

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, it 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 manifest 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 owner 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.

Cognitive 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.