

Project Problem Description

Project Objective:

The project objective is to develop a computer vision and AI-based passenger boarding kiosk for airport operations, aimed at facilitating the boarding process without the need for human assistance. The kiosk, when in full working condition, is expected to perform the following functions:

Requirements:

- The kiosk should be able to scan airline passengers ID card and Boarding pass, extract their information from the boarding pass, verify it from the ID card, and then confirm to match information between the boarding pass and flight manifest on server. **(Text Data Extraction)**
- The kiosk should be able to take a 15-30 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. **(Face Data Extraction)**
- The kiosk should be able to scan the passenger's carry-on baggage and identify any prohibited item and stop the passenger from boarding. **(Object Detection)**
- If all scanning and validation goes well, the kiosk greets the passenger with a final message that "He/she can board the plane" or if there are issues, the kiosk can suggest the passenger to "Please see an airline representative to complete the boarding along with issues during the validation process". **(Validation)**

The simulated kiosk experience can be created as below:

- 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 15-30 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)
- Passenger Boarding Pass (6)
- Passenger 15-30 second video showing their face
- Passenger carry-on items photo

The Solution Strategy:

- Using the **Azure Form recognizer service**, a model will be trained to extract passengers information from the Boarding passes.
- Using **Face API service** and **Azure Form recognizer 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 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**.
- The Azure custom vision model which is trained for lighter images identification will be tested using the sample carry-on images on **Azure custom vision services**.
- 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.