

% REGISTERED STEREO-CAMERA AND RANGE IMAGES

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The 98 high-resolution stereo camera and range images were obtained with a Nikon D700 digital camera, having a 20-mm fixed focus lens, mounted on a Riegl VZ-400 3D laser range scanner. The camera's gain was set to ISO 200, with apertures as small as possible to achieve appropriate exposure with maximum open-shutter duration of 10ms. The camera and laser scanner were mounted on a custom portable robotic gantry so that the nodal points of the camera and laser range scanner could be aligned, which eliminates half-occlusions. The sequence of image capture was as follows: (i) capture the first range image, (ii) translate parallel to earth vertical and perpendicular to the line of sight by 6.5 cm and capture the second range image, (iii) translate vertically to align the camera nodal point with that of the second range image and capture one of the camera images, (iv) translate back 6.5 cm and capture the other camera image. Each digital camera image was 4284 x 2844 pixels, with a bit depth of 14 bits per RGB color channel. Each pixel subtended about 0.02 deg. The camera was calibrated so that the images could be converted to 8-bit luminance images (camera spectral sensitivities are available on the current website). The range scanner provides accurate depth measurements (mm) over the range of approximately 2 m to 200 m (beam width expands 30 mm per 100 m). Images were captured from the typical eye-height of a six-foot male, 66 inches above the ground. Optical axes were approximately earth parallel and parallel to each other. The images available here were cropped to 35 x 20 deg of visual angle (1920 x 1080) to minimize the potential effects of camera lens distortions (e.g., barrel distortion). Some more details of the dataset are given below:

Luminance Images

/lImageNNN.png: 16 bit linear rgb raw camera responses

/lImageNNNV.png: 8 bit sRGB preview images produced by running makeSRGB.py

/lImageNNN.exif: exif data file on camera parameters

ColorMapping

The file makeSRGB.py has some python code for converting the images between useful color spaces (e.g. sRGB, and XYZ). This code depends on an iPython (<https://ipython.org/install.html>). Running 'python makeSRGB.py' in the directory containing the images should produce 8 bit, color and gamma corrected sRGB images that will look reasonable on screen.

Range Images

/lRangeNNN.mat: matlab formatted range data for analysis with two elements in the structure

1) 'rangeMap' is a WidthxHeightx3 tensor of XYZ positions

-X is into screen, +X is out of screen
-Y is left, +Y is right
-Z is down, +Z is up

2) 'rangeImg' is a WidthxHeight matrix of euclidean distances to the targets.

Note: i) pixels with a value of -1 indicate pixels for which there was no laser return (e.g. sky)

Projection Screen Geometry

Screen Width: 1.940m, 1920pix

Screen Height: 1.118m, 1080pix

Screen Distance: 3.0m

IOD: 65mm

Note: This implies that an in-image disparity of 0 is at a distance of 3m. There should be very few crossed disparities in the scene, as objects should (for the most part) be behind the projection plane.

Scenes With Obvious Object Motion / Registration Errors

16, 21, 25, 30, 31, 37, 43, 45, 48, 49, 56, 60, 65, 80, 83, 84, 85, 86, 94

Other Notes

We have been told that scene number 53 contains offensive graffiti in Japanese.