Project Problem Description

**Project Objective:**

The goal of this project is to develop an AI-powered, computer vision-based passenger boarding kiosk for airport operations, enabling airline passengers to board their flights independently without human assistance. The kiosk should automate the entire boarding process with the following key features:

* Passengers will be able to scan their ID cards and boarding passes at the kiosk.
* The kiosk will extract passenger data from the boarding pass and verify it against the details on the ID card.
* A 10-second video of the passenger will be recorded by the kiosk, utilizing facial recognition to match the live image to the one on the ID card.
* The kiosk will scan the passenger’s carry-on baggage, detecting prohibited items such as lighters and halting the boarding process if necessary.
* If the scans and validation are successful, the kiosk will display a message confirming the passenger’s eligibility to board. If any issues arise, the kiosk will prompt the passenger to "Please see an airline representative to complete the boarding process."

**Simulated Kiosk Experience:**

* A flight manifest with details of five or more passengers will be created, containing essential passenger information.
* Fabricated digital IDs and boarding passes for all passengers listed in the manifest will be generated.

The project owner’s fabricated ID card will be included for the purpose of face recognition validation.

* A 15-30 second video of the project owner will be used for the facial recognition system.
* Carry-on items will be scanned for prohibited items such as lighters. If a lighter is detected, the passenger will be flagged.
* All data will be processed using various Azure Computer Vision services to simulate the automated boarding process.

**Input Data Sources:**

* Flight Manifest List for all passengers (5)
* Passenger ID card (5 including one face photo for the project owner)
* Passenger Boarding Pass (5)
* Passenger 15-30 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:**

1. **Boarding Pass Data Extraction**:
   * Use **Azure Form Recognizer** to train a model that will extract passenger data from boarding passes.
2. **Digital ID Verification**:
   * Apply the **Azure Form Recognizer Digital ID** service to extract both facial images and personal details from passenger ID cards.
3. **Manifest Validation**:
   * Validate the passenger information extracted from the boarding pass against the flight manifest.
4. **Face Recognition**:
   * If the passenger is found in the manifest, verify the passenger’s identity by comparing the facial image extracted from the ID card to the facial data from the passenger video (provided). This will be done using the **Azure Video Indexer** service.
5. **Prohibited Item Detection**:
   * Utilize **Azure Custom Vision** to train a machine learning model to detect prohibited items, such as lighters, in carry-on baggage. Test this model using the sample carry-on images provided in the project.
6. **Final Validation & Messaging**:
   * After successful validation of the boarding pass and ID, the kiosk will display a message confirming whether the passenger can board or advising them to see an airline representative in case of any issues.

By leveraging Azure’s AI services, the project aims to create an efficient and seamless self-boarding experience, simulating a fully automated boarding process for passengers.