

Project Problem Description

Project Objective:

The objective of this project is to create an automated airline boarding process. This will be achieved by developing a boarding kiosk which makes use of use computer vision and AI.

In full working condition, the kiosk should have the following functions:

- Airline passengers should be able to scan their ID card and Boarding pass at the kiosk
- The kiosk should be able to extract passenger information from the boarding pass and then verify it from the ID card.
- Kiosk should be able to take a 10 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 should also be able to scan the passenger's carry-on baggage and identify any prohibited item and stop the passenger from boarding.
- 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".

A simulated kiosk experience has been created as follows:

- A passenger manifest (list of passengers boarding in the plane) has been created with a list of 6 passengers.
- Digital IDs have been fabricated for all the passengers listed in the manifest.
- Boarding passes have been fabricated for all the passengers in the manifest.
- A 30 seconds video of the project instructor has been used to represent the Kiosk face recognition system (alongside the project instructor fabricated ID card, for face recognition validation).
- Passenger carry-on items are also scanned for lighters and if a lighter is present, a passenger will be flagged for having prohibited items in their 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 instructor)
- Passenger Boarding Pass (6)

- Passenger 30 second video showing their face (project instructor video)
- Passenger carry-on items photos (using the sample images provided)

The Solution Strategy:

- A model will be trained to extract passengers' information from boarding passes using the **Azure Form recognizer service**.
- The **Azure Form recognition digital ID** service will be used to extract personal information from the passengers' digital ID
- The manifest list will be used to validate information extracted from both the boarding pass and the personal ID.
- A face photo extracted from the digital ID will be verified against a face photo extracted from the passenger video using **Azure Video Indexer service**.
- A machine learning model for lighter identification will be created using **Azure custom vision services**, based on lighter images provided in the project.
- As a learning exercise, the Azure custom vision model (trained to detect lighters) will be used to test sample carry-on images provided in the project.
- Metrics such as recall, precision and average precision will be used when evaluating the custom vision model. We are looking for a precision $\geq 75\%$ before deploying a model for this project.