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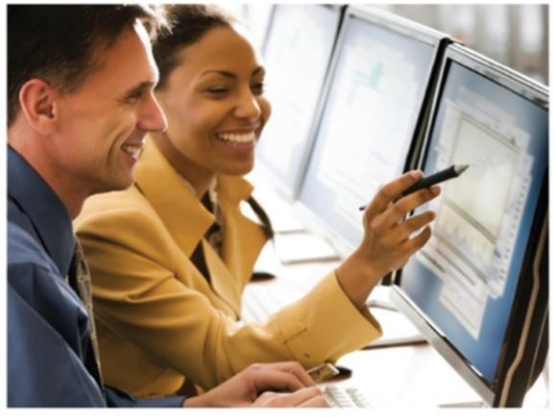
Exercises: Object Detection – Part 1

AUVSI Foundation: Computer Vision Training



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Detect Traffic Sign with Template Matching

Solution

```
>> templateMatchDetect
```

In this exercise, you will use template matching to detect a yield sign.

1. Load a scene which contains a yield sign.
   `>> load yield2`

2. Load the template images.
   `>> load templates`

3. Write a script that performs template matching on the image `yield2` using the template image `templateYield`.

4. Load a different scene which contains a yield sign.
   `>> load yield`
   Repeat step 3 with the loaded `yield` image. What is your observation?

5. **Optional 1:** Note the time taken to perform template matching. Try finding the region of interest (ROI) of the sign using blob analysis, and then use the ROI when performing template matching. How does this affect the execution time?

6. **Optional 2:** Try to detect the different traffic signs in the video `vipwarnsigns.avi` with multiple templates to turn this into a traffic sign recognition problem.

Detect Traffic Sign with Cascade Object Detection

In this exercise, you will use cascade object detection to find a traffic sign.

1. Load the positive instances.
```
>> load stopSigns
>> positiveInstances = data;
```

2. Add the folder corresponding to positive instances to the path.
```
>> positiveFolder = fullfile( ...
   matlabroot,'toolbox','vision', ...
   'visiondata','stopSignImages');
>> addpath(positiveFolder);
```

3. Specify the folder containing negative images.
```
>> negativeFolder = fullfile( ...
   matlabroot,'toolbox','vision', ...
   'visiondata','nonStopSigns');
```

5. Train a cascade object detector using the folders above.

6. Test the cascade object detector on an image containing a stop sign.
```
>> load stop
```

7. Try the cascade object detector on the `vipwarnsigns.avi` video. Notice that the cascade object detector has incorrectly detected the yield sign. The original negative images folder only had 5 images. Try using more negative images by selecting the provided folder `nonStopSignImagesLarge` as the location for the negative images.

Solution

```
>> cascadeObjectDetect
```

8. **Optional:** Try to detect the different traffic signs in the `vipwarnsigns.avi` video with multiple cascade object detectors to turn this into a traffic sign recognition problem.