Udacity – Passport Kiosk Project

Problem Definition

An airport has a kiosk deployed. There is a manifest that contains the passengers for the upcoming flights. We need to verify the passenger's identity and data from a few different data sources which include a Boarding Pass and an Identity Document. Using this information given by the potential passenger, we need to find a way to extract and validate the data on these data points and compare against the manifest table.

Solution Strategy

Using several Azure Cognitive Services. We can pass the relevant data to pre trained and custom models to then verify a passenger's identity and data to validate them to board the flight.

Boarding Pass Extraction

Form Recognizer (Custom Model): Which will require several examples and manually labeling fields to extract. After training we should have confidence in having high accuracy and performance on extracting fields from the boarding pass.

Identity Document Extraction

Form Recognizer (pre-built Model): Leverage pre-trained models that can accurately extract fields from various ID's. This should be sufficient for extracting the fields we need from this data source.

Person Validation Extraction

Face API: Use the APi's given from this service to detect, verify and find similar faces from the Identity Document Provided.

Video Analyzer For Media: Upload a short clip of the passenger standing by the Kiosk to this service to then extract relevant data and key moments/frames from the video to compare the face from the video to the one given on the Identity document.

Once we have all the information extracted, we can then compare this to the data that the manifest table holds. Depending on the results, we will give different responses on the Kiosk Screen for the passenger to follow.

Data Sources

Boarding Pass

This Data Source has the following fields:

- PassengerName
- Carrier
- FlightNumber
- Class
- Origin

- Destination
- Gate
- FlightTime
- FlightDate
- Seat

Identity Document

This Data Source has the following fields:

- Expiry
- FirstName
- LastName
- Address
- DateOfBirth
- Gender
- FaceThumbnail

Cognitive Services

- Form Recognizer
- Video Analyzer
- Custom Computer Vision
- Face API

Data Validation Process

Confidence Score

The results returned by the models will have a confidence score attached to each data point extracted. For example, for the Form Recognizer Custom Model we will create.

Each field we extract will have a score between 0-1. You can think of this as a percentage of how confident the model is that it extracted the given value returned. A confidence score of one would mean that the model is 100% sure of its value being correct and 0 would mean the opposite. It can have many scores in between like 0.67 (67%) to give you a better understanding of the results.

This allows us to set Thresholds to our data validation. For example, for this fields anything above 0.5 we can say that we can trust the results given and do not need to have human intervention to confirm. However, this threshold should be changed, depending on how important the data is and what's it's predicting.