ 0.118872553, 0.318251669, 0.817401946, 0.225490168 ],
    "fruit_9": [ 0.18259804, 0.2136765, 0.6335784, 0.643790841 ],
    "fruit_10": [ 0.05269608, 0.282303959, 0.8088235, 0.452614367 ],
    "fruit_11": [ 0.05759804, 0.0894935, 0.9007353, 0.3251634 ],
    "fruit_12": [ 0.3345588, 0.07315363, 0.375, 0.9150327 ],
    "fruit_13": [ 0.269607842, 0.194068655, 0.4093137, 0.6732026 ],
    "fruit_14": [ 0.143382356, 0.218578458, 0.7977941, 0.295751631 ],
    "fruit_15": [ 0.19240196, 0.0633497, 0.5710784, 0.8398692 ],
    "fruit_16": [ 0.140931368, 0.480016381, 0.6838235, 0.240196079 ],
    "fruit_17": [ 0.305147052, 0.2512582, 0.4791667, 0.5408496 ],
    "fruit_18": [ 0.234068632, 0.445702642, 0.6127451, 0.344771236 ],
    "fruit_19": [ 0.219362751, 0.141781077, 0.5919118, 0.6683006 ],
    "fruit_20": [ 0.180147052, 0.239820287, 0.6887255, 0.235294119 ]
}

vegetable_image_regions = {
    "vegetable_1": [ 0.4007353, 0.194068655, 0.259803921, 0.6617647 ],
    "vegetable_2": [ 0.426470578, 0.185898721, 0.172794119, 0.5539216 ],
    "vegetable_3": [ 0.289215684, 0.259428144, 0.403186262, 0.421568632 ],
    "vegetable_4": [ 0.343137264, 0.105833367, 0.332107842, 0.8055556 ],
    "vegetable_5": [ 0.3125, 0.09766343, 0.435049027, 0.71405226 ],
    "vegetable_6": [ 0.379901975, 0.24308826, 0.32107842, 0.5718954 ],
    "vegetable_7": [ 0.341911763, 0.20714055, 0.3137255, 0.6356209 ],
    "vegetable_8": [ 0.231617644, 0.08459154, 0.504901946, 0.8480392 ],
    "vegetable_9": [ 0.170343131, 0.332957536, 0.767156839, 0.403594762 ],
    "vegetable_10": [ 0.204656869, 0.120539248, 0.5245098, 0.743464053 ],
    "vegetable_11": [ 0.05514706, 0.159754932, 0.799019635, 0.730392158 ],
    "vegetable_12": [ 0.265931368, 0.169558853, 0.5061275, 0.606209159 ],
    "vegetable_13": [ 0.241421565, 0.184264734, 0.448529422, 0.6830065 ],
    "vegetable_14": [ 0.05759804, 0.05027781, 0.75, 0.882352948 ],
    "vegetable_15": [ 0.191176474, 0.169558853, 0.6936275, 0.6748366 ],
    "vegetable_16": [ 0.1004902, 0.279036, 0.6911765, 0.477124184 ],
    "vegetable_17": [ 0.2720588, 0.131977156, 0.4987745, 0.6911765 ],
    "vegetable_18": [ 0.180147052, 0.112369314, 0.6262255, 0.6666667 ],
    "vegetable_19": [ 0.333333343, 0.0274019931, 0.443627447, 0.852941155 ],
    "vegetable_20": [ 0.158088237, 0.04047389, 0.6691176, 0.843137264 ]
}
```

In [10]:

```
base_image_location = "C:/Users/Jaswanth Reddy/Desktop/Image dataset/api_fruit_vegetable/"

# Going through the data table above and create the images
print ("Adding images...")
tagged_images_with_regions = []
i=0
for file_name in fruit_image_regions.keys():
    x,y,w,h = fruit_image_regions[file_name]
    regions = [ Region(tag_id=fruit_tag.id, left=x,top=y,width=w,height=h) ]

    with open(base_image_location + "fruit/" + str(i) + ".jpg", mode="rb") as image_contents:
        i=i+1
        tagged_images_with_regions.append(ImageFileCreateEntry(name=file_name, contents=image_contents.read(), r
j=0
for file_name in vegetable_image_regions.keys():
    x,y,w,h = vegetable_image_regions[file_name]
    regions = [ Region(tag_id=vegetable_tag.id, left=x,top=y,width=w,height=h) ]

    with open(base_image_location + "vegetable/" + str(j) + ".jpg", mode="rb") as image_contents:
        j=j+1
        tagged_images_with_regions.append(ImageFileCreateEntry(name=file_name, contents=image_contents.read(), r

upload_result = trainer.create_images_from_files(project.id, ImageFileCreateBatch(images=tagged_images_with_regi
if not upload_result.is_batch_successful:
    print("Image batch upload failed.")
    for image in upload_result.images:
        print("Image status: ", image.status)
    exit(-1)
```

```
Adding images...
```

In [11]:

```
# Training
print ("Training...")
iteration = trainer.train_project(project.id)
while (iteration.status != "Completed"):
    iteration = trainer.get_iteration(project.id, iteration.id)
    print ("Training status: " + iteration.status)
    time.sleep(1)
```

```
Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
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Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
Training status: Training
```

In [12]:

```
# The iteration is now trained. Publish it to the project endpoint
trainer.publish_iteration(project.id, iteration.id, publish_iteration_name, prediction_resource_id)
print ("Done!")
```

```
Done!
```

In [15]:

```python
# Predicting an image

with open(base_image_location + "/vegetable/14.jpg", mode="rb") as test_data:
    results = predictor.detect_image(project.id, publish_iteration_name, test_data)

# Display the results.
for prediction in results.predictions:
    print("\t" + prediction.tag_name + ": {0:.2f}% bbox.left = {1:.2f}, bbox.top = {2:.2f}, bbox.width = {3:.2f}
```

```
	vegetable: 11.64% bbox.left = 0.29, bbox.top = 0.21, bbox.width = 0.48, bbox.height = 0.65
	vegetable: 1.61% bbox.left = 0.64, bbox.top = 0.26, bbox.width = 0.36, bbox.height = 0.68
	vegetable: 1.54% bbox.left = 0.44, bbox.top = 0.07, bbox.width = 0.44, bbox.height = 0.67
	vegetable: 1.19% bbox.left = 0.82, bbox.top = 0.56, bbox.width = 0.07, bbox.height = 0.08
	vegetable: 0.86% bbox.left = 0.89, bbox.top = 0.25, bbox.width = 0.06, bbox.height = 0.06
	fruit: 0.79% bbox.left = 0.10, bbox.top = 0.61, bbox.width = 0.61, bbox.height = 0.34
	vegetable: 0.60% bbox.left = 0.56, bbox.top = 0.44, bbox.width = 0.06, bbox.height = 0.07
	vegetable: 0.56% bbox.left = 0.13, bbox.top = 0.24, bbox.width = 0.43, bbox.height = 0.71
	vegetable: 0.55% bbox.left = 0.93, bbox.top = 0.25, bbox.width = 0.05, bbox.height = 0.05
	vegetable: 0.52% bbox.left = 0.16, bbox.top = 0.61, bbox.width = 0.61, bbox.height = 0.34
```

In [ ]:

In [25]:
```
# Predicting an image

with open("C:/Users/Jaswanth Reddy/Desktop/Image dataset/api_fruit_vegetable/fruit/14.jpg", mode="rb") as test_d
    results = predictor.detect_image(project.id, publish_iteration_name, test_data)

# Display the results.
for prediction in results.predictions:
    print("\t" + prediction.tag_name + ": {0:.2f}% bbox.left = {1:.2f}, bbox.top = {2:.2f}, bbox.width = {3:.2f}
```

```
        fruit: 41.91% bbox.left = 0.20, bbox.top = 0.04, bbox.width = 0.56, bbox.height = 0.73
        fruit: 3.28% bbox.left = 0.40, bbox.top = 0.61, bbox.width = 0.60, bbox.height = 0.35
        fruit: 2.11% bbox.left = 0.38, bbox.top = 0.19, bbox.width = 0.43, bbox.height = 0.69
        fruit: 1.86% bbox.left = 0.36, bbox.top = 0.23, bbox.width = 0.21, bbox.height = 0.24
        fruit: 1.76% bbox.left = 0.55, bbox.top = 0.37, bbox.width = 0.07, bbox.height = 0.08
        fruit: 1.50% bbox.left = 0.50, bbox.top = 0.31, bbox.width = 0.45, bbox.height = 0.69
        fruit: 1.27% bbox.left = 0.43, bbox.top = 0.55, bbox.width = 0.07, bbox.height = 0.08
        fruit: 1.15% bbox.left = 0.37, bbox.top = 0.62, bbox.width = 0.07, bbox.height = 0.08
        fruit: 1.13% bbox.left = 0.42, bbox.top = 0.00, bbox.width = 0.48, bbox.height = 0.63
        fruit: 1.07% bbox.left = 0.43, bbox.top = 0.62, bbox.width = 0.08, bbox.height = 0.08
        fruit: 0.92% bbox.left = 0.51, bbox.top = 0.04, bbox.width = 0.49, bbox.height = 0.36
        fruit: 0.91% bbox.left = 0.31, bbox.top = 0.61, bbox.width = 0.07, bbox.height = 0.08
        fruit: 0.89% bbox.left = 0.56, bbox.top = 0.49, bbox.width = 0.07, bbox.height = 0.07
        fruit: 0.88% bbox.left = 0.43, bbox.top = 0.49, bbox.width = 0.08, bbox.height = 0.08
        fruit: 0.81% bbox.left = 0.37, bbox.top = 0.55, bbox.width = 0.07, bbox.height = 0.09
        fruit: 0.80% bbox.left = 0.50, bbox.top = 0.55, bbox.width = 0.07, bbox.height = 0.08
        fruit: 0.79% bbox.left = 0.02, bbox.top = 0.00, bbox.width = 0.52, bbox.height = 0.70
        fruit: 0.78% bbox.left = 0.33, bbox.top = 0.44, bbox.width = 0.41, bbox.height = 0.56
        fruit: 0.78% bbox.left = 0.30, bbox.top = 0.49, bbox.width = 0.09, bbox.height = 0.08
        fruit: 0.75% bbox.left = 0.24, bbox.top = 0.31, bbox.width = 0.57, bbox.height = 0.32
        fruit: 0.71% bbox.left = 0.36, bbox.top = 0.49, bbox.width = 0.08, bbox.height = 0.08
        fruit: 0.70% bbox.left = 0.37, bbox.top = 0.43, bbox.width = 0.07, bbox.height = 0.08
        fruit: 0.69% bbox.left = 0.36, bbox.top = 0.45, bbox.width = 0.22, bbox.height = 0.28
        fruit: 0.67% bbox.left = 0.43, bbox.top = 0.43, bbox.width = 0.08, bbox.height = 0.08
        fruit: 0.62% bbox.left = 0.31, bbox.top = 0.55, bbox.width = 0.07, bbox.height = 0.10
        fruit: 0.59% bbox.left = 0.62, bbox.top = 0.44, bbox.width = 0.06, bbox.height = 0.07
        fruit: 0.58% bbox.left = 0.56, bbox.top = 0.43, bbox.width = 0.07, bbox.height = 0.07
        fruit: 0.57% bbox.left = 0.30, bbox.top = 0.43, bbox.width = 0.08, bbox.height = 0.07
        fruit: 0.57% bbox.left = 0.36, bbox.top = 0.50, bbox.width = 0.58, bbox.height = 0.32
        fruit: 0.55% bbox.left = 0.50, bbox.top = 0.50, bbox.width = 0.06, bbox.height = 0.07
        fruit: 0.51% bbox.left = 0.00, bbox.top = 0.36, bbox.width = 0.06, bbox.height = 0.10
```

In [ ]: