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Challenge

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Infilect Deep Learning Challenge

Problem Statement

Given a set of images captured in grocery stores(shelf image), and a set of close up images of products in those stores, your task is as follows.

1. For every product image, find the location of that product in all shelf images in which it appears.
2. For every shelf image, locate all products and assign the name from given set of product images.
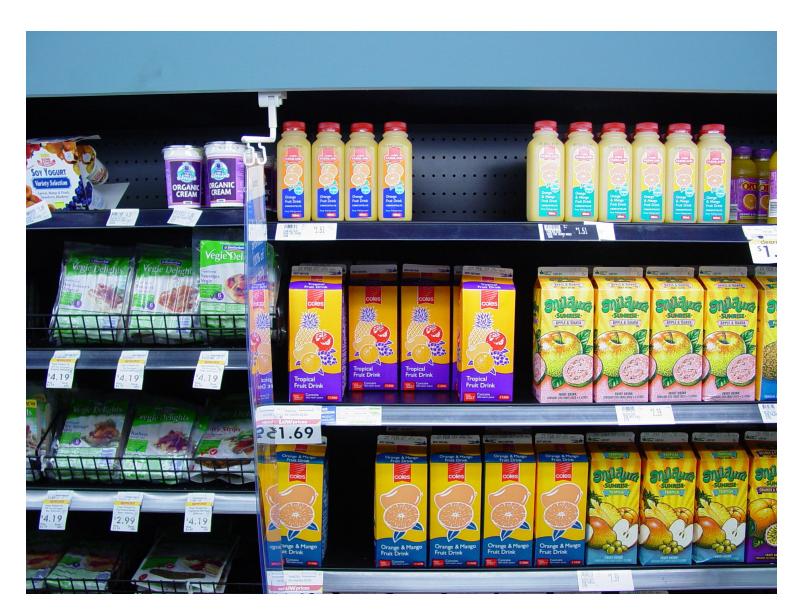
Additionally, you should also submit all the code files and a small description of your approach in a mail in order to validate your submission.
Note that these 2 problems are almost similar and solving one of them will help you solving the other one.

Dataset Description

That dataset is divided into 2 parts. Shelf images and product images.

Shelf images

These images are clicked in stores standing in front of shelves and with proper lighting conditions and product visibility.
Note that these images may contain various types of products with multiple copies of same products.
There are 3153 such shelf images. Each shelf image is named as db1.jpg, db2.jpg, db3.jpg ... db3153.jpg

Product images

These images are clicked by placing each product on the floor and taking a close up shot such that it clearly captures the entire product. You will find 3 images for each product each of which captures a different angle of the product.
There are total 300 such product images containing 100 unique products.
Each product image is named as qr1.jpg, qr2.jpg, qr3.jpg ... qr300.jpg

Download

You can get the dataset from one of the following sources.

1. Use this link download it from internet (2.2GB).
2. Ask for a local copy if download is taking too long.

Problem definitions and Submission

Problem 1

The following sample shows for a given input product image, and its corresponding shelf image, mark all the instances of the product. A given product image can be present in one or more shelf images, each of which might contain one or more instances of that product.
Your task is as follows.

- For each product image, find all the shelf image which contains that product.
- Find the location of the product in the shelf image.

The solution will be judged based on f1-score of solution and your submission.

Input Product Image	Corresponding Boxes on Shelf Image

To submit a solution to this problem you should create a txt file `solution_1.txt` in the following format

```
52, 1731, 1884, 954, 2190, 1419
53, 1731, 1884, 954, 2190, 1419
54, 1731, 1884, 954, 2190, 1419
....
52, 1739, 36, 1053, 315, 1515
53, 1739, 36, 1053, 315, 1515
54, 1739, 36, 1053, 315, 1515
```

Here, each line denotes a single box. First number of this line is the id of the product image, second number is the id of the shelf image. Next 4 numbers are box coordinates in form of x_min, y_min, x_max, y_max.
Each line should have exactly 6 numbers.
The solution will be judged based on f1-score of solution and your submission.

Problem 2

This problem is similar to problem 1 but instead of taking product image as input and giving shelf image as output, you will take shelf images as input and find all occurances of products that are present in the given set of 100 products. You might observe that all the visible products present in a shelf are not part of the given set of 100 products. Since we are only interested in those 100 products, you can choose to ignore the rest of the products in the shelf.

To submit a solution to this problem, you should create a txt file `solution_2.txt` in the following format.

```
1739, 52, 36, 1053, 315, 1515
1739, 53, 36, 1053, 315, 1515
1739, 54, 36, 1053, 315, 1515
....
1739, 136, 1546, 514, 1782, 814
1739, 137, 1546, 514, 1782, 814
1739, 138, 1546, 514, 1782, 814
```

Here, each line denotes a single box. First number of this line is the id of the shelf image and second number is the id of the product present in the crop. Next 4 numbers are box coordinates in form of x_min, y_min, x_max, y_max.
Each line should have exactly 6 numbers.
The solution will be judged based on f1-score of solution and your submission.

How to submit

DOs

- Make sure the name of your solution file follows `solution_n.txt` format where n is the id of problem
- Make sure you also attach the corresponding code files used to generate predictions
- Make neccessary assumptions wherever needed
- Please maintain coding standards

DON'Ts

- Attach huge model/embeddings/cache files

Deliverables

1. **Solution Files:** Txt files containing your solutions. Make sure you stick you naming and formatting mentioned in the problem descriptions.
2. **Code Files:** Attach all your code files used to generate the solution.
3. **Writeup:** A detailed explanation of your solution. It may also contain other approaches that you think will work for the problem and some comparison between the approaches. We would also suggest you to submit your best approach for solving all 4 problems even if you are not able to generate solutions for the problem.

Submit

You can choose to solve one or more problems mentioned above. To make a submission, email your zipped generated files as mentioned in the deliverables to vijay@infilect.com and tushar@infilect.com.

Points to ponder

- As you can see there are no labels provided with the dataset and only visual similarity can be used.
- Using a ML technique does not necessarily mean training a new model. Please feel free to use any pre-trained model for any task.
- If you are not able to solve a problem, we would appreciate if you submit you best approach to solve that problem instead of the solution.