The Full Images for Natural Knowledge Caltech Office DB
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We describe the image collection and labeling procedures of an office scene database. The office database is aimed at providing training and benchmarking tools for multiclass object detection in natural scenes. The described database is unique in the fact that high quality office images were collected following a protocol that (in theory) does not introduce a human bias in camera positioning and environment manipulation. 225 360deg office images all labeled with 14 objects are available. The objects are: LightSwitch, window, doorFrame, bookshelf, Monitor ,whiteboard, Keyboard, chairBack, Television, roundClock, Laptop, cabinet, PictureFrame and openShelf. The use of the office database is conditioned by a contribution to the labeling effort.

Notice that the office database (at http://www.vision.caltech.edu/fink/) should only be downloaded or used with explicit permission of Michael Fink (fink@huji.ac.il) or Pietro Perona (perona@vision.caltech.edu). Also notice that this database is not complete and that the attached code should be modified for working in your local directories.

The officeDB zip file contains:

1. **227 images of Caltech offices** (e.g. smalloffice001.jpg) + 2 Caltech labs. The following image collection protocol was followed:

    a. Offices (on Caltech campus) were visited (in a pseudorandom manner). After permission of the lab residence was achieved (explaining that we are collecting a database for scientific computer vision research, e.g. a robot visual navigation system), a tripod was positioned in the approximate center of each working space. The camera focus was at approximately 130cm above the floor level (simulating the perspective of our Evolution robotics robot or the perspective of a short sitting human).

    b. 14-22 pictures covering 360 deg were taken using a Canon G1 camera (vertically oriented). Exposure was manipulated to optimize object visibility. A remote control device was used to prevent camera movement during exposure. No modifications of the room configuration were done (e.g. no lights were turned on/off, chairs were not moved etc.).

    c. The resulting images were stitched using Canon Photostitch 3.1 software. Future data collection will probably use a single shot (facing the camera upward) and a commercial panoramic lens.

2. **labelGUI** is the matlab GUI used for labeling the data. This GUI presents the image and enables the following functions:

   a. Select a jpg file in the directory to be labeled
   b. Add a new object class (press addObj button)
      i. Type in the new object's name
      ii. Enter the number of key points required for labeling the object
   c. Select object class for current labeling (from the addObj list)
   d. Flip the 360 deg image by 180 degs to avoid splitting an object (rotate180deg)
   e. Zoom on object (dragging the left mouse)
   f. Click the appropriate number of key points. If a key point is occluded click on the estimated proper coordinates (left mouse click on Zoomed window). Press 4, 6, 8, 2 to move the last clicked key point left, right, up and down, respectively and 5 to undo the last click. Only if the full number of key points is clicked is the label data saved (upon continuation to the next labeling). Notice that the sequence of clicking should be fixed; usually starting on the top and proceeding clockwise assuming a frontal view and counter clockwise with a back view. This convention enables disambiguation of frontal/back pose.
   g. Proceed to the next image in the directory (next image)
   h. Select a new image to label in the current directory (new image)

3. **objLabel.mat** - a matlab mat file containing a structure with the labeled data. Use matlab's **load objLabel** to load the labels and object list.

   a. **objLabel** the labels struct. Each label has the following format:
      i. serial number of label starts at 0 (serial: 5899)
      ii. directory name (e.g. '/common/fink/OfficePanorama/Small/')
      iii. file name (fileName: 'smalloffice001.jpg')
      iv. undo flag: could be used for erasing wrong labels (undoFlag: 0)
      v. object class identity code (objCode: 5)
      vi. flag indicating whether the label was collected while the image was flipped by 180deg to avoid cutting an object (flip180: 0)
      vii. 2 corners of the object's bounding box (p1: [2x2 double])
      viii. the object's key points (p2: [4x2 double])
      ix. time and date of labeling (clock: [2003 10 13 14 41 39.3287])

b. **objNames & objNclicks**, names and number of required key point for all the objects in the following list. Rectangle objects clicking sequence starts on the top left and proceeds clockwise assuming a frontal view and counter clockwise with a back view. Non rectangle objects like chair backs and clocks start at the left most point going clockwise with a frontal view and at the right most side going counterclockwise for back views. Walls were no fully labeled and assume that a flood fill function is available for later processing.

Object name	objNclicks	Object name	objNclicks
'addObj'	-1	'wall'	1
'LightSwitch'	4	'window'	4
'doorFrame'	6	'bookShelf'	4
'Monitor'	4	'whiteBoard'	4
'Keyboard'	4	'chairBack'	4
'Television'	4	'roundClock	4
'Laptop'	6	'cabinet'	4
'PictureFrame'	4	'openShelf'	4

4. **OfficePanorama.xls** An Excel file describing the location and time images were taken

5. **dispClicks.m** a matlab file for displaying the labeled data