

Project Definition and Solution Strategy

Main Problem:

Before flight and onboarding on the airplane, the customer's identity must be verified whether they are permitted to board the plane for that specific flight and whether their baggage contains items that cannot be brought inside. Due to the large number of customers every day, there is a need for automating this process with a high level of accuracy since risks are high for wrong identification and carrying of hazardous items. Additional details that could improve customer experience and service are sentiment analysis on the overall onboarding process.

Solution: Use computer vision technologies in automating the passenger boarding kiosk procedures.

1. **Form recognizer services** will be used for reading the boarding pass details of the customer. A pdf version of the boarding pass will be used as input. A custom model which is trained to the boarding pass format of that specific airline will be used and accuracy and confidence scores will be used as metrics. We want to set a threshold in the confidence score such that there will be high accuracy and less need for rechecking of results.
2. **Face detection and verification** will be used to validate the identity of the customer and whether the ID photos correspond to the person entering the plane. Images of the ID of the customer as well as the current video scan of the customer will be compared. Confidence scores will be used as well in determining whether the two persons are the same or not. Here, we want the model to have very high confidence so that unauthorized and fraudulent people will be caught.
3. Sentiment analysis via **Azure Video Indexer** would also determine whether the customer is sad, happy, or neutral about the experience. The current video scan of the customer will serve as input to this objective.
4. In detecting hazard items, **object detection** will be helpful in determining the presence of such items and where specifically in the luggage it is located. The scanned picture of the luggage of the customer will be used as data input. A custom lighter detection model will be created and used to predict from test images later on. To evaluate the trained model, performance metrics such as precision, recall, and mean average precision will be used. Based on this, the acceptable performance threshold will be determined. This also needs to have a fairly high threshold value so that baggages will be safe from lighters.
5. All of these datasets will then be stored using the **Azure blob storage facility**.

After validating and collecting data from the steps above, the project end result is an automated kiosk message stating whether customer can board the airplane or not.