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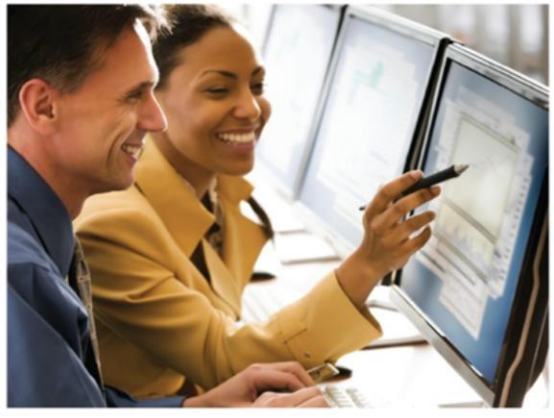
Exercises: Object Detection – Part 2

AUVSI Foundation: Computer Vision Training



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Foreground Detection of a Moving Ball

The `ballsGrayscale.avi` video shows two moving balls. In this exercise, you will segment the balls using a foreground detector and highlight the ball position using a bounding box.

1. Import and display the video `ballsGrayscale.avi`.

2. Create a `ForegroundDetector` object. You can start with the default values for the detector and later adjust name-value arguments to improve the detection. For example, try changing the `NumGaussians`, `MinimumBackgroundRatio`, and `InitialVariance` properties.

3. Use a `BlobAnalysis` object to find connected components and return their bounding boxes. You can also configure this object to discard small objects and to remove objects touching the border of the image.

Solution

```
>> detectForeground
```

Recognize Traffic Sign Text with Optical Character Recognition (OCR)

Solution

```
>> recognizeSignText
```

Use optical character recognition (OCR) to recognize text on a traffic sign. Since OCR depends heavily on preprocessing, we will focus on this to obtain accurate recognition.

1. Load the 50th frame of the `vipwarnsigns.avi` video.
   ```
   >> load stop50
   ```
2. Select the region of interest (ROI) corresponding to the text on the stop sign using the `imrect` function.
3. Use this ROI with OCR to recognize the text. Notice how tight the bounding box needs to be around the text. Choose a bounding box such that the white perimeter of the sign is not included.
4. Try to find the location of the text automatically. First, use blob analysis to find the location of the traffic sign and output a label matrix.
5. Use this label matrix to extract the exact pixels corresponding to the traffic sign blob. This will be the masked image.
6. Threshold the masked image to extract the text.
7. Perform morphological closing to merge the text into one blob.
8. Perform blob analysis on this blob to obtain the location of the text.
9. Perform OCR with the ROI obtained by this blob analysis.