Interview question: data engineering (Python)

Glare or not glare?

A manufacturer of automotive vision systems is developing a vision system (camera + object detection module). The machine learning engineers have developed an algorithm and want to test it for direct sun-glare conditions when the camera is installed in a forward-facing position. A direct glare is a condition that creates difficulty of detecting objects in the presence of bright light. See an example below:

Example of a sun-glare

The engineers have access to a large repository of high-resolution images that is collected from many hours of driving. They want to select a subset of these images that potentially has direct sun-glare condition in them. Instead of processing the images directly, they want to only use image metadata to examine the glare condition. Each image comes with the following metadata:

-   "lat": a float between 0 to 90 that shows the latitude in which the image was taken
-   "lon": a float between -180 to 180 that shows the longitude in which the image was taken
-   "epoch": Linux epoch in second
-   "orientation": a float between -180 to 180 the east-ward orientation of car travel from true north. 0 means north. 90 is east and -90 is west
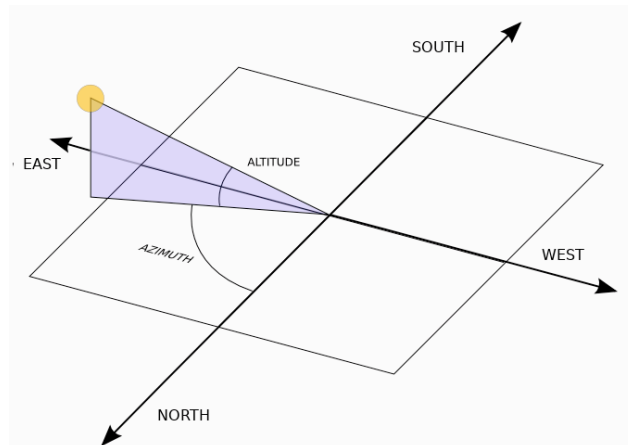
Here is an example of an image metadata:
{
        "lat": 49.2699648
        "lon": -123.1290368
        "epoch": 1588704959.321
        "orientation": -10.2
}

We are interested in a REST API (using either Flask or Django libraries) that process the metadata requests and determines if there is a possibility of direct glare in the associated image or not. We assume there is a possibility of direct glare if:

1. Azimuthal difference between sun and the direction of the car travel (and hence the direction of forward- facing camera) is less than 30 degrees AND

2. Altitude of the sun is less than 45 degrees.

For the definition of azimuth and altitude see below:

Here is an example of what is expected from your API endpoints:

Request: POST 0.0.0.0:5000/detect_glare -d
```
{
        "lat": 49.2699648
        "lon": -123.1290368
        "epoch": 1588704959.321
        "orientation": -10.2
}
```
Response:
```
{
  "glare": "true",
}
```

Please feel free to use internet resources, stackoverflow, or any external API and Python libraries you see fit. Also, reach out to us if you need any clarification or have any questions.

Please send us your Python code. Also, share what are the limitations and conditions of your implementation.

Your answer will be evaluated based on:
- Understanding the problem
- Functionality of the code
- Structure, styling and documentation of the code
- Proper handling of the corner-cases and various invalid input parameters