```python
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from azure.core.exceptions import ResourceNotFoundError
from azure.ai.formrecognizer import FormRecognizerClient
from azure.ai.formrecognizer import FormTrainingClient
from azure.core.credentials import AzureKeyCredential
```

```python
def display_image(path):
    img = mpimg.imread(path)
    imgplot = plt.imshow(img)
    plt.show()
```

```python
endpoint_form_recognizer = "https://udacity-fr.cognitiveservices.azure.com/"
key_form_recognizer = "60baf17acfa44cb19d630b2141b10931"
training_data_url = "https://udacitykioskstorage.blob.core.windows.net/passengerdata?sp=racwdli&st=2023-12-21T11:26:30Z&se=2023-12-24T19:26:30Z&spr=https&sv=2022-11-02&sr=c&sig=exie53NShLKCxjo%2FCOOe%2FWwtGdh7ePxgzajf2e89B

form_training_client = FormTrainingClient(endpoint=endpoint_form_recognizer, credential=AzureKeyCredential(key_form_recognizer))
```

```python
training_process = form_training_client.begin_training(training_data_url, use_training_labels=True, include_subfolders=False)
trained_model = training_process.result()
```

```python
trained_model.model_id
```

```
'1c208a81-bfb4-46c9-8d5b-d5443e53124e'
```

```python
trained_model.status
```

```
'ready'
```

```python
# Code  Snippet Source: L3 Exercise 3 - Custom Form 1040 Recognizer Exercise Solution.ipynb
training_documents = trained_model.training_documents
for d in training_documents:
    print("Training document name: {}".format(d.name))
    print("Training document status: {}".format(d.status))
    print("Training document page count: {}".format(d.page_count))
    print("Training document errors: {}".format(d.errors))
```

```
Training document name: boarding_daniel.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding_janina.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding_joshua.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding_kartik.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding_pascal.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-avkash.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-james-webb.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-james.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-libby.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-radha-s-kumar.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
Training document name: boarding-sameer.pdf
Training document status: succeeded
Training document page count: 1
Training document errors: []
```

In [ ]: `trained_model.submodels`

Out[ ]: `[CustomFormSubmodel(accuracy=0.992, model_id=1c208a81-bfb4-46c9-8d5b-d5443e53124e, fields={'Baggage': CustomFormModelField(label=None, name=Baggage, accuracy=0.995), 'Boarding Time': CustomFormModelField(label=None, name=Boarding Time, accuracy=0.995), 'Carrier': CustomFormModelField(label=None, name=Carrier, accuracy=0.995), 'Class': CustomFormModelField(label=None, name=Class, accuracy=0.909), 'Date': CustomFormModelField(label=None, name=Date, accuracy=0.995), 'Destination': CustomFormModelField(label=None, name=Destination, accuracy=0.995), 'Flight No.': CustomFormModelField(label=None, name=Flight No., accuracy=0.995), 'Gate': CustomFormModelField(label=None, name=Gate, accuracy=0.995), 'Origin': CustomFormModelField(label=None, name=Origin, accuracy=0.995), 'Passenger Name': CustomFormModelField(label=None, name=Passenger Name, accuracy=0.995), 'Seat': CustomFormModelField(label=None, name=Seat, accuracy=0.995)}, form_type=custom:1c208a81-bfb4-46c9-8d5b-d5443e53124e)]`

In [ ]:
```python
# Code based on: L3 Exercise 3 - Custom Form 1040 Recognizer Exercise Solution.ipynb
for submodel in trained_model.submodels:
    print(
        "The trained model with form type '{}' has overall accuracy '{}' and recognized the following fields: {}".format(
            submodel.form_type,
            submodel.accuracy,
            ", ".join(
                [
                    field.label if field.label else name
                    for name, field in submodel.fields.items()
                ]
            ),
        )
    )
```

The trained model with form type 'custom:1c208a81-bfb4-46c9-8d5b-d5443e53124e' has overall accuracy '0.992' and recognized the following fields: Baggage, Boarding Time, Carrier, Class, Date, Destination, Flight No., Gate, Origin, Passenger Name, Seat

```python
test_data_url = "https://udacitykioskstorage.blob.core.windows.net/passengerdatatest/boarding_pascal.pdf?sp=racwdyti&st=2023-12-21T13:07:51Z&se=2023-12-25T21:07:51Z&spr=https&sv=2022-11-02&sr=b&sig=sUvc0YRkef2ivAvUhzIP%2Bc

form_recognizer_client = FormRecognizerClient(endpoint=endpoint_form_recognizer, credential=AzureKeyCredential(key_form_recognizer))
```
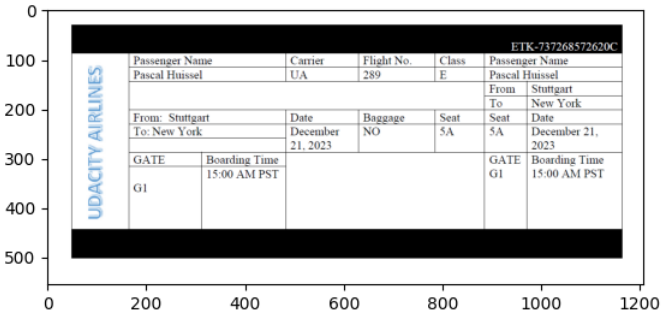
```python
trained_model.model_id
```

```
'1c208a81-bfb4-46c9-8d5b-d5443e53124e'
```

```python
test_boarding_pass = form_recognizer_client.begin_recognize_custom_forms_from_url(model_id=trained_model.model_id, form_url=test_data_url)
test_boarding_pass_result = test_boarding_pass.result()
```

```python
# Code  Snippet Source: L3 Exercise 3 - Custom Form 1040 Recognizer Exercise Solution.ipynb
for recognized_content in test_boarding_pass_result:
    print("Form type: {}".format(recognized_content.form_type))
    for name, field in recognized_content.fields.items():
        print("Field '{}' has label '{}' with value '{}' and a confidence score of {}".format(
            name,
            field.label_data.text if field.label_data else name,
            field.value,
            field.confidence
        ))
```

```
Form type: custom:1c208a81-bfb4-46c9-8d5b-d5443e53124e
Field 'Flight No.' has label 'Flight No.' with value '289' and a confidence score of 0.994
Field 'Passenger Name' has label 'Passenger Name' with value 'Pascal Huissel' and a confidence score of 0.99
Field 'Seat' has label 'Seat' with value '5A' and a confidence score of 0.99
Field 'Carrier' has label 'Carrier' with value 'UA' and a confidence score of 0.994
Field 'Boarding Time' has label 'Boarding Time' with value '15:00 AM PST' and a confidence score of 0.99
Field 'Class' has label 'Class' with value 'E' and a confidence score of 0.972
Field 'Baggage' has label 'Baggage' with value 'NO' and a confidence score of 0.994
Field 'Date' has label 'Date' with value 'December 21, 2023' and a confidence score of 0.99
Field 'Destination' has label 'Destination' with value 'New York' and a confidence score of 0.99
Field 'Gate' has label 'Gate' with value 'G1' and a confidence score of 0.99
Field 'Origin' has label 'Origin' with value 'Stuttgart' and a confidence score of 0.99
```

```python
# image of boarding pass for validation
validation_image = "C:\\_Huissel\\PythonProjects\\workspace\\udacity\\cd0461-building-computer-vision-solutions-with-azure-project-starter\\starter\\sample_submission\\step_2\\test_boarding_pass_image_for_validation.PNG"
display_image(validation_image)
```