Problem Definition and Solution Strategy

Problem Objective

The objective for this project is to develop an automated passenger boarding kiosk that would allow a user to check in without any agent assistance.

This problem consists of the following main functions.

1. Extract user details from a user's ID card and boarding pass
2. Correlating end user identifiable information on the user's ID with their boarding pass
3. Confirm that a 10 second video of the user and the face that is captured matches the face on the ID
4. Identify if the user has any prohibited items in their carry-on and stop the passenger from boarding if necessary
5. Extract user sentiment from the video input of the user
6. If user identity validation is successful and no prohibited items are detected, the system is to output a success message.

Input Sources:

- A flight manifest list for all passengers on the flight
- Passenger ID card (5)
- Passenger boarding passes (5)
- Passenger 15-30 second video
- Passenger carry-on items photos

Solution Strategy:

- We will use the Azure Form Recognizer service to extract passenger data from their boarding passes
- We will use Azure Form Recognition for digital IDs service to extract face and personal information from the passenger's digital ID
- The passenger information from the boarding pass will be cross-checked against the flight manifest

- We will use Azure Video Indexer to extract the user's face and user sentiment from the input video stream
- We will use Azure Face API to validate if the face on the ID and the face on the video match
- We will use Azure Custom Vision to build a object detection model that can identify lighters in images

Data Validation

For our form recognizer, we will be looking at the probability scores of whether a label correctly corresponds to a piece of data on the document.

For the custom vision object detection, we will select our probability threshold in a way that optimizes our precision and recall values.

For the Azure Face API, we will observe the probability that a person's ID photo matches the person group created by the thumbnails from the video stream.