



SCREENING TASKS- DATA SCIENCE INTERNSHIP

Task 1: Photovoltaic Cell Fault Detection:

Identify photovoltaic cell defects from a thermal video stream/images and point their location and provide any other information that might be a value add to the project.

Task 2: Image Segmentation and Crowd Density Estimator:

Find out how many people are there based on a set density based on the image segmentation result.

Task 3: Human Activity Recognition:

As the name suggests, identify and recognize human activity from a video source and classify it based on the activity thus performed

Task 4:

Use a pretrained ResNet 18 and train on the CityScapes (see download page of site for data) dataset for 15 epochs. Use discriminative learning and then measure its effect on your model's performance.

Resources:

1. ResNet18:
 - a. <https://pytorch.org/docs/stable/torchvision/models.html#torchvision.models.resnet18>
 - b. https://pytorch.org/tutorials/beginner/transfer_learning_tutorial.html
2. Discriminative learning:
 - a. <https://paperswithcode.com/method/discriminative-fine-tuning>
 - b. <https://blog.slavv.com/differential-learning-rates-59eff5209a4f>

Task 5:

Perform Sentiment analysis using DistilBERT on Yelp reviews - Full and apply the EDA augmentation. Report the performance metrics for before and after augmentation? show examples of data augmentation?

Resources:

1. Data:
 - a. <https://course.fast.ai/datasets>
2. Papers:
 - a. <https://arxiv.org/pdf/1910.01108.pdf>
 - b. <https://arxiv.org/pdf/1901.11196.pdf>
3. Hint:
 - a. Down sample the dataset based on your system requirements.



Alpha AI

Implementation:

- Create a logic to check for the various objects (you could stick to coco dataset).
 - Create an API for inference. Flask or FastAPI Recommended.
- Time allotted: 2 days (Maximum)

Submission Expectation:

The architecture design of a solution that also includes the following:

1. Representation of technical details.
2. An executable file for the solution or link to the Git repository that contains the code.
3. Properly documented Readme file so that the team can verify the code by re-creating the solution.

Key things to keep in mind:

1. The submission has to be in the form of a Jupyter Notebook along with any necessary data files or models.
2. The submitted files could be shared via a google drive link or by sharing a GitHub link for the same.
3. Feel free to refer to any online codes or references but, your submission shall be evaluated for plagiarism as well.
4. Time for the task is 2 days, and it starts as soon as you confirm that you have received the mail. We expect honesty and loyalty in this part.
5. No clarification shall be provided from our end, this task is quite crisp, clear and concise.
6. Once you've completed the task, kindly share the link to the submission folder or GitHub URL with hroperations@alphaai.biz

All the best for the task!