Project Problem Description

**Project Objective:**

Your objective is to develop a computer vision and AI based passenger boarding kiosk for the airport operations that will assist airline passengers to onboard the plane.

In details:

* ID card and Boarding pass are scanned at the kiosk
* The kiosk extracts passenger information from the boarding pass and then verify it from the ID card.
* Kiosk then take a short (30-second) video of the person and perform facial recognition to match the live person at the kiosk with the ID card provided during the scan.
* Kiosk scan carry-on baggage and identify any prohibited item and stop the passenger from boarding.
* If all scanning and validation goes well, the kiosk send out the approval to board. If not, if will ask for human assistance.

**Working flow:**

* A passenger manifest (list of passengers boarding in the plane) is created with a list of 5+ passengers with the following info
* Fabricated Digital IDs for all the passengers listed in the manifest are created
* Fabricated boarding passes for all the passengers listed in the manifested are created
* The project owner fabricated ID card is also part of passengers list to validate the face recognition using the project owner video
* A 20 seconds video of project owner is used as the Kiosk face recognition system
* Passenger carry-on items are also scanned for lighter and if lighter is present, the passenger is flagged for prohibited items in the carry-on baggage.
* All of this data is processed by various Azure computer vision services to simulate the automated airline boarding process.

**Input Data Sources:**

* Flight Manifest List for all passengers (6)
* Passenger ID card (6 including one face photo for the project owner)
* Passenger Boarding Pass (6)
* Passenger 20 second video showing their face (Project owne video)
* Passenger carry-on items photo (Please use the sample images provided in the project)

**The Solution Strategy:**

* Using the **Azure Form recognizer service**, a model will be trained to extract passengers information from the Boarding passes
* Using **Azure Form recognition digital ID** service will be used to extract the face and personal information from the passengers digital ID
* The passenger information extracted from the boarding pass, will be validated from the manifest list
* If person name exist in the manifest list then person identity will be validated from the personal ID
* The face photo extracted from the digital ID will be verified from the face photo extracted from the passenger video (as provided) using **Azure Video Indexer service**.
* Using the various lighter images provided in the project, a machine learning model for the lighter identification is created using **Azure custom vision services**.
* As the learning exercise, you can test your Azure custom vision model (which you trained for lighter images identification), using the sample carry-on images provided in the project.
* Once the boarding pass validation is done and then the final message of either successful or unsuccessful validation is displayed as the part of the last step in this project.

**Cognigtive Services used:**

* Azure Form recognizer service
* Azure Form recognition digital ID service
* Azure Video Indexer service
* Azure custom vision services

**Data validation process:**

Based on the data collected from Steps 2, 3 and 4, the following validations can be performed:

3-Way Person Name Validation: The first and last name extracted from the boarding pass and ID card must match the name on the flight manifest table.

DoB Validation: The DoB extracted from the ID card should match with the flight manifest table.

Boarding Pass Validation: Flight-specific information such as flight number, seat number, class, origin, destination, flight date and flight time must be compared with the flight manifest table.

Person Identity Validation: The face extracted from the ID and that from the video must match and the match result should be 65% or higher.

Luggage Validation: It must be determined if the carry-on loose items in the passenger's pocket contain a lighter.

The flight manifest table should then be updated with the validation results. A validation is set to TRUE if successful and to FALSE if it failed. A majority of validations (3 out of 5) should turn from FALSE to TRUE.