Project Problem Description

Project Objective:

The primary objective of this project is to develop a fully automated system capable of recognizing passengers as they pass through the kiosk and assisting them in boarding the plane without human intervention. This solution aims to optimize time efficiency and reduce the reliance on human resources.

Input Data Sources:

- **Boarding Pass Information**
- **ID Card Details**
- **Images of Passenger's Carry-On Items**
- **Short Videos Displaying Passenger Faces**
- **Flight Manifest with Passenger Details**

Solution Strategy:

1. **ID Card Information Extraction**

The system will utilize **Azure Form Recognizer Service** to extract relevant data from passengers' ID cards. This extracted data will then be cross-referenced with the flight manifest to ensure the accuracy of passenger information.

2. **Face Extraction and Verification**

The **Azure Face API** will be used to extract facial features from both the ID card and video inputs. This facial information will be compared to verify that the ID card and the video correspond to the same individual.

3. **Boarding Pass Information Extraction**

Azure Form Recognizer Service will be employed to extract details from passengers' boarding passes, which will then be validated against the flight manifest data.

4. **Carry-On Item Detection**

A custom model will be trained using **Azure Custom Vision** to detect lighter objects in images of passengers' carry-on items, enhancing security checks.

Model Performance Metrics and Thresholds:

- **Object Detection Model:** The model's performance will be evaluated based on **Precision** and **Recall** metrics.
- **Face Recognition Model: Accuracy** will be the primary metric for validating the face recognition model.
- **Confidence Threshold:** Each model will generate a confidence score between 0 and 1. Only fields with a confidence score above **0.5** will be considered valid for the system's verification processes.

This streamlined approach aims to enhance the passenger onboarding experience through automation, ensuring efficiency and reliability at every step.