

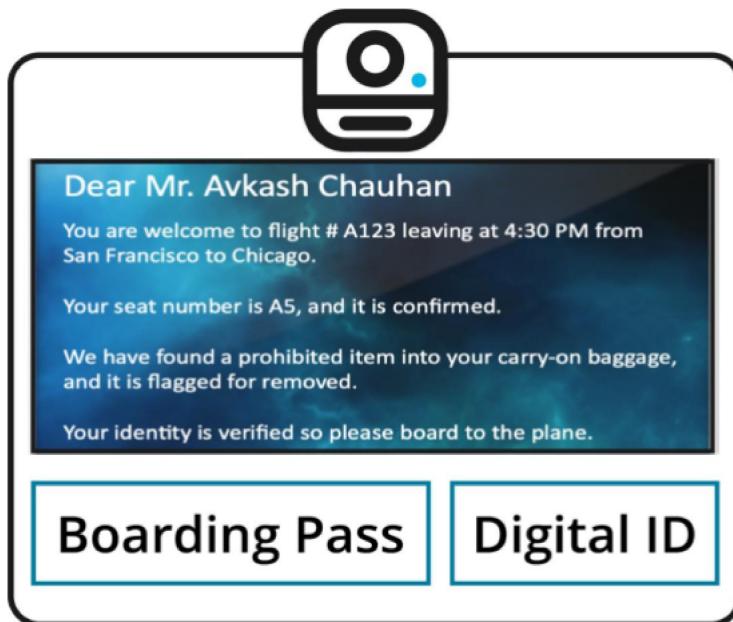
AI-powered passenger boarding kiosk

Building a fully automated passenger boarding kiosk with [Azure cognitive services](#). I apply best practices with **data version control** with [DVC](#), **infrastructure as code** with [Terraform](#) and ensure code quality with [flake8](#), [black](#) and [pre-commit](#).

Project brief

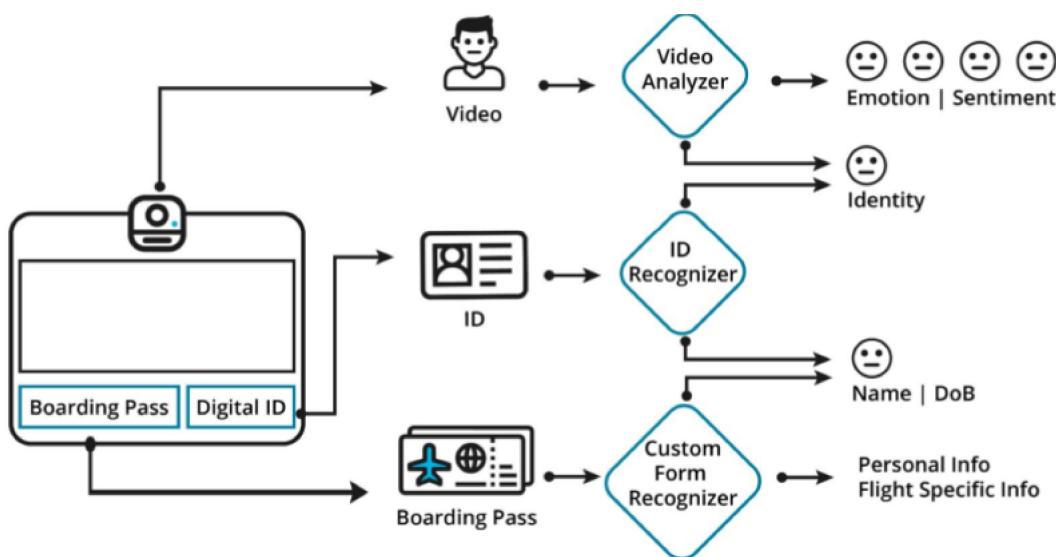
Problem definition (Objective)

Build an AI-powered boarding kiosk for a fictional airline.



Solution strategy (Key results)

1. Load image & extract labeled text from ID card
2. Extract image from ID card
3. Load image & extract labeled text from passenger boarding pass
4. Load video & extract face images as thumbnails from video
5. Compare face from video with extracted ID photo
6. Compare ID details (name, dob) with flight manifest
7. Compare boarding pass details (seat, flight time, name) with flight manifest
8. Run object detection for lighter on image of luggage
9. Show message to passenger depending on validations

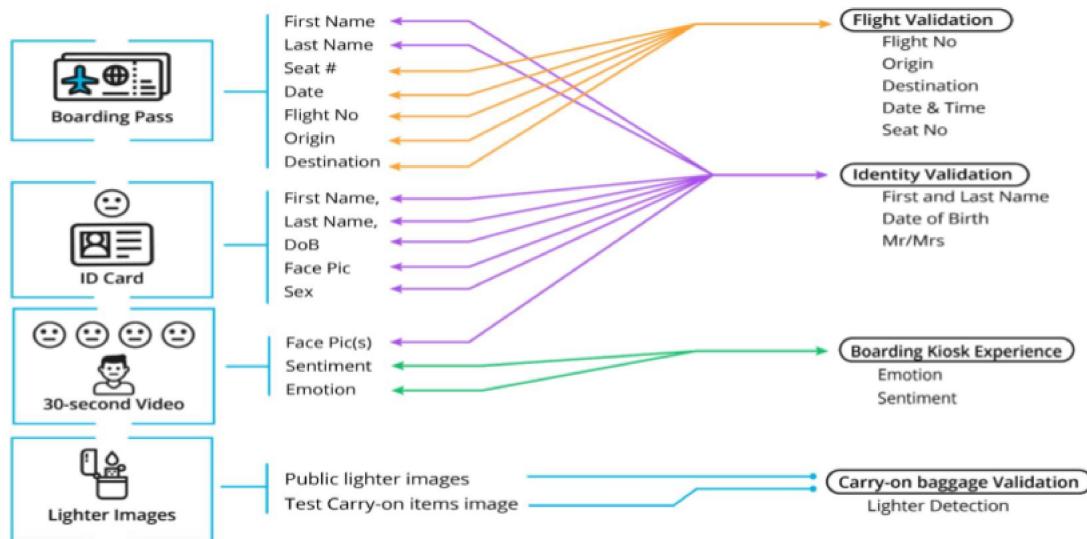


Data

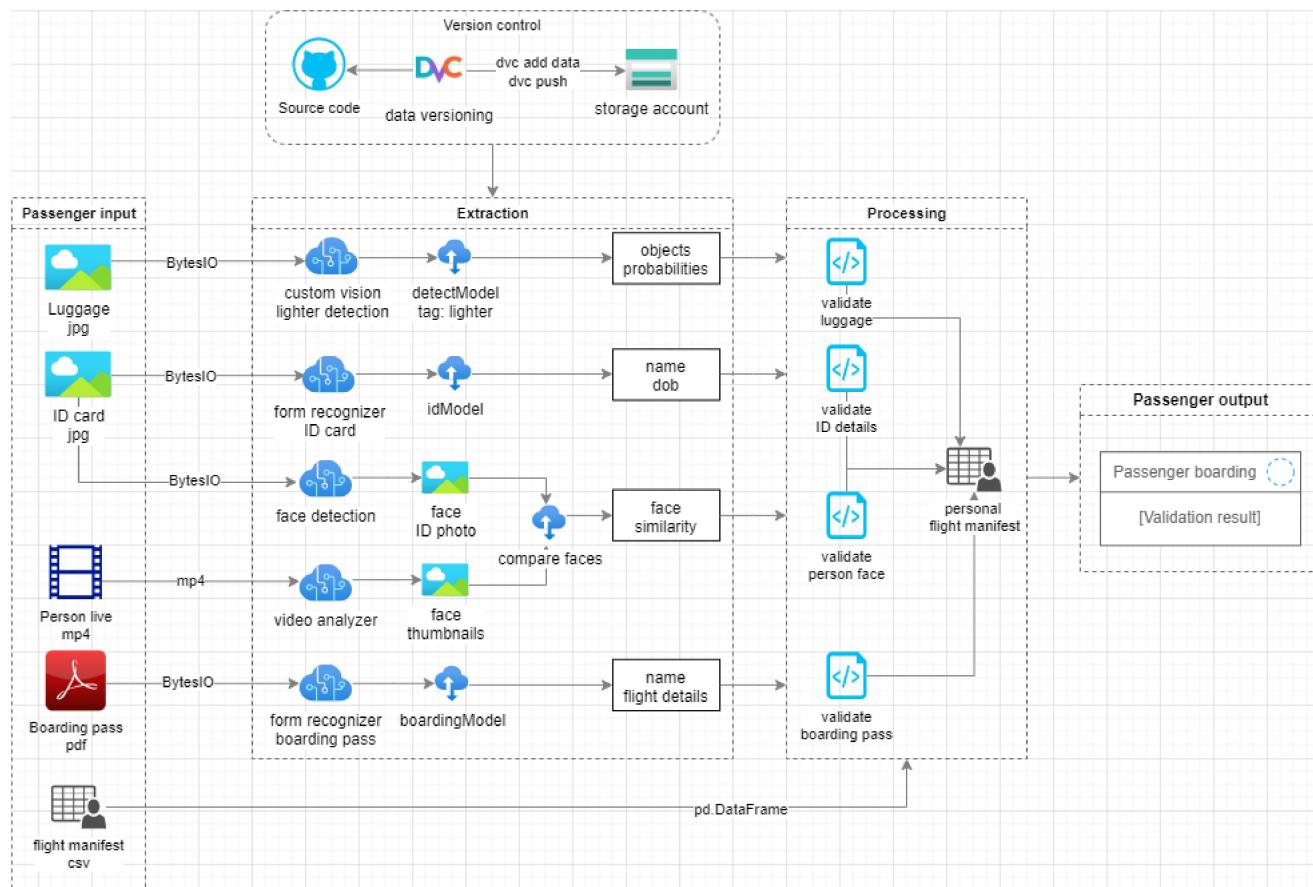
The submission dataset is found in [./data_projectsubmit](#). I excluded

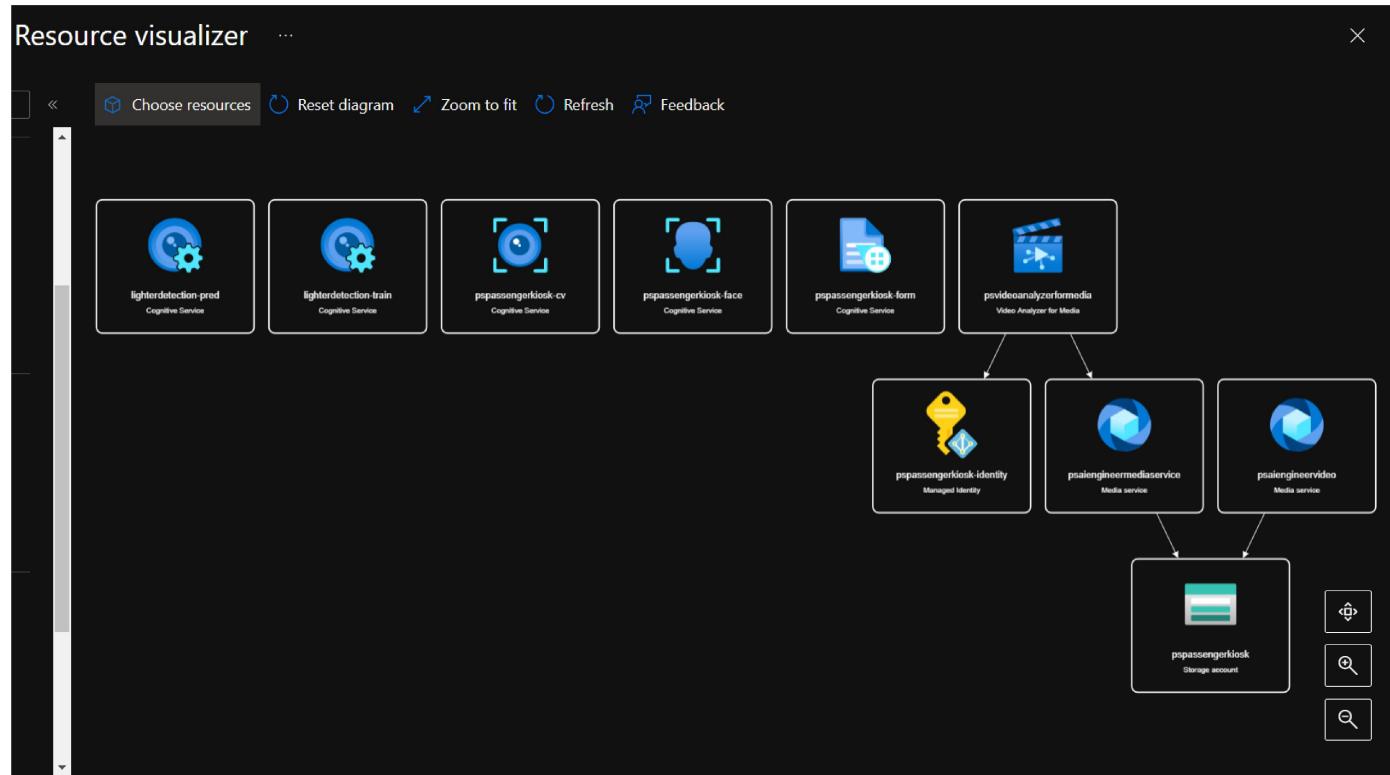
The data comprises the following areas:

- flight details (flight number, carrier code, departure, destination, date, time, gate, boarding)
- passenger details (name, birth date, sex, seat, face image)
- photos taken from <https://this-person-does-not-exist.com/en>



Cognitive services (Architecture)





Data validation

The `main.py` script runs `pipeline_validate` which takes the prediction outputs from each AI component (cognitive service), checks it against `data/raw/flight_manifest.csv` and writes the validation result in `f"data/validated/flight_manifest_{idx[0]}.csv"`, where `idx[0]` refers to the case id in chronological order.

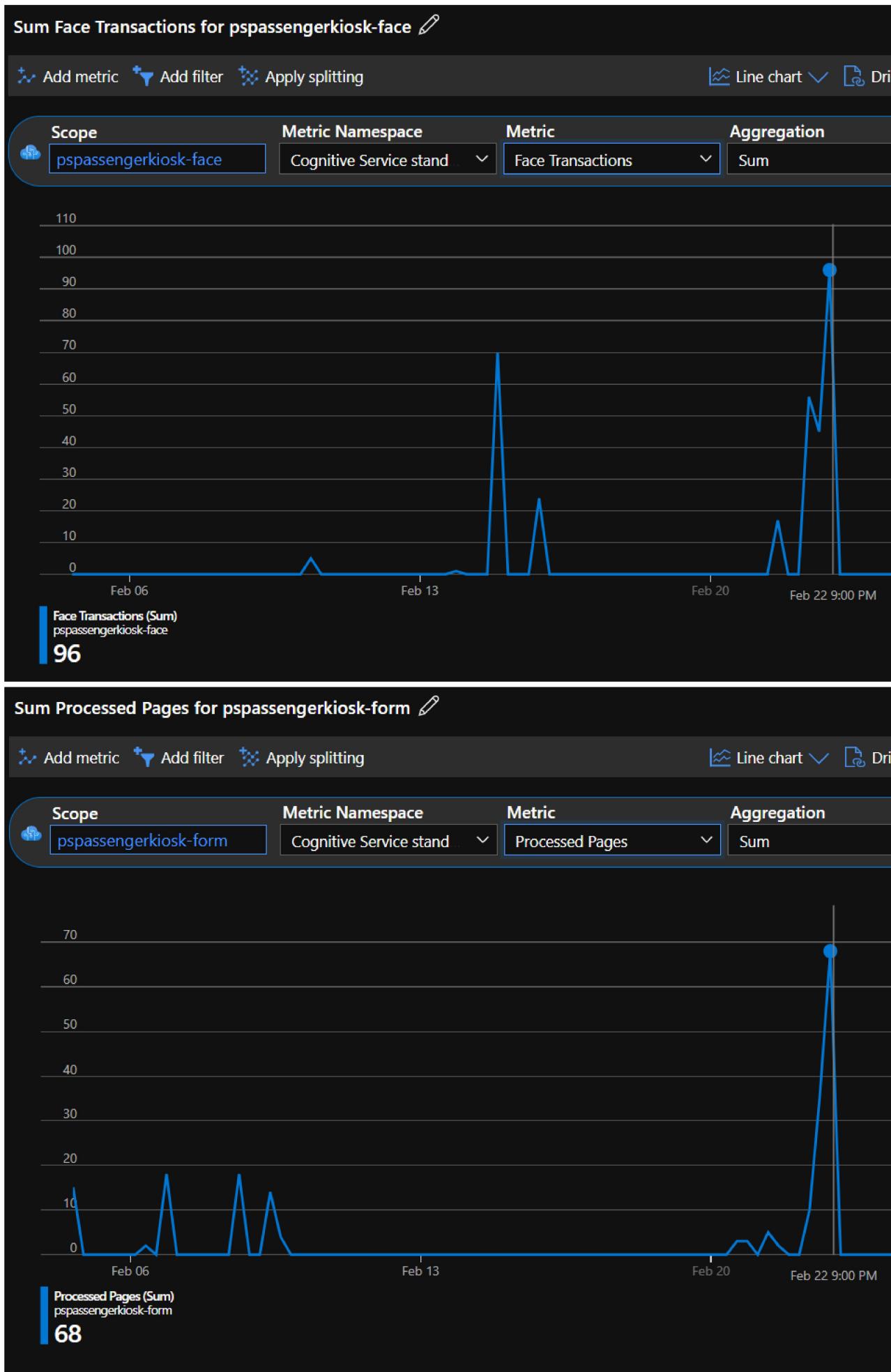
```

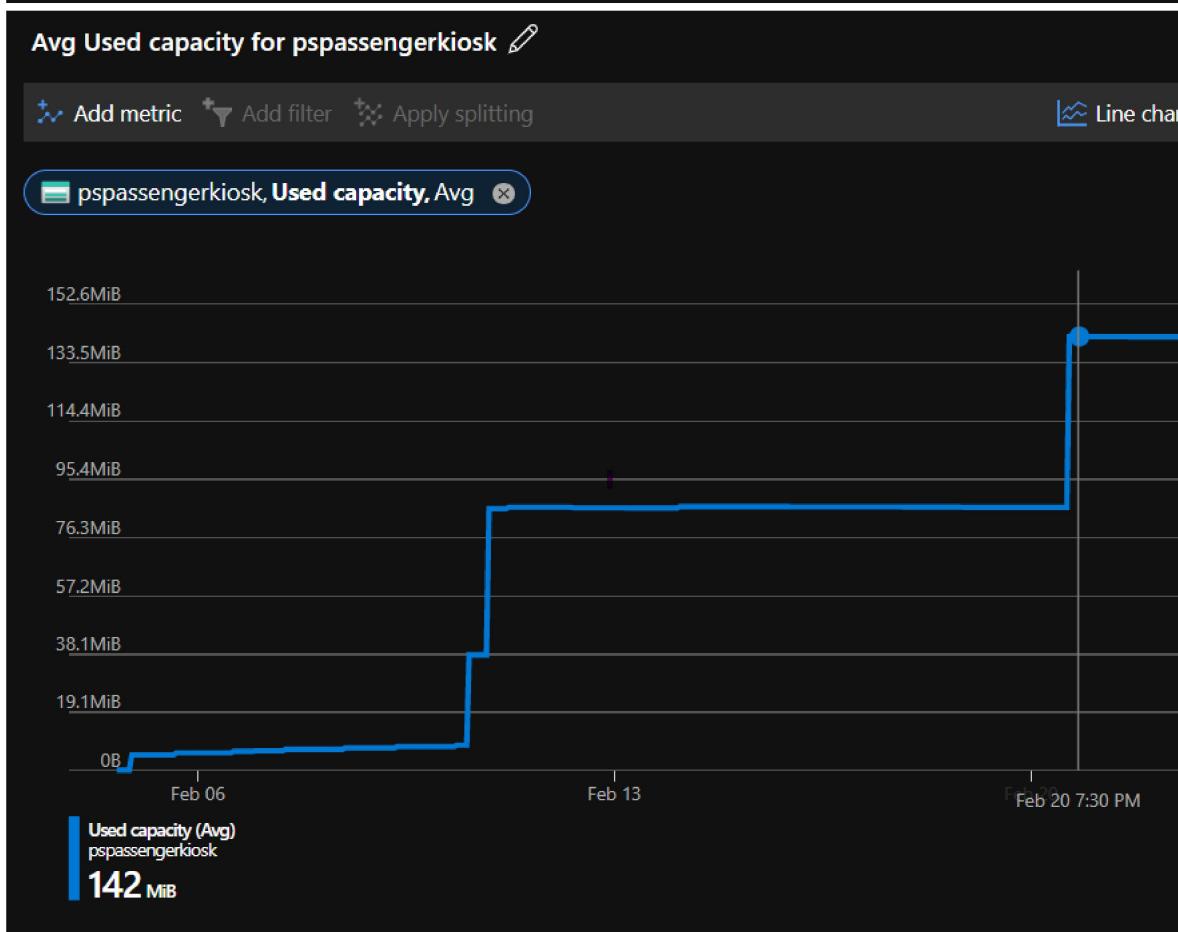
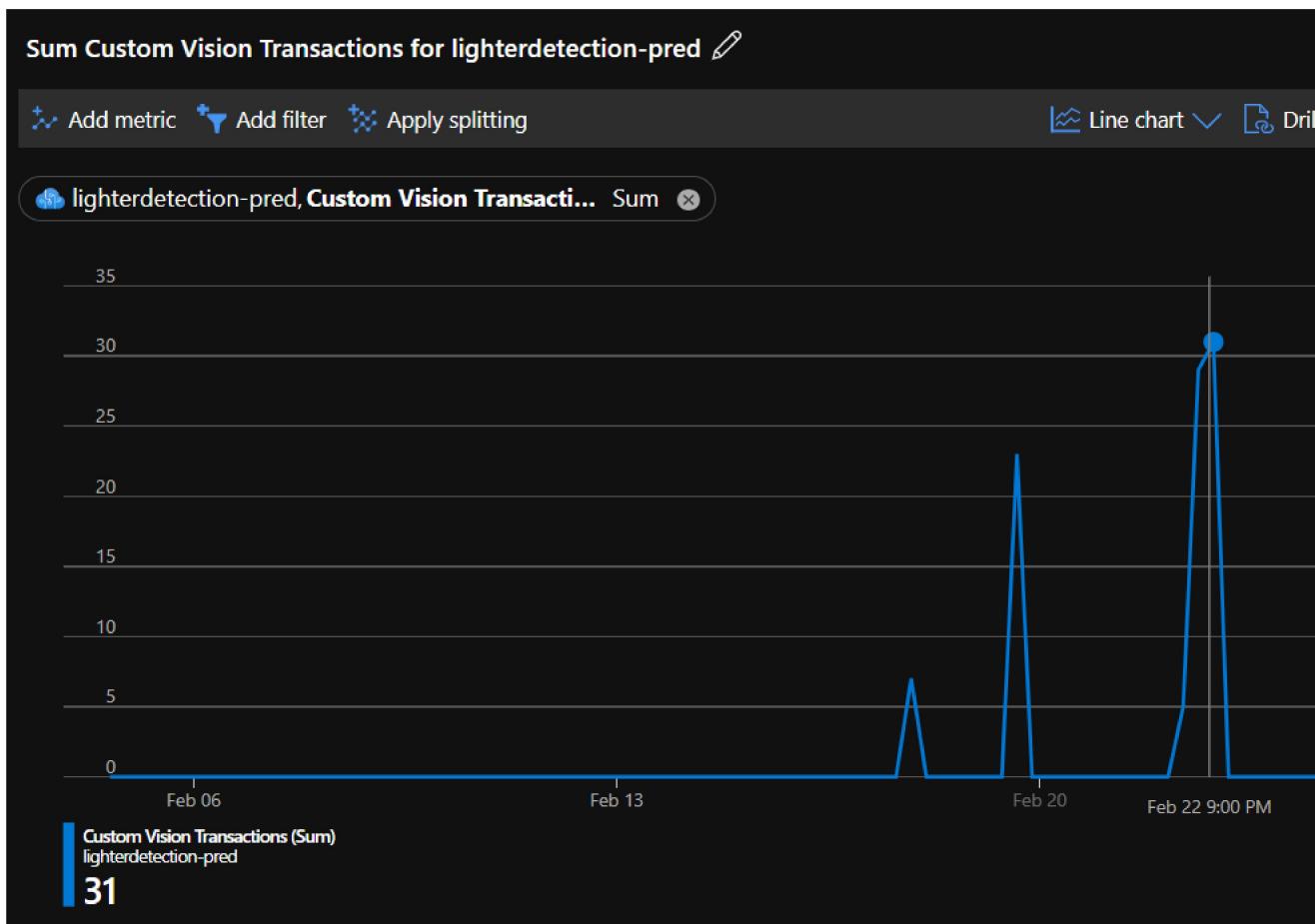
# validate
passenger_manifest = pipeline_validate(
    flight_manifest,
    dict_id,
    dict_boardingpass,
    dict_face,
    dict_lighter,
)
  
```

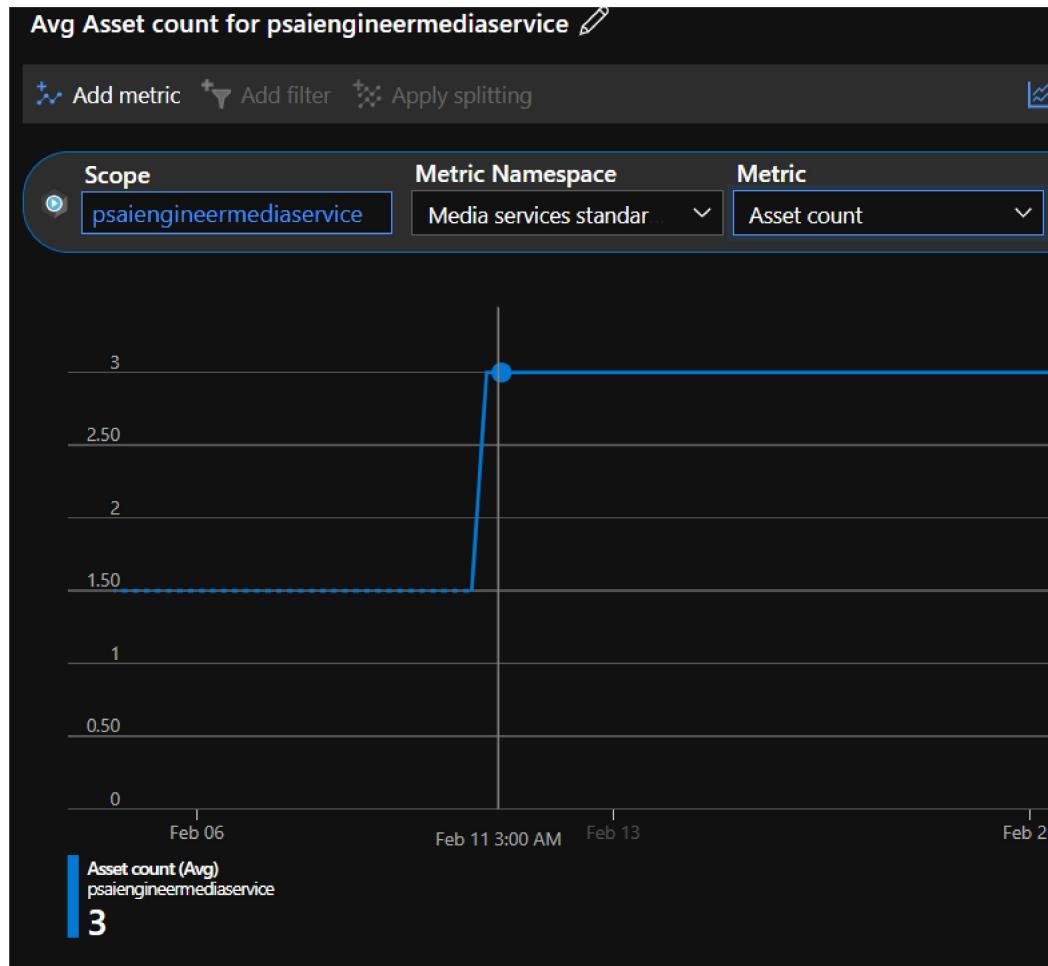
For **lighter detection** the model performance was not sufficient to detect lighters with high certainty. Since lighters count as a dangerous good in aviation, we need a low false negative rate and disregard the passenger experience. Safety is prioritized over comfort. Therefore, I chose a conservative `detect_threshold=0.2` in the `has_no_lighter` function that is part of `pipeline_validate`.

Usage reports

Screenshots of the Service Consumption Report showing the usage pattern and performance of each Azure cognitive resource.







Submission checklist

- list of python libraries; see [conda.yaml](#)
- match faces from video and id card; see [src.utils_data.compare_faces\(\)](#)
- validation for all passengers: run [main.py](#) with the data stored in [data/raw/boarding_{name}.pdf](#), [data/raw/id_{name}.jpg](#), [data/raw/lighter_test_images/lighter_test_set_1of5.jpg](#), [data/video/thumbnail/ps-{number}.jpg](#) Here is an example output:

```
...
2022-02-22 20:58:26,671 - root - INFO - SUCCESS. Return boardingpass details as dict.
2022-02-22 20:58:27,357 - root - INFO - Faces:
    Reference: f7e625aa-48da-4f46-9d7a-a0e50734d5c9
    Comparing: 1ab47702-6ab8-4fd8-a0db-322d357d0ce7
    identical: False
    confidence: 0.08906
2022-02-22 20:58:27,408 - root - INFO - Created/loaded project 220216-184815.
2022-02-22 20:58:27,410 - root - INFO - Detecting lighters
2022-02-22 20:58:27,734 - root - INFO - Prediction probabilities: {'lighter': [0.2125389, 0.16957963, 0.102686286]}
2022-02-22 20:58:27,740 - root - INFO - Validated: Scott Harrington, 2011-12-26
2022-02-22 20:58:27,743 - root - INFO - Set ['valid_dob', 'valid_name'] True.
2022-02-22 20:58:27,747 - root - INFO - Boarding pass is valid.
2022-02-22 20:58:27,749 - root - INFO - Set valid_boardingpass True.
2022-02-22 20:58:27,750 - root - INFO - Lighter detected with probability 0.2125389
2022-02-22 20:58:27,754 - root - INFO - Saved validated manifest for Scott Harrington to data/validated/flight_manifest_0.csv
2022-02-22 20:58:27,756 - root - INFO - Flight manifest is valid.

Dear Scott Harrington,
You are welcome to flight LH-398 departing at 11:00 from San Francisco to Chicago.
Your seat number is 14A, and it is confirmed.
Your identity is verified so please board the plane.

CAUTION
We have found a prohibited item in your carry-on baggage, and it is flagged for removal. Please remove it.
```

- See all validation results: