

## Problem Definition and Solution Strategy Write-up

With respect to the project, the main objective, and therefore also the problem to be solved, is to build an automated passenger boarding kiosk.

The problem to be solved involves automating the boarding of a passenger. The kiosk will collect different information as input, specifically it will receive the boarding pass, the digital ID, a 30-second video of the passenger and the image of his luggage.

Different Azure cognitive services will be used to answer the problem. Specifically, step 2 of the project will use the Azure Form Recognizer service to extract the Digital ID information through the Prebuild ID Model, a custom model will be generated to obtain the boarding pass data and, finally, this Custom Boarding Pass Recognizer Model will be used to extract the information from the passengers' Boarding Passes.

Step 3 will consist of face data extraction. For this, Azure Face and Video Analyzer services will be used to perform the facial recognition. First, the passenger's face will be extracted from the 30-second video, then the passenger's feelings and emotions will be obtained from the video, and finally, the face will be extracted from the digital ID.

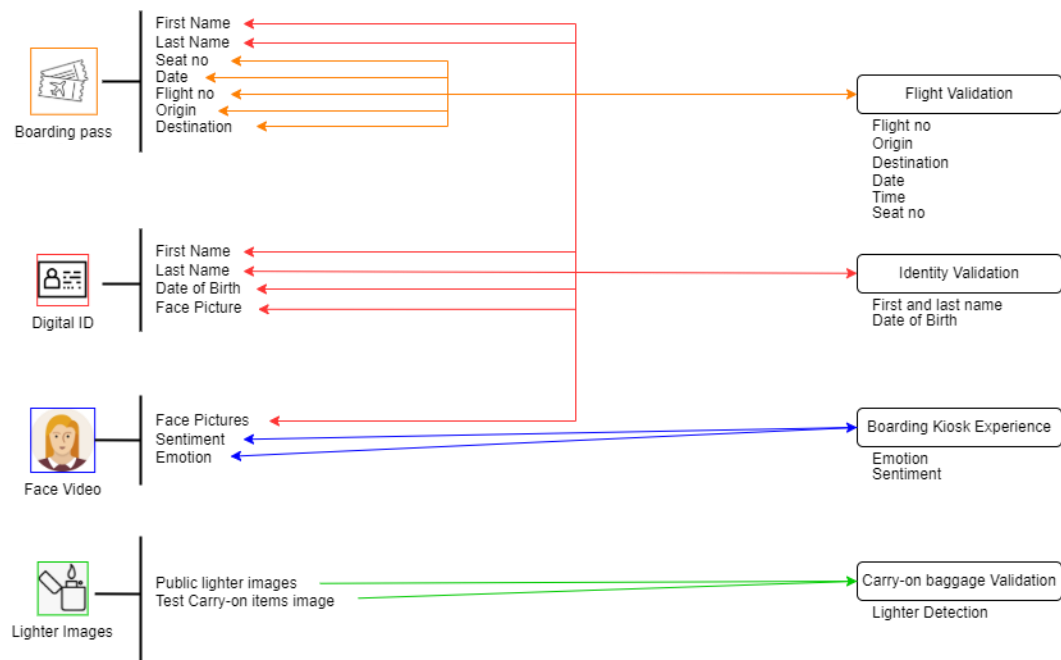
In step 4, the detection of objects in the passenger's luggage will be carried out in search of lighters, since these are objects that cannot be carried by the passenger. A Custom Object Detection Model will be built using the lighter images to train it and then test the model with the provided test images.

Finally, in step 5, all the data extracted in the previous steps will be validated. A total of 5 validations will be performed: validation of the boarding pass, all data must match the flight manifest; validation of the digital ID, again the data must match the flight manifest; 3-way validation, verifying that the passenger's identity in the digital ID, boarding pass and flight manifest exist and match; validation of the face, comparing the image of the digital ID with the faces extracted from the video; and finally, the image of the passenger's luggage will be verified, if it is carrying luggage, verifying that it is not carrying any lighter.

Regarding model performance metrics and threshold, the aim is to obtain a model that is as accurate as possible; specifically, model accuracy should be at least 80%, recall 65% and mAP 85%.

On the other hand, the probability threshold and overlap threshold parameters will be left as default, i.e. probability threshold 50% and overlap threshold 30%.

## Data Flow Diagram



## Azure Services Architecture Diagram

