Problem Definition and Solution Strategy Write-up

Description:

In this project, I will prototype an automated passenger boarding kiosk to assist with pre-flight boarding procedures. The automated system will showcase the power of computer vision in executing a wide variety of business processes within the context of airline boarding operations, specifically identity verification to board the flight and automated customer feedback collection. In this project, I will use Azure Computer Vision, Face, and Form Recognizer services, along with a few other cloud services such as Blob Storage.

Objectives:
- To validate passenger identity using video from kiosk, id card and boarding pass information
- To implement lighter detection in carry-on baggage using lighter images
- Understand passenger experience by extracting emotions and sentiments using a video from kiosk
- To implement flight validation using the boarding pass

Dataset:
- Boarding Pass
  - First Name - Identify validation
  - Last Name - Identify validation
  - Seat - Flight validation
  - Flight Number - Flight validation
  - Flight Date - Flight validation
  - Origin - Flight validation
  - Destination - Flight validation

- 30-sec Video from Kiosk
  - Face picture - Identity validation
  - Sentiment - Boarding kiosk Experience
  - Emotion - Boarding kiosk Experience

- Driving License ID card
    - First Name - Identity validation
    - Last Name - Identity validation
    - Date of Birth - Identity validation
    - Face picture - Identity validation
    - Sex

- Lighter Images
    - Public lighter images - carry-on baggage validation

Solution:

The passenger submits their driver's license id card and their boarding pass to the kiosk's image scanner from which their face data and other validation data will be taken for identity verification and flight validation.
- Form recognizer: Text data extraction from the Boarding Pass and the Driver's ID.
- Face API: Face extraction from the Driver's ID.

A 30 seconds video of the passenger will be recorded during this time using a front-facing camera on the Kiosk also for passenger verification.
- Video Analyzer: face extraction from video frames.

A luggage scanner connected to the kiosk will use the object detection model to check for any lighters in the passenger's luggage.
- Custom Vision: carry out object detection using lighter images.

Model metrics and evaluation:
- Confidence scores: The confidence scores will be used when implementing the identity verification model.
    - A minimum threshold confidence score of 70% will be required to validate the passenger's identity
- Recall, Precision: These metrics will be used to evaluate the object detection model which will be used to detect lighters in the passenger's luggage.
    - A minimum of 75% precision and recall is required for carry-on baggage validation.